Rs.10

JIMA

Volume 67 (RNI) ♦ Number 11 ♦ NOVEMBER 2023 ♦ KOLKATA

JOURNAL *Of the* INDIAN MEDICAL ASSOCIATION

Official Publication of the Indian Medical Association

Indexed in

INDEX COPERNICUS INTERNATIONAL

Scopus®

Volume 121 (JIMA) ♦ Number 11 ♦ November 2023 ♦ KOLKATA

Dr ©

Largest Circulated Medical Journal in India

ISSN 0019-5847

94 TH YEAR OF PUBLICATION

Visit us at https://onlinejima.com

TEAM IMA (2022-24)


Chief Patron
Past President,WMA,MCI, IMA
Dr Ketan Desai


National President
(2022-23)
Dr Sharad Kumar Agarwal


Imm. Past National President
(2022-23)
Dr Sahajanand Prasad Singh


National President
(2023-24)
Dr R.V. Asokan


Hony. Secretary General
(2022-24)
Dr Anilkumar J Nayak


National Vice President
(2022-23)
Dr. Jayesh M Lele


National Vice President
(2022-23)
Dr Sachchidanand Kumar


National Vice President
(2022-23)
Dr Shailesh H Shah


National Vice President
(2022-23)
Dr Daggumati Shree Harirao


National Vice President
(2023-24)
Dr R Gunasekaran


National Vice President
(2023-24)
Dr. Suresh Gutta


National Vice President
(2023-24)
Dr Ashok Sharda


National Vice President
(2023-24)
Dr Shiv Kumar Utture


Hony. Finance Secretary
(2022-24)
Dr Shitij Bali


Hony. Joint Secretary
from NCR (2022-24)
Dr Munish Prabhakar


Hony. Joint Secretary
from National Capital
Region (2022-24)
Dr. Prakash Lalchandani


Hony. Joint Secretary
from rest of the country
(2022-24)
Dr. M. Venkatachalapathy


Hony. Joint Secretary
stationed at Calcutta
(2022-24)
Dr. Pradeep Kumar Nemani


Hony. Joint Secretary
nominated by National
President (2022-23)
Dr Anand Prakash


Hony.Jt Finance Secretary
from rest of the country
(2022-24)
Dr Mahendra Nath Thareja


Hony. Joint Finance Secretary
stationed at Calcutta
(2022-24)
Dr Sarbari Dutta

IMA College of General Practitioners


Hony. Asstt. Secretary
from NCR (2022-24)
Dr Thakur Padmanabhan


Hony. Asst. Secretary from
rest of the country (2022-24)
Dr Paramjit Singh Maan


Dean, IMA-CGP
(2022-23)
Dr Rayapu Ramesh Babu


Dean, IMA-CGP
(2023-24)
Dr Satyajit Borah


Vice Dean,IMA CGP
(2022-24)
Dr Poonam Singh


Hony. Secretary
IMA CGP (2022-24)
Dr. R Anburajan


Hony. Joint Secretary IMA CGP
from Tamilnadu (2022-24)
Dr M Thiraviam Mohan


Hony.Jt.Secy.,IMA CGP
from Tamilnadu (2022-24)
Dr D Senthil Kumar


Hony. Joint. Secy. IMA CGP from
rest of the country (2022-24)
Dr Satish joshi


Hony. Joint. Secy. IMA CGP from
rest of the country (2022-24)
Dr Sunil Bhikhabhai Chenwala


Hony. Joint. Secy.,\, IMA CGP
from rest of the country (2022-24)
Dr Yeshwant Vasantrao Gade


Hony.Joint.Secy. IMA CGP from
rest of the country (2022-24)
Dr Pavankumar N Patil

TEAM IMA (2022-24)

Journal of IMA


Hony. Editor-JIMA
(2022-23)
Dr Nandini Chatterjee


Hony. Editor-JIMA
(2023-24)
Dr Sanjoy Banerjee

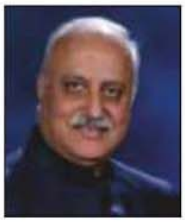

Hony. Associate Editor
JIMA (2022-24)
Dr Ranjan Bhattacharyya


Hony. Associate Editor
JIMA (2022-24)
Dr Prasanta Kr. Bhattacharyya


Hony. Secretary
JIMA (2022-24)
Dr Sibabrata Banerjee


Hony. Asstt. Secretary
JIMA (2022-24)
Dr Meenakshi Ganguly

IMA Academy of Medical Specialities


Chairman, IMA AMS
(2022-23)
Dr Pankaj Mutneja


Chairman, IMA AMS
(2023-24)
Dr Nomeeta Shiv Gupta


Vice Chairman, IMA-AMS
(2022-24)
Dr Nibedita Pani


Hony. Secretary, IMA-AMS
(2022-24)
Dr Srirang Abkari

IMA AKN Sinha Institute


Director
IMA-AKNSI (2022-23)
Dr G N Prabhakara


Director
IMA-AKNSI (2023-24)
Dr Ramneek Singh Bedi


Hony. Executive Secretary
IMA-AKNSI (2022-24)
Dr Sanjiv Ranjan Kr. Singh


Hony. Joint Secretary
IMA-AKNSI (2022-24)
Dr Deepak Kr. Singh


Hony. Joint Secretary
IMA-AKNSI (2022-24)
Dr Parul Vedgama

Your Health of IMA


Hony. Editor
Your Health (2022-24)
Dr Kakoli Sen Mandal


Hony. Associate Editor
Your Health (2022-24)
Dr Sankar Sen Gupta


Hony. Associate Editor
Your Health (2022-24)
Dr Bibartan Saha


Hony. Secretary
Your Health (2022-24)
Dr Samrendra Kumar Basu

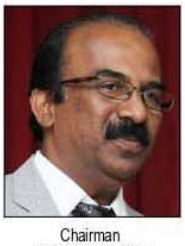
Apka Swasthya of IMA


Hony. Editor
Apka Swasthya (2022-24)
Dr Sudhir Singh


Hony. Associate Editor
Apka Swasthya (2022-24)
Dr Arun Kumar Tripathi


Hony. Secretary
Apka Swasthya (2022-24)
Dr Ritu Garg

IMA Hospital Board of India


Chairman
IMA HBI (2022-24)
Dr A K Ravikumar


Hony. Secretary.
IMA HBI (2022-24)
Dr Dinesh Bhujangrao Thakare


Treasurer IMA HBI
(2022-24)
Dr Rajeev Balkrishna Agarwal

JIMA COMMITTEE 2022-2024


Dr. Sharad Kumar Agarwal
National President, IMA
(2022-23)


Dr. R V Asokan
National President, IMA
(2023-24)


Dr. Anilkumar J Nayak
Hony Secretary General, IMA


Dr. Pradeep Kumar Nemani
Hony. Joint Secretary, Hqs


Dr. Sarbari Datta
Hony. Jt. Finance Secretary, Hqs


Prof (Dr) Nandini Chatterjee
Hony. Editor, JIMA
(2022-23)


Dr Sanjoy Banerjee
Hony. Editor, JIMA
(2023-24)


Dr Ranjan Bhattacharyya
Hony. Associate Editor,
JIMA


Dr Prasanta Kumar
Bhattacharyya
Hony. Associate Editor, JIMA


Dr. Sibabrata Banerjee
Hony. Secretary,
JIMA


Dr. Minakshi Gangopadhyay
Hony. Assistant Secretary,
JIMA


Prof (Dr) Tamonas Chaudhuri
Member, JIMA Committee


Dr Debraj Jash
Member, JIMA Committee


Dr Awadhesh Kumar Singh
Member, JIMA Committee


Dr Sekhar Chakraborty
Member, JIMA Committee


Dr. Prakash Chandra Mondal
Member, JIMA Committee

JIMA Editorial Advisory Board Members (National and International)

JOURNAL
Of the
INDIAN MEDICAL ASSOCIATION

Volume 121 (JIMA)
Number 11
November 2023
KOLKATA
ISSN 0019-5847

Contents

(Continued next page)

JOURNAL
Of the
INDIAN MEDICAL ASSOCIATION

Volume 121 (JIMA)
Number 11
November 2023
KOLKATA
ISSN 0019-5847

Contents

JIMA Guidelines for Authors

Communications intended for publication should be sent to the Editor, Journal of the Indian Medical Association (JIMA). JIMA will consider manuscripts prepared in accordance with the **Vancouver style**[1].

Articles are considered for publication on condition that these are contributed solely to JIMA, that they have not been published previously in print and are not under consideration by another pub-lication. In the selection of papers and in regard to priority of publica-tion, the opinion of the Editor will be final. The Editor shall have the right to edit, condense, alter, rearrange or rewrite approved articles, before publication without reference to the authors concerned.

Authorship : All persons designated as authors should **qualify for authorship.** Authorship credit should be based only on **significant contributions** to (a) conception and design, or analysisand interpretation of data; and to (b) drafting the article or revising it critically for important intellectual content; and on (c) final ap-proval of the version to be published. **Conditions (a), (b) and (c) must all be met.** Authors may include explanation of each author'scontribution separately.

Title page — The title page should include the title of the articlewhich should be concise but informative, name(s) of author(s) with his/her (their) academic qualification(s) and designation(s). Declaration-regarding no conflict of interest and complete postal address including pin code of the institution(s) to which the work should be attributed. Mobile no. and email of all authors to be mentioned.

Abstract — Should carry an abstract of no morethan 250 words and should contain the purposes of the study or investigations, basic procedure, main findings and their implications along with **Key words and Take home message (4-5 lines).**

Text — The text of Original Articles should conform to theconventional division of Abstract, Introduction, Material and Method, Observations, Discussion, Conclusion and References. Other types of articles such as Practitioners' Series, Case Reports, Current Topics, etc, are likely to need other formats.

Statistical evaluation — Description of the statistical methodsused should either be given in detail in the "Material and Method" section of the article or supportive reference may be cited.

Abbreviations — Standard abbreviations should **be used and be spelt out when first used in the text.** Abbreviations should not beused in the title or abstract.

Units of measurement — Metric units should be used in scientific contributions. If the conventional units or SI units were actually followed in measurements that should be given in parentheses.

Drugs — The **generic names of the drugs (and not proprietary names)** including dose(s), route(s) and period of administration should be mentioned.

Length of manuscripts — For Originals Articles : Maximum 2200 words, 3 figures, and/or 4 tables, for Case Reports: Maximum 800 words, 2 figures, 1 table, for Letter to the Editor: upto 500 words.

Tables— Tables should be simple, self-explanatory and should supplement and not duplicate the information given in the text.

Illustrations — Graphs, charts, diagrams or pen drawings must be drawn by professional hands. Photographs should be supplied in resolution minimum 350 dpi and 5 inch wide. In case of microphotograph, stains used and magnification should be **mentioned.** Each illustration should have a minimum resolution of 350 dpi with proper labelling. All illustrations should be with suitable legends.

References — References should be **numbered in the order in which they are first mentioned in the text.** The full list of references at the end of the communication should be arranged in the order mentioned below (names and initials of all authors and/or editors up to 6; if more than 6, list the first 6 followed by *et al*):

[1]International Committee of Medical Journal Editors—Uniform Requirements for Manuscripts Submitted to Biomedical Journals. *JAMA* 1997; **277:** 927-34.

Reference from Journal :

[1]Cogo A, Lensing AWA, Koopman MMW, Piovella F, Sivagusa S, Wells PS, *et al* —Compression ultrasonography for diagnostic management of patients with clinically suspected deep vein throm-bosis: prospective cohort study. *BMJ* 1998; **316:** 17-20.

Reference from Book :

[2]Handin RI — Bleeding and thrombosis. In: Wilson JD, Braunwald E, Isselbacher KJ, Petersdorf RG, Martin JB, Fauci AS, *et al* editors—Harrison's Principles of Internal Medicine. Vol 1. 12th ed. New York: Mc Graw Hill Inc, 1991: 348-53.

Reference from Electronic Media :

[3]National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/ theme_health/ HSQ 20.pdf (accessed Jan 24, 2005): 7-18.

Only verified references against the original documents should be cited. Authors are responsible for the accuracy and com-pleteness of their references and for correct text citation. **The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.**

Dual publication : If material in a submitted article has beenpublished previously or is to appear in part or whole in another publication, the Editor must be informed.

Forwarding letter : The covering letter accompanying the articleshould contain the name, complete postal address along with Mobile number & E-mail identity of one author as correspondent and must be digitally signed by all authors. The correspondent author should notify change of address, if any, in time.

Declaration : A declaration should be submitted stating that themanuscript represents valid work and that neither this manuscript nor one with substantially similar content under the present authorship has been published or is being considered for publication elsewhere and the authorship of this article will not be contested by anyone whose name (s) is/are not listed here, and that **the order of authorshipas placed in the manuscript is final and accepted by the co-authors.** Declarations should be signed by all the authors in the orderin which they are mentioned in the original manuscript also **Ethical clearance letter to be send.**

- **Manuscript in Vancouver style in MS Word.**
- **Original / Review article:**
  Max 2200 words, 3 Figures, 4 Tables, 20 References.
- **Case report / Current topics:**
  Max 800 words, 2 Figures, 1 Table, 10 References.
- **Letter to the Editor : 500 words**
- **Abstract :**
  Max 250 words, Keywords – 4-5 words,
  Take Home Message – Max 50 words.
- **Title Page:**
  Title of the article, Name (s) of the Author (s), Qualification, Designation, Institution, Postal Address, Email, Mobile Number & Digital Signature
- **Declaration:**
  Article is not published / submitted in any other journal.

— Hony Editor

JIMA, 53, Sir Nilratan Sirkar Sarani (Creek Row), Kolkata-700014
Phone : (033) 2237-8092,
E-mail : <jima1930@rediffmail.com> <jimaeditorial@gmail.com>
Editorial Office No.: (033) 2237-8092/ (+91) 9477493027
Website: https://onlinejima.com

Editorial

Challenges in Tropical Infections

— Nandini Chatterjee
MD, FRCP (Glasgow), FICP
Professor, Department of Medicine,
IPGME&R and SSKM Hospital, Kolkata 700020 and
Hony Editor, JIMA

The Indian subcontinent represents one of the largest tropical and subtropical regions, which is the seat of multifarious infections causing acute febrile illnesses. Nearly 15 million people die every year because of tropical infections and parasitic diseases. The predisposing factors are many – notably, hot &humid climate with less seasonal variation in temperatures, higher rainfall, Poor living condition, higher population with limited resources and greater coverage of land by vegetation.

It could be expected that with the advancement of medical science, the infectious diseases would have taken a back seat by now. However contrary to popular belief, tropical infections continue to thrive and physicians are facing many new challenges with the passage of time.

Changing epidemiology :

The newchallenge facing humanity is the spread of tropical infections to temperate zones.

This is the resultant from increasing migration, international air travel, tourism and work visits to the tropical regions from the West. As a result, Chikungunya Virus (CHIKV) cases that have been reported in Italy and France throughout the past years while ZIKA virus infections are being diagnosed in the United states.

Moreover, urbanization and deforestation coupled with climatic alterations have an impact by influencing the geographical and temporal distribution of arthropods and/or reservoir hosts. This affects the transmission chains and leads to the emergence of new epidemics in non endemic zones.

Increase in ambient temperature and prolongation of monsoon months lead to survival of mosquito vectors for a longer period in hilly regions that used to have extreme climates in the past.

Changing Clinical spectrum :

The clinical presentation of most infections are undergoing a sea change. Atypical manifestations are being seen in common acute febrile illnesses like malaria, dengue, scrub typhus, leptospirosis and enteric fevers. More asymptomatic and subclinical infections are having an enhancing effect on transmission dynamics .

Common trends indicate an increase in severe disease manifestations like Expanded Dengue Syndromes (EDS), complicated Vivax malaria infection, AES due to Scrub typhus, JE and enteric fever as well as fulminant Hepatic Failure in Leptospirosis and Hepatitis A & E.

The changes in clinical profile are being attributed to genetic changes in the organisms or the presence of non-neutralizing antibodies that cross react and lead to Antibody Dependant immune Enhancements (ADE)

Coinfections :

Also baffling the physicians are overlapping and nonspecific symptoms in different infections as well as Mixed Infections or Coinfections.

In India, certain geographic regions witness simultaneous outbreaks of two or more diseases like scrub typhus, dengue fever, malaria, leptospirosis and chikungunya during monsoon and post-monsoon period.

In published literature various permutation and combination of infections have been reported.

The most common coinfection found are scrub typhus and dengue, Scrub typhus and leptospirosis, Dengue and chikungunya .Evensimultaneous Scrub typhus, dengue and vivax malaria together were detected in some series. Malaria- dengue – chikungunya combinations are also common.

Himachal Pradesh, Uttarakhand, Central India, Puducherry have all documented serious mixed infections.

Mixed infections are responsible for diagnostic conundrums with prolonged disease courses and increased morbidity.

Diagnostic challenges :

Acute undifferentiated fevers pose great dilemmas for physicians because of the non-specific similar and overlapping symptomatology in various infections.

A greater problem is the short window of detection after clinical symptom onset due to the short viremic phase in case of arboviruses.So antigen detection assays by ELISA, though a definitive test, has time constraints.

Serology is the next tool at our disposal but serology-based differential diagnosis is complicated by cross reactivity by other organisms (scrub typhus, dengue and salmonella) or by previous infections of separate strains eg, dengue virus

In endemic zones, high baseline titres are also a deterrent to accurate diagnosis as in enteric fever.

Apart from the diagnostic challenge, patterns of cross-reactivity are also important because cross-reactive pre-existing heterotypic arbovirus antibodies of a previous infection can lead to an enhanced immune reaction via Antibody Dependent Enhancement (ADE), as seen between different DENV serotypes. This was recently demonstrated in the Zika virus epidemic demonstrating elevated risk of DENV severe disease by either a prior ZIKV or DENV infection or both.

Thus the desirable diagnostic modalities are culture of the organism or Genome detection by PCR technology. The differentiation of cross reactivity and serological dual positivity requires molecular diagnostic tests. But in low resource countries like ours there is scarcity and poor accessibility of sophisticated facilities.

Culture of organisms also suffers from limitations, as it is time consuming, yield is often unsatisfactory and affected by prior empirical therapy, which is rampant in the Indian subcontinent.

Therapeutic challenges :

The therapy of tropical infections too have many impediments.

Firstly arboviral infections rely on supportive therapy as there are no specific drugs for them.

Moreover, for other infections development of drug Resistance is a scourge with far reaching consequences.

Many factors have contributed to that, the foremost of which is empirical therapy. In rural or under developed set ups sometimes empiric therapy is inevitable but there should be some guideline oralgorithm for empiric therapy.

Other reasons for resistance are use of improper dosing, under or overuse of drugs and over the counter purchase of Medicine and their application.

Preventive Challenges :

The basic and most important intervention in preventing infectious diseases is to improve the quality of water, sanitation and hygiene (WASH). Unfortunately handwashing facilities are available to 87.5 per cent of our population. Population density and overcrowding are the mainhurdles in ensuring adequate sanitation .

Availability of vaccines is another major issue .Most of the infections either do not have vaccines or the vaccines are not up to the mark in efficacy and safety. Large field efficacy trials are the need of the hour but cost and logistic difficulties need to be surmounted. Vaccination also entails availability of storage and cold chain space, workforce allotment, training of frontline health workers.

Thus it is evident that tropical infections have multifaceted problems and tackling them requires meticulous clinical, infrastructural and therapeutic strategies. We need to develop disease burden extrapolation models through surveillance data to choose the sites that need to be prioritized for routine intervention and this requires long-term financial and administrative commitments.

In this issue we are publishing a case report of a patient presenting with icterus who was diagnosed to have a co infection of Dengue and Leptospirosis. The co infection led to the prolongation of the illness with enhanced severity. Also this case emphasizes the fact that exclusion of all the possibilities by testing is necessary as there is an overlap of signs and symptoms in tropical diseases.

Coinfections are a significant public health issue in tropical countries. These scenarios need to be reported more often and studies should be designed for evaluation of clinical atypia and patient outcomes and also to explore the extent of cross reactivity between various pathogens in tropical regions.

Further Readings

1 Yeolekar ME— Tropical infections: Clinical implications. *J Assoc Physicians India* 2018; **66:** 68-9.

2 Shelke YP, Deotale VS, Maraskolhe DL — Spectrum of infections in acute febrile illness in central India. *Indian J Med Microbiol* 2017; **35:** 480-4.

3 Morch K, Manoharan A, Chandy S, Chacko N, Alvarez-Uria G, Patil S, *et al*— Acute undifferentiated fever in India: a multicentre study of aetiology and diagnostic accuracy. *BMC Infect Dis* 2017; **17:** 665.

4 Salam M, Mustafa S, Hafiz A, Chaudhary AA, Deeba F, Parveen S — Global prevalence and distribution of coinfection of malaria, dengue and chikungunya : a systematic review. *BMC Public Health* 2018; **18:** 710.

5 Raina S, Raina RK, Agarwala N, Raina SK, Sharma R — Co-infections as an aetiology of acute undifferentiated febrile illness among adult patients in the Sub Himalayan region of North India. *J Vector Borne Dis* 2018; **55:**130-6.

6 Ahmed S, Dhar M, Mittal G, Bhat NK, Shirazi N, Kalra V, *et al* — A comparative hospital based observational study of mono and coinfections of malaria, dengue virus and scrub typhus causing acute undifferentiated fever. *Eur J Clin Microbiol Infect Dis* 2016; **35:** 705 11.

7 Basheer A, Iqbal N, Mookkappan S, Anitha P, Nair S, Kanungo R, Kandasamy R — Clinical and laboratory characteristics of dengue-orientia tsutsugamushi co-infection from a tertiary care center in south india. *Mediterr J Hematol Infect Dis* 2016; **8:** e2016028

8 Borkakoty B, Jakharia A, Biswas D, Mahanta J — Co-infection of scrub typhus and leptospirosis in patients with pyrexia of unknown origin in Longding district of Arunachal Pradesh in 2013. *Indian J Med Microbiol* 2016; **34:** 88-91.

9 Sivamani K, Dhir V, Singh S, Sharma A— Diagnostic dilemma—dengue or Japanese encephalitis? *Neurol India* 2017; **65:**105-7.

10 Gupta N, Chaudhry R, Mirdha B, Das B, Dar L, Kabra S, etal. Scrub Typhus and Leptospirosis: The fallacy of Diagnosing with IgM Enzyme Linked Immunosorbant Assay. *J Microb Biochem Technol* 2016; 8.

Original Article

Study of Thyroid Dysfunction in Metabolic Syndrome Patients

Omkumar Bharatbhai Patel[1], Hemant M Shah[2], Harshil J Gosalia[3], Nilesh M Doctor[4]

Background : The "Metabolic Syndrome" is the combination of metabolic abnormalities in which people are Obese and Hypertensive with high triglyceride levels, decreased high-density lipoproteins and abnormal fasting glucose levels. Dysfunction of thyroid gland may be related to different components of Metabolic Syndrome like obesity, insulin resistance, lipid and glucose metabolism irregularities, Cardiovascular dysfunction and raised BP. Thus on correcting the thyroid abnormality at an earlier stage, adverse effects of Metabolic Syndrome can be brought down.

Materials and Methods : This is a randomized cross sectional study enrolling total 54 OPD and indoor patients having Metabolic Syndrome in our Tertiary Care Hospital of South Gujarat. Pretested proforma was used to collect data after taking informed consent. Patient's data including clinical examinations, physical examination and relevant investigations like Lipid profile, FBS, S.T3,T4,TSH were collected. Final analysis has been done with the help of IBP SPSS version 22.

Results : In our study, 8 patients were having Thyroid Dysfunction, out of which 4 patients (50%) fulfilled all 5 criterias of Metabolic Syndrome. This study clearly shows that the association of Thyroid Dysfunction in Metabolic Syndrome patients was higher than that of normal population. This finding indicates a need to investigate the presence of Thyroid Dysfunction in management of Metabolic Syndrome patients.

Conclusion : There is possible correlation between Thyroid Dysfunction and Metabolic Syndrome. If we consider evaluation of Thyroid function in each Metabolic Syndrome patient, the early diagnosis and treatment will help to modify course of disease.

[*J Indian Med Assoc* 2023; **121(11):** 14-7]

Key words **: Thyroid Dysfunction, Metabolic Syndrome.**

The "Metabolic Syndrome" also called "deadly quartet" and "syndrome X", is the combination of metabolic abnormalities in which people are Obese and Hypertensive with high triglyceride levels, decreased high-density lipoproteins and abnormal fasting glucose levels[1,2]. People with Metabolic Syndrome are at increased risk for developing cardiovascular disease like myocardial infarction and stroke[3]. Insulin resistance is invented to be the main underlying pathophysiological phenomenon[4]. Thyroid disease is often associated with atherosclerotic diseases (commonly cardiovascular disease)[5,6]. Most of the organs of body are influenced by thyroid hormones in a sense that this hormone accelerates metabolic process and it may be associated with Metabolic Syndrome. Dysfunction of thyroid gland may be related to different components of Metabolic Syndrome like obesity, insulin resistance, lipid and glucose metabolism irregularities, cardiovascular dysfunction and raised BP[7]. This study is an effort to evaluate association between Thyroid Dysfunction and Metabolic Syndrome.

Editor's Comment :

- There is possible correlation between thyroid dysfunction and metabolic syndrome. If we consider evaluation of thyroid function in each metabolic syndrome patient, the early diagnosis and treatment will help to modify course of disease.

Aims and Objectives

To discover the association between Thyroid Dysfunction and Metabolic Syndrome and to discover the type of Thyroid Dysfunction in Metabolic Syndrome.

Materials and Methods

The study was done at Surat Municipal Institute of Medical Education and Research (SMIMER) Hospital, Surat, Gujarat, from year July, 2020 to November, 2021. It was randomized cross sectional study enrolling total 54 OPD and indoor patients having Metabolic Syndrome.

Patients aged >18 years, who satisfied the criteria of Metabolic Syndrome by ATP III ie, any three of the

Department of General Medicine, SMIMER Hospital & Medical College, Gujarat 395010

[1]MD (General Medicine), Second Year Resident

[2]MD (General Medicine), Assistant Professor and Corresponding Author

[3]MBBS, Third year Resident

[4]MD (General Medicine), Professor

Received on : 01/11/2022

Accepted on : 27/01/2023

five [Central obesity: waist circumference ≥102cm or 40 inches (male), ≥88cm or 36 inches (female); Dyslipidemia : TG ≥1.7 mmol/L (150 mg/dl); Dyslipidemia : HDL-C < 40 mg/dl (male), <50 mg/dl (female);Blood pressure ≥130/85 mm Hg; Fasting plasma glucose ≥6.1 mmol/L (110 mg/dl)]; patient willing for admission and willing to participate in study and all patient giving informed written consent for study were included in the study.

Patients taking drugs that alter thyroid levels (eg, Iodine, Amiodarone, Anti-neoplastic agents, Systemic steroids, Phenytoin, Furosemide, Heparin); diagnosed case of hypothyroidism or sub-clinical hypothyroidism or hyperthyroidism; individual less than 18 years of age and not willing to participate in study were excluded.

Approval for this study was taken in Institutional Ethical Committee. Informed written consent of all the participants were taken. All necessary confidentiality of participants were maintained.

Patient's data including age and sex, medical history including family history, risks factors, clinical examinations, physical examination and relevant investigations were included as part of the methodology. Blood investigation including CBC, RFT, Lipid profile, Liver function test including S Bilirubin, SGOT/SGPT, Total protein, S. ALP, S. T3,T4,TSH and Urine routine microbiological examination were done.

Data entry and statistical analysis was performed with the help of IBP SPSS version 22. Statistical analysis was done by appropriate statistical method.

Result

This study was piloted in 54 cases of Metabolic Syndrome who were admitted in our Tertiary Care Hospital. All cases met inclusion criteria. The observations made in this study are debated here (Table 1).

In the present study, majority patients were from age group of 51-60 years 15 (27.77%) followed by 21-30 years 14 (25.93%), 31-40 years 14 (25.93%) and 41-50 years 11 (20.37%) respectively. The mean and Standard Deviation for age in the participants were 40.68 ± 11.14 years respectively (Table 2).

Table 1 — *Agewise Distribution of Patients*

Age (Years)	No of Patients
21-30	14 (25.93%)
31-40	14 (25.93%)
41-50	11 (20.37%)
51-60	15 (27.77%)
Total	54 (100%)
Mean Age (Years)	40.68 ± 11.14

In the view of gender wise distribution, there were more number of females 30 (55.56%) as compared to males 24 (44.44%). The male: female ratio was 0.8:1 (Table 3, Fig 1).

In this study, Thyroid Dysfunction was 14.81% prevalent in Metabolic Syndrome patients. Among these, subclinical Hypothyroidism was highly prevalent (9.26%). Hypothyroidism was seen in 3.70% patients with Metabolic Syndrome. Prevalence of subclinical Hyperthyroidism was 1.85% prevalent. No overt Hyperthyroidism patients in our study (Table 4).

In the present study, 13 patients were between the age of 20-29 years, out of which 1 was Hypothyroid, 1 was subclinical Hypothyroid and rest were euthyroid. 13 patients were between the age of 30-39 years, out of which 3 were Subclinical Hypothyroid, 1 was subclinical Hyperthyroid and rest were euthyroid. All 12 patients between the age of 40-49 years were euthyroid. 16 patients were between the age of 50-59 years, out of which 1 hypothyroid, 1 subclinical hypothyroid and rest were euthyroid (Table 5, Fig 2).

In the present study, total 17 patients were fulfilling 3 criteria and 17 patients were fulfilling 4 criteria of Metabolic Syndrome, out of which, 15 were euthyroid and 2 were having Thyroid Dysfunction in each group. Rest 20 patients were fulfilling all five criteria of Metabolic Syndrome, out of which 4 were having thyroid

Table 2 — Genderwise Distribution of Patients

Gender	No of Patients
Male	24(44.44%)
Female	30(55.56%)

Table 3 — *Distribution of Patients According to Thyroid Dysfunction*

Category	No of Patients	%	Male	Female
Euthyroid	46	85.19%	23	23
Hypothyroid	2	3.70%	1	1
Subclinicalhy pothyroidism	5	9.26%	0	5
Subclinicalhy perthyroidism	1	1.85%	0	1
Hyperthyroidism	0	0	0	0

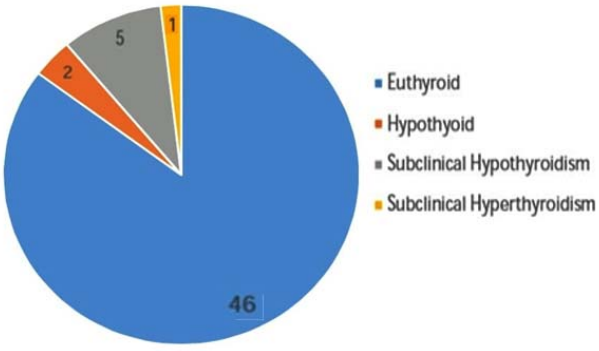


Fig 1 — Distribution of Patients According to Thyroid Dysfunction

Table 4 — *Agewise Thyroid Dysfunction*

Age	Total no	Euthyroid	Hypothyroid	Subclinical hypothyroid	Subclinical hyperthyroid
20-29	13	11	1	1	0
30-39	13	9	0	3	1
40-49	12	12	0	0	0
50-59	16	14	1	1	0

Table 5 — *Metabolic Syndrome Parameterswise Thyroid Dysfunction*

Metabolic Syndrome Criteria Fulfilled	Total no	Eu-thyroid	Hypo-thyroid	Subclinical hypothyroid	Subclinical hyperthyroid
3	17	15	1	1	0
4	17	15	0	1	1
5	20	16	1	3	0

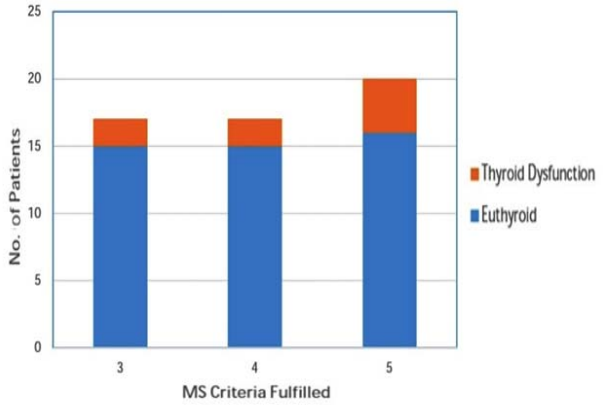


Fig 2 — Metabolic Syndrome Parameters Wise Thyroid Dysfunction

Dysfunction. As considerable number of patients were only in Euthyroid group (46) and sub-clinical Hypothyroid group (5), further statistical analysis was done between these 2 groups only (Table 6).

In the present study, all MS parameters were analysed between Euthyroid and sub clinical hypothyroid groups. Mean, SD and p value of each of them were obtained. P value of each parameter was >0.05 (statistically insignificant). As there was small number of patients with very high variants, statistically significant result was not established.

Table 6 — *Metabolic Syndrome Parameterwise Comparison between Euthyroid and Sub Clinical Hypothyroid*

Metabolic Syndrome parameter	Euthyroid		Sub Clinical hypothyroid		P Value
	Mean	SD	Mean	SD	
WC	96.72	8.79	95.60	4.77	0.78
SBP	137.30	9.75	144.40	12.99	0.14
DBP	88.83	5.62	92.00	7.07	0.25
FBS	122.83	19.68	114.80	26.48	0.41
HDL	41.09	8.28	45.20	4.09	0.28
TGL	158.30	13.66	165.80	14.18	0.25

Discussion

The Metabolic Syndrome is a group of metabolic abnormalities in which there is weight gain, Raised BP, high triglyceride level, low high-density lipoprotein cholesterol and abnormal fasting glucose levels. Patients with metabolic syndrome are having high chances of developing cardiovascular abnormalities and Type 2 Diabetes in the future. Hypothyroid patients are also having lipid abnormalities like high triglycerides and low high-density lipoproteins with weight gain, glucose intolerance and Hypertension[8]. Thus, hypothyroidism imitates the parameters of Metabolic Syndrome. Therefore, Thyroid Dysfunction is commonly seen in patients with metabolic syndrome.

In the present study, mean age was 40.6±11.1, which is comparable to other studies. In our study, females predominated males, which is comparable to all other studies. In this study, Thyroid Dysfunction was found in 14.81% among Metabolic Syndrome patients. Prevalence of overt Hypothyroidism was 3.7% and sub clinical Hypothyroidism was 9.26% in Metabolic Syndrome patients (total hypothyroidism prevalence was 12.96%). This study result is consistent with study done by Uzunulu, *et al*[9], as 16.4% of Metabolic Syndrome patients had Hypothyroidism.

According to Unnikrishnan AG, *et al*[10], prevalence of hypothyroidism in normal population was 10.95%, which is lower than prevalence in Metabolic Syndrome patients.

In our study, sub-clinical hypothyroidism was highly prevalent (9.26%) and subclinical hyperthyroidism was least prevalent (1.85%). These findings were consistent with the other studies.

According to studies done by Meier C, *et al* and Nadia C, *et al*, risk reduction of Cardiovascular mortality of 9-31% was possible by decreasing low-density lipoprotein cholesterol in sub clinical hypothyroidism patients treated with levothyroxine therapy[11,12]. Surks, *et al* also commends treating sub-clinical Hypothyroidism associated with Type 2 Diabetes and Hypertension[13]. As the metabolic syndrome patients have dyslipidemia, diabetes mellitus, hypertension and increased cardiovascular risk, it seems important to manage metabolic syndrome patients with sub clinical hypothyroidism by levothyroxine replacement therapy. Inadvertent over treatment occurred in 14-21% of Metabolic Syndrome patients treated with levothyroxine[14,15]. Probable risk of Osteoporosis and atrial fibrillation were present when serum TSH falls below 0.1 mU/L. These patients should be frequently evaluated for Thyroid function to avoid these complications. This study shows prevalence of Thyroid

Dysfunction was greater in Metabolic Syndrome patients than in normal population. This finding point towards the need for investigating the presence of Thyroid Dysfunction while managing Metabolic Syndrome patients. As described above, managing Hypothyroidism in Metabolic Syndrome patients was worthwhile by improving the metabolic parameters and sinking the Cardiovascular risk.

Conclusion

Study results indicates possible correlation between Thyroid Dysfunction and Metabolic Syndrome. This data will help the practitioner in their routine clinical practice for developing better management strategies in Metabolic Syndrome patients. If we consider evaluation of thyroid function in each metabolic syndrome patient, the early diagnosis and treatment will help to modify course of disease. However, prospective study in future correlating management of Thyroid Dysfunction and its implication in course of Metabolic Syndrome disease will be more conclusive.

References

1 Reaven GM — Insulin resistance, cardiovascular disease and metabolic syndrome. *Diabetes Care* 2004; **27:** 1011-12.
2 Reaven GM — Banting Lecture 1988. Role of insulin resistance in human disease. *Diabetes* 1988; **37:** 1595-607.
3 Grundy GM — obesity, metabolic syndrome and cardiovascular diseases. *Jclin Endocrinal Metab* 2004; **89:** 2595-600.
4 Zimmet PZ — The metabolic syndrome. *Lancet* 2005; **365:** 1415-28.
5 Duntas LH — Thyroid disease and lipids. *Thyroid* 2002; **12:** 287-93.
6 Klein I — thyroid hormones and cardiovascular system. *N Engl J med* 1976; **344:** 501-9.
7 Deshmukh V — Thyroid dysfunction in patients with metabolic syndrome: A cross sectional, epidemiological, Pan-India Study. International Journal of Endocrinology Vol 2018; Article ID 2930251, 6pages.
8 Gupta V — Current medical management of obesity; Williams endocrinology; 10th edition; p-445-56.
9 Uzunlulu M, Yorulmaz E, Oguz A — Prevalance of subclinical hypothyroidism in patients with metabolic syndrome. *Endocr J* 2007; **54:** 71-6.
10 Unnikrishnan AG, Kalra S, Sahay RK, Bantwal G, John M, Tewari N — Prevalence of hypothyroidism in adults: An epidemiological study in eight cities of India. *Indian J Endocrinol Metab* 2013; **17(4):** 647-52. doi:10.4103/2230-8210.113755.
11 Meier C — TSH controlled L-thyroxine therapy reduces cholesterol levels and clinical symptoms in hypothyroidism. *J Clin Endocrinol Metab* 2001; **86:** 4860-6.
12 Nadia C — Lipoprotein profile in Subclinical hypothyroidism: response to levothyroxine therapy. *J Clin Endocrinol Metab* 2002; **87:** 1533-8.
13 Surks MI — Subclinical Thyroid Disease: Clinical applications. *JAMA* 2004; **291:** 239-43.
14 Parle JV — Thyroxine prescription in the community. *Br J Gen Pract* 1993; **43:** 107-9.
15 Ross DS — The use and limitation of thyrotropin assay as a single thyroid function test. *J ClinEndocrinol Metab* 1990; **71:** 764-9.

Original Article

A Hospital based Cross-sectional Study Measuring the Psychological Comorbidities Associated with Alopecia Areata in Indian Patients

Sujata Sengupta[1], Aparajita Ghosh[2], Punam De[3], Prasun Kumar Ghosh[4], Sayantan Nandi[3]

Background : Alopecia Areata (AA) is an autoimmune disease resulting in recurrent, patchy hair-loss that has a significant impact on the lives of the patients. Most of the studies attempting to measure the psychological impact of this disease have focussed on the assessment of quality of life. These studies however have not assessed the anxiety and depression that often coexist with this disease. Anxiety and depression may not only be the result of the disease but might also induce or aggravate AA. There is lack of studies evaluating anxiety and depression in Indian patients suffering from the disease. This study was carried out to address this lacuna.

Aims and Objectives : Measuring the anxiety and depression in patients attending the OPD with alopecia areata and comparing the same with individuals without any associated alopecia.

Study Design : This is a cross-sectional, comparative study conducted in the dermatology OPD of a Tertiary Care Hospital in Eastern India.

Materials and Methods : Forty-four consecutive patients suffering from AA attending the OPD between September, 2019 and March, 2022 were included in the study group. Forty-four age and sex matched individuals attending the OPD without any associated alopecia were included in the control group. The anxiety and depression in both sets of patients were assessed using the Hospital Anxiety Depression Scale and compared using paired 'T' test.

Results : The scores for both anxiety and depression were significantly higher in the study group as compared to the control group.

Conclusion : The psychiatric syndromes of anxiety and depression are more common in patients with AA.

[*J Indian Med Assoc* 2023; **121(11):** 18-21]

Key words **: Alopecia Areata, Anxiety, Depression.**

Alopecia Areata (AA) is a condition which results in immune mediated loss of hair leading to development of patches completely devoid of hair. Any hair bearing area may be affected, however involvement of the scalp, beard, eyebrows or eyelashes often leads to significant distress and feelings of social rejection due to the striking presentation. Regrowth of hair often occurs on its own or with treatment but such regrowth may be temporary with frequent relapses. The chronic and recurrent course of the disease further hampers the psycho-social wellbeing of the affected individuals. The adverse impact on the quality of life is significant but even more important is the fact that AA can be associated with true anxiety and depression syndromes. Stress by itself is known to induce or exacerbate AA. Whether anxiety or depression are truly contributing factors in the development of AA or are a consequence of the disease is difficult to determine. A vicious cycle can often result in which the anxiety or depression worsens the alopecia and the worsening alopecia can further aggravate the psychiatric conditions. Hence, appropriate treatment of AA should also include timely detection and treatment of these psychiatric co-morbidities to break this vicious cycle of cause and effect and improve treatment outcome. Most of the studies attempting to measure the psychological impact of this disease have focussed on assessment of quality of life for these patients and have not specifically measured the anxiety and depression that often co-exist. There is a lack of studies assessing true anxiety and depression in AA especially in Indian patients and this study was carried out to address this lacuna (Figs 1-3).

Editor's Comment :

- Alopecia areata is associated with significant psychiatric morbidities in Indian patients.

Aims and Objectives

The aim was to provide an insight into how prevalent were syndromic anxiety and depression in patients of

Department of Dermatology, KPC Medical College and Hospital, Kolkata 700032

[1]MBBS, MD, DVL, DCH, Professor & Head and Corresponding Author

[2]MBBS, MD, DVL, Associate Professor

[3]MBBS, 3rd Year Postgraduate Trainee

[4]MBBS, MD, DTO cum ACMOH, Department of Dermatology, Howrah District Hospital, West Bengal 711101

Received on : 15/12/2022

Accepted on : 03/05/2023

Fig 1a — Multiple Patches of AA

Fig 1b — Frontal View Same Patient

Fig 2 — Coalescing Patches of AA

Fig 3 — Ophiasis Pattern of AA

AA. The objective was to measure the anxiety and depression scores in patients with AA and to compare them with the scores of individuals without alopecia.

Materials and Methods

The study was a hospital based cross-sectional study. It was conducted in the Dermatology OPD of a Tertiary Care Hospital in Eastern India over a period of two and half years from September, 2019 to March 2022 during which period all new patients suffering from AA attending the OPD were assessed. AA was diagnosed clinically by qualified dermatologists on finding, patchy areas of non-scarring, complete hair loss. Patients having any other type of alopecia co-existing with AA and cases where there was a doubt in diagnosis were excluded. Patients with mental retardation and inability to comprehend and communicate were also not included. A total of 52 cases of AA were screened of which 8 had to be excluded and remaining 44 were included in the study group. Forty four age and sex matched patients attending the OPD with other dermatological disorders without any associated alopecia were included in the comparative or control group. An informed consent was taken from all patients following which the Hospital Anxiety Depression Scale (HADS; Zigmond & Snaith 1983) was administered to both sets of patients. Their answers were recorded and scores were calculated. The mean anxiety and depression scores in both sets of patients were compared using paired T test.The statistical analysis was performed using the software SPSS (ver 16.0.)

Results

Among the 44 patients of AA in the study group, 17 (38.6%) were females and 27 (61.36%) were males. The control group had a similar sex and age composition. The mean age of the patients was 34.2 years among cases and 34.5 years among controls. The demographic distribution of the study group is shown in Table 1.

It was found that in the study group,8 out of 44 (18.18%) cases had frank clinical anxiety with HADS score more than eleven, 7 (15.9%) cases had borderline symptoms (HADS score from 8 to10) while remaining 29 (65.9%)had normal HADS score (from 0-7) while among the controls only 2 out of 44 (4.54%) individuals had frank anxiety, only 4 (9.09%) had borderline symptoms while rest 38 (86.36%) were in the normal range of anxiety HADS score.

Similarly it was found that among the study cases

Table 1 — *Demographic characteristics (age and sex distribution) of the study population*

Age in years	Female	Male	Total
0-20	4	2	6
20-40	10	18	28
>40	3	7	10
Total	17	27	44

10 (22.7%) had frank depression with depression HADS score more than eleven, 6 (13.6%) were in borderline range while 28 (63.63%) had normal scores. Among controls only two individuals had borderline scores, while the rest (95%) had normal scores.

Amongst the cases frank clinical anxiety was found to be more common in females (23.52%) compared to males (14.82%). Frank depression too showed a similar pattern (23.52% in females while 22.22% in males). However, the difference between the sexes were not statistically significant.

Table 2 — *Anxiety and depression scores and their distribution according to gender in the study and control groups*

		Anxiety score			Depression score		
		Normal (0-7)	Borderline (8-10)	Abnormal (11-21)	Normal (0-7)	Borderline (8-10)	Abnormal (11-21)
Study Group (n=44)	Female	10	3	4	11	2	12
	Male	19	4	4	17	4	6
	Total	29	7	8	28	6	10
Control Group (N=44)	Female	14	1	2	16	1	0
	Male	24	3	0	26	1	0
	Total	38	4	2	42	2	0

It was found that mean anxiety score of patients with AA (6.55) was more than the mean anxiety score (4.91) of individuals without AA. A paired 't' test was done to compare the means and the difference was found to be statistically significant (t-value=2.541 and p-value= 0.013).

Similarly the mean depression score of AA patients (8.52) was observed to be more than the mean score (4.81) of individuals without alopecia. Performing paired 't' test showed the difference to be statistically significant (t-value= 3.81, p-value = 0.0003) (Table 2).

Discussion

Hospital Anxiety and Depression Scale (HADS) was designed in 1983 with an intention to produce a tool for detection of anxiety and depression in people with physical health problems[1]. It is a well validated questionnaire to determine the level of anxiety and depression that a person experiences on a fourteen item scale, seven items each for anxiety and depression. Response to each item is again graded on a four point Likert scale from 0 to 3. For each dimension of anxiety and depression a score from 0 to 7 is considered normal, 8 to 10 borderline and 11 to 21 abnormal, indicative of significant psychological morbidity. This is different from measurements of the quality of life, which usually assess the impact of the disease on physical and psychological health, social relationships and daily functioning of an individual but are not designed to specifically or directly detect symptoms of true anxiety and depression[2]. A search of relevant literature revealed that the majority of the studies have focussed on assessment of the quality of life in patients with AA. Studies assessing true anxiety and depression in AA are fewer and far between with not much data being available in Indian patients. An OPD based study in Tunisia by Sellami, *et al* had found anxiety and depression among 68% and 32% out of fifty cases of AA respectively[3]. A study by del Carmen Vélez-Muñiz, *et al* assessing 126 Mexican patients (94 adults and 32 children) with AA found clinical anxiety and depression in 46.8% and borderline scores in 19.1% among adult patients with AA[4]. Our study appears to be the first of this kind from India and the results here too reveal that both anxiety and depression are significantly more common in patients with alopecia areata as compared to individuals without the disease. However, the prevalence of clinical anxiety (18.18%) and clinical depression (22.7%) in our study was lesser than in the above mentioned studies. There is a possibility that this variation may be due to cultural differences. In our study the cases of depression outnumbered the cases of anxiety. Similar findings establishing the relationship of AA with anxiety, depression and other psychiatric co-morbidities have also been reported in a few studies from other countries using various other scoring methods for assessing clinical anxiety and depression[5-11]. A study from Taiwan involving 5117 patients of AA not only found an increased risk of developing anxiety and depression but also found that the age of onset of AA was an important factor in determining the type of psychiatric comorbidity. There was an increased risk of depression in age less than 20 years while risk of anxiety between the ages of 20 and 39 years and risk obsessive-compulsive disorder and anxiety in patients aged 40-59 years[12].

A recent meta-analysis concluded that patients with AA had a higher risk of both anxiety and depression and recommended that Healthcare professionals must be aware of this and routine assessment of these conditions and appropriate referral and management is important[13]. A review by Ghanizadeh, *et al* had also noted increased lifetime prevalence of both anxiety, depression and other psychiatric conditions like obsessive compulsive disorder and alexithymia in cases with AA and mentions the benefits of antidepressant therapy in inducing and maintaining hair regrowth[14].

The importance of actively looking for psychiatric

symptoms of generalised anxiety and depression in patients with AA lies in the fact that the association of these psychological co-morbidities with AA may be more complex than just a simple cause and effect relationship. While it is understandable that the cosmetic disfigurement caused by AA may lead to anxiety and depression, it is also being postulated that AA and certain psychiatric syndromes may have similar underlying pathogenesis. Stress related neuroendocrine and immunologic mechanisms and complex systemic cytokine profiles may contribute both to the pathogenesis of AA and to the associated anxiety and depression[15,16]. Hence, detection and treatment of associated psychiatric syndromes alongwith specific treatment for AA, may not only improve the psychological wellbeing of the patient but also improve outcome in the form of hair regrowth in these patients.

Conclusion

A significant percentage of patients with AA have associated anxiety and depression. Hence, complete and appropriate management for these patients must include assessment for these psychiatric co-morbidities along with treatment aimed at regrowth of hair. Certain questionnaire based scoring methods like the HADS are easy to use and can often detect frank anxiety and depression and help in determining which patients would require psychiatric therapy.

Limitations : Our study being cross-sectional in design, could not assess the temporal and cause or effect relationship of both anxiety and depression with AA. Also their relationship with the extent and severity of alopecia could not be determined due to a relatively small sample size. Longitudinal studies involving larger number of patients are required to study these issues.

References

1 Zigmond AS, Snaith RP — The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand*1983; **67:** 361-70.

2 Ali FM, Johns N, Salek S, Finlay AY — Correlating the Dermatology Life Quality Index with psychiatric measures: A systematic review. *Clinics in Dermatology* 2018; **36(6):** 691-7.

3 Sellami R, Masmoudi J, Ouali U, Mnif L, Amouri M, Turki H, *et al* — The relationship between alopecia areata and alexithymia, anxiety and depression: A case-control study. *Ind J Dermatol* 2014; **59:** 421

4 del Carmen Vélez-Muñiz R, Peralta-Pedrero ML, Jurado-Santa Cruz F, Morales-Sánchez MA — Psychological profile and quality of life of patients with alopecia areata. *Skin Appendage Disorders* 2019; **5(5):** 293-8.

5 Colón EA, Popkin MK, Callies AL, Dessert NJ, Hordinsky MK — Lifetime prevalence of psychiatric disorders in patients with alopecia areata. *Comprehensive Psychiatry* 1991; **32(3):** 245-51.

6 Ruiz Doblado S, Carrizosa A, García Hernández MJ — Alopecia areata: psychiatric comorbidity and adjustment to illness. *Int J Dermatol* 2003; **42(6):** 434-7.

7 Alfani S, Antinone V, Mozzetta A, Di Pietro C, Mazzanti C, Stella P, *et al* — Psychological status of patients with alopecia areata. *Acta Derm Venereol* 2012; **92(3):** 304-6.

8 Kim JC, Lee ES, Choi JW — Impact of alopecia areata on psychiatric disorders: A retrospective cohort study. *J Am Acad Dermatol* 2020; **82(2):** 484-6.

9 Baghestani S, Zare S, Seddigh SH — Severity of depression and anxiety in patients with alopecia areata in Bandar Abbas, Iran. *Dermatology Reports* 2015; Dec 22; **7(3):** 6063. doi: 10.4081/dr.2015.6063. eCollection 2015 Dec 3.

10 Koo JY, Shellow WV, Hallman CP, Edwards JE — Alopecia areata and increased prevalence of psychiatric disorders. *Int J Dermatol* 1994; **33(12):** 849-50.

11 Ruiz Doblado S, Carrizosa A, García Hernández MJ — Alopecia areata: psychiatric comorbidity and adjustment to illness. *Int J Dermatol* 2003; **42(6):** 434-7.

12 Chu SY, Chen YJ, Tseng WC, Lin MW, Chen TJ, Hwang CY, *et al* — Psychiatric comorbidities in patients with alopecia areata in Taiwan: a case–control study. *British Journal of Dermatology* 2012; **166(3):** 525-31.

13 Okhovat JP, Marks DH, Manatis-Lornell A, Hagigeorges D, Locascio JJ, Senna MM— Association between alopecia areata, anxiety, and depression: a systematic review and meta-analysis. *J Am Acad Dermatol* 2023 May; **88(5):** 1040-1050. doi: 10.1016/j.jaad.2019.05.086. Epub 2019 Jun 1.

14 Ghanizadeh A, Ayoobzadehshirazi A — A review of psychiatric disorders comorbidities in patients with alopecia areata. *Int J Trichology* 2014; **6(1):** 2.

15 Bain KA, McDonald E, Moffat F, Tutino M, Castelino M, Barton A, *et al* — Alopecia areata is characterized by dysregulation in systemic type 17 and type 2 cytokines, which may contribute to disease associated psychological morbidity. *B J Dermatol* 2020; **182(1):** 130-7.

16 Brajac I, Tkalèiæ M, Dragojeviæ DM, Gruber F — Roles of stress, stress perception and trait anxiety in the onset and course of alopecia areata. *The Journal of Dermatology* 2003; **30(12):** 871-8.

Original Article

Prevalence, Clinical Features and Risk Factors of Ectopic Pregnancy in a Tertiary Care Hospital in Bangalore

Anuvi Sinha[1], Ratnesh Sinha[2]

Objectives : The present study was designed to determine the prevalence of Ectopic Pregnancy, the associated risk factors and their clinical presentation in a Tertiary Care Hospital.

Material and Methods : It is a hospital based observational study conducted in OBG department of Mazumdar Shaw Medical Centre, Narayana Hrudayalaya, Bengaluru over a period of 3 years. Detailed history with clinical examination and supported by pregnancy test and findings of an ultrasound scan was taken. 84 Ectopic Pregnancy cases were included in this study.

Results : A total of 4359 pregnancies were confirmed during the study period, of which 239 cases of ectopic pregnancies were diagnosed, giving a prevalence of 5.48%. Forty one percent were in the age group of 26-30 years. Fortyfour percent of study participants were nulliparous. Approximately, one third (29.7%) of the study participants had history of prior abortion. Amenorrhea (98.9%) was the most common complaint reported followed by pain abdomen, bleeding per vagina, nausea & vomiting in 84.5%, 71.4% and 52.3% respectfully.

Conclusion : To diagnose Ectopic Pregnancy early is one of the biggest challenges for a physician. Pregnant women with clinical presentation of pain abdomen, bleeding per vagina with amenorrhea should undergo screening for Ectopic Pregnancy. Past history of infertility, PID, previous ectopic pregnancy, induced abortions, abdominal surgery, D&C and contraception use were the associated risk factors for Ectopic Pregnancy identified in this study

[*J Indian Med Assoc* 2023; **121(11):** 22-5]

Key words **: Ectopic Pregnancy, Intrauterine Pregnancy, Amenorrhea, Abdominal Pain.**

Ectopic Pregnancy (EP) is defined as the implantation of the fertilized ovum outside the endometrial lining of the uterine cavity[1] . It is an obstetric emergency associated with high maternal morbidity and mortality[2]. It accounts for 10-15% of all maternal deaths[3]. The classic triad of abdominal pain, amenorrhea and vaginal bleeding should always alert the clinician for evaluation of an EP[4].

Worldwide, EP complicates 0.25-2.0% of all pregnancies[5]. Pelvic Inflammatory Disease (PID), puerperal sepsis, postabortion sepsis, appendicitis and the use of Intra-uterine Contraceptive Devices (IUCD) have been identified as major risk factors. Other factors include tubal/pelvic surgeries, endometritis, exposure to diethylstilboestrol in utero, use of progesterone only pills and conception following induction of ovulation and history of infertility[6].

Present study aims to determine the prevalence of EP, the associated risk factors and the pattern of presentation of EP in a Tertiary Care Hospital.

[1]MBBS, DNB, Consultant, Department of Obstetrics and Gynaecology, Sadar Hospital Ranchi, Jharkhand 834001

[2]MBBS, MD, Assistant Professor, Department of Community Medicine, Manipal TATA Medical College, Jamshedpur, Manipal Academy of Higher Education, Manipal, India and Corresponding Author

Received on : 06/06/2022
Accepted on : 12/10/2023

Editor's Comment :

- Ectopic Pregnancy (EP) is an obstetric emergency accounting for 10-15% of all maternal deaths.
- Any pregnant woman with abdominal pain, amenorrhea, and vaginal bleeding should be evaluated for EP.
- Risk factors for EP are past history of infertility, PID, previous EP, induced abortions, puerperal sepsis, post-abortion sepsis, appendicitis, abdominal surgery, D&C and contraception.
- Surgical management for tubal EP includes salpingostomy, salpingotomy, resection and anastomosis, and salpingectomy depending on the fertility status of the patient.

Material and Methods

This hospital based observational study was conducted on patients registered from January, 2015 to September, 2018 under OBG department of Mazumdar Shaw Medical Centre, Narayana Hrudayalaya, Bengaluru. The study protocol was approved by the Ethics Committee of the institute.

A total of 84 EP patients were included in the study. Sample size was calculated by using the incidence of EP as 2% from the previous studies with 3% precision and 95% confidence interval[5,7-9].

Prevalence of EP = (Number of pregnant patients diagnosed as ectopic/Total number of pregnant patients admitted in hospital for delivery) X 100.

Inclusion Criteria for Study participants : EP patients registered for treatment under OBG department

of MSMC, NH, Bengaluru from January, 2015 to September, 2018 who were willing to participate in study and ready to give consent.

Exclusion criteria for Study participants : Patients age <18years; not registered in MSMC, NH; refusing or unable to give consent or participate in the study; who got discharged against medical advice and got treated elsewhere were excluded from the study.

Operational Definition : In our study EP is defined as the implantation of the fertilized ovum outside the endometrial lining of the uterine cavity.

The diagnosis of EP was made by history taking, clinical examination and supported by pregnancy test and findings of an ultrasound scan. Study participants were interviewed by using a pre-designed semi structured questionnaire, physical examination, investigations and USG. The information collected was tabulated and analysed using standard statistical software (Microsoft Excel 2010) and SPSS Version 18.

Results

During the period of study, there were 239 cases of ectopic cases diagnosed and 4359 pregnant patients were admitted for delivery. The prevalence of EP in this study was found out to be 5.48% of deliveries in the study period.

Table 1 shows the socio-demographic characteristics of 84 study participants who participated in the study in which the age distribution revealed that maximum subjects in cases ie, 41.7% were in age group of 26-30 years. Most of the affected study participants were nulliparous 37 (44%) and primiparous were 32 (38.1%). Approximately one third (29.7%) of the study participants had history of prior abortion.

Table 1 — *Socio-demographic characteristics of study participants*

Socio demographic variables		Frequency (N=84)	Percentage
Patient's Age (in years)	<20	1	1.1
	20 -25	18	21.4
	26 -30	35	41.7
	31 – 35	23	27.4
	>35	7	8.4
Religion	Hindu	82	97.6
	Others	2	2.4
Patient Occupation	Professional	27	32.1
	Housewife	56	66.8
	Student	1	1.1
Income	<20,000	12	14.2
	20,000-39,999	16	19
	40,000-60,000	22	26.2
	>60,000	44	40.6
Married life	Unmarried	2	2.4
	Married	82	97.6
Parity	0	37	44
	1	32	38.1
	≥2	15	17.9
Abortion	0	59	70.3
	1	16	19
	2	6	7.1
	≥3	3	3.6

Amenorrhoea (98.9%) was the most common complaint reported followed by pain abdomen, bleeding per vagina, nausea & vomiting in 84.5%, 71.4% and 52.3% respectfully. Majority of the study participants (65.5%) had period of amenorrhoea between 5-8 weeks (Table 2).

Table 3 shows various risk factors responsible for EP. 19% of cases had history of PID; 6% cases had history of previous EP; Prior D&C was done in 15.5% cases. Amongst the various methods of contraception, the most common method was usage of barrier contraception in cases (21.4%). Past surgical history shows that 29.8% cases had undergone caesarean section. Infertility was present in 20 (23.8%) cases (Fig 1).

Table 2 — *Presenting symptoms of study participants*

Presenting complaints	Frequency (N=84)	Percentage
Amenorrhoea	83	98.9%
Pain abdomen	71	84.5%
Bleeding per vagina	60	71.4%
Nausea, Vomiting	48	52.3%
Syncopal attacks	19	22.6%
Dysuria	10	12%
Fever	4	4.8%
Rectal symptoms	4	4.8%

Table 3 — *Risk factors for development of EP in study participants*

Risk factors	Frequency (N=84)	Percentage
History of Infertility	20	23.8
Past History of PID	16	19
D&C	13	15.5
Past History of Previous EP	5	6
History of Contraception Use :		
Barrier	18	21.4
Copper T	13	15.5
OCPs	3	3.6
Tubectomy	4	4.8
Past History of Surgeries :		
LSCS	25	29.8
Appendicectomy	8	9.6
Lap Ovarian Cystectomy/ Oophorectomy	3	3.6
Salpingectomy	4	4.8
Tubal Recanalization	2	2.4
Myomectomy	1	1.1
Treatment of Infertility :		
Ovulation Induction	11	13.1
OI+IUI	8	9.6
IVF	1	1.1

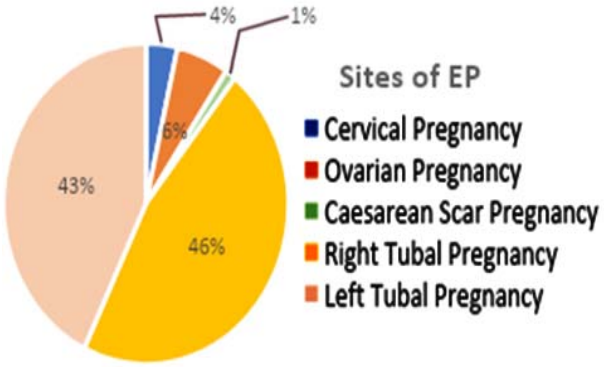


Fig 1 — Distribution of EP cases based on USG Findings

Discussion

The mean maternal age of study participants was 29 years. The findings of the present study were similar to findings of Khedar S, *et al*[11] where the mean maternal age was 28±5.16 years. The same was also reported in the findings of Yadav A, *et al*[5] and Bansal N, *et al*[6], where 35.61% and 44.55% cases of EP fell in the age group of 25-29 years respectively.

A significant number of the patients presented with amenorrhoea, pain abdomen and bleeding per vagina. These findings were supported by the findings of study conducted by Yadav A, *et al*[5] in which 93.15% cases presented with amenorrhoea, 87.67% cases presented with pain abdomen and 64.38% cases presented with bleeding per vagina. Around two-third of the cases (65.5%) of EP had period of amenorrhoea between 5-8 weeks in this study. This finding was similar to study conducted by Bansal N, *et al*[6] where 54.5% cases had amenorrhoea of ≤8 weeks and Saritha K, *et al*[12] where 68.1% cases had amenorrhoea between 7-8 weeks.

In this study, 38.1% cases were para 1 and 17.9% cases were ≥para 2 which was similar in study conducted by Tahmina S, *et al*[13] were 34.7% cases were para 1.

In the present study, 6% cases of EP had history of previous EP. Similarly, study conducted by Yadav ST, *et al*[14] and Sindhura M, *et al*[10], 2.8% and 5.06% cases of EP had history of previous EP respectively.

In this study, 19% cases had past history of minimum one abortion, which is similar to the findings of study conducted by Yadav ST, *et al*[14], Sindhura M, *et al*[10] and Shrivastava M, *et al*[2], 19.4%, 18.9% and 17% cases of EP had history of previous abortions respectively.

The associated risk factors for Ectopic Pregnancy noted in this study were the past history of PID, previous EP, Prior D&C, use of contraception and past surgical history. It was observed that majority of the patients had more than one risk factor. These findings were similar to that reported by Sindhura M, *et al*[10], Khedar S, *et al*[11], Moini A, *et al*[15], Tahmina S, *et al*[13], Yadav ST, *et al*[14] and Sindhura M, *et al*[10].

In the present study, 29.8% cases had undergone previous LSCS. Jacob S, *et al*[16] conducted a study where 18.4% cases had undergone LSCS previously. Sindhura M, *et al*[10] conducted a study where 12.6% cases of EP had previous LSCS.

In our study, 20 (23.8%) cases had history of infertility which is more as compared to the study conducted by Yadav ST, *et al*[14], Sindhura M, *et al*[10] and Shaikh SB, *et al*[17] showed that 13.9%, 18.9% and 8% cases of EP had history of infertility respectively.

In current study 89.2% cases were found to be Tubal EP by Ultrasound. These findings were supported by study conducted by Madan A, *et al*[19] where 88.8% cases were tubal ectopic.

In this study, 30.9% cases of EP had no obvious risk factors whereas in study conducted by Pradhan HK, *et al*[18], 52.46% cases had no obvious risk factors. This could be a reason of high prevalence (5.48%) of EP as compared to previous studies (1.5-2%)[7, 8-10].

Limitation : Although all the medical records were retrieved, a few documents were either missing, poorly documented or in a poor condition.

Conclusion

Amenorrhoea, abdominal pain and bleeding per vagina are the most consistent features of EP. Past history of infertility, PID, previous EP, induced abortions, abdominal surgery, D & C and contraception use were the associated risk factors for EP identified in this study. It was also noted that history of at least one risk factor for EP increases the chance of EP in the patient.

To ensure early diagnosis and management for EP, all pregnant women presenting with abdominal pain and vaginal bleeding with amenorrhoea should be evaluated for EP.

Conflict of Interest : None.

Disclaimer : Nil.

References

1 Aboyeji AP, Fawole AA, Ijaiya MA — Trends in ectopic pregnancy in Ilorin, Nigeria. N*igerian Journal of Surgical Research* 2002; **4:** 6-11

2 Shrivastava M, Parashar H, Modi JN — A clinical study of ectopic pregnancy in a tertiary care centre in Central India**.** *Int J Reprod Contracept Obstet Gynecol* 2017; **6(6):** 2485-90.

3 Kharat D, Giri PG, Fonseca M — A study of epidemiology of ectopic pregnancies in a tertiary care hospital of Mumbai, India. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology* 2017; **6(9):** 3942-6.

4 Mukul LV, Teal SB — Current Management of ectopic Pregnancy. *Obstet Gynecol Clin N Am* 2007; **34:** 403-19.

5 Yadav A, Prakash A, Sharma C, Pegu B, Saha MK — Trends of ectopic pregnancies in Andaman and Nicobar Islands. *Int J Reprod Contracept Obstet Gynecol* 2017; **6(1):** 15-9.

6 Bansal N, Nanda A, Gupta V — Profile of Ectopic Pregnancy in Tertiary Level Hospital in Uttarakhand, India. *Open Journal of Obstetrics and Gynecology* 2015; **5:** 185-91.

7 Tuli AG, Goyal S, Livingston D, Kurian AS — Ectopic pregnancy: a five year retrospective study in a tertiary care hospital. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology* 2015; **4(5):** 1400-3.

8 Goyal LD, Tondon R, Goel P, Sehgal A — Ovarian ectopic pregnancy: A 10 years' experience and review of literature. *Iran J Reprod Med* 2014; **12(12):** 825-30.

9 Prasanna B, Jhansi CB, Swathi K, Shaik MV — A study on risk factors and clinical presentation of ectopic pregnancy in women attending a tertiary care centre. *Int Archive of Integrated Med* 2016; **3(1):** 90-6.

10 Sindhura M, Sailatha R, Famida AM, Vijayalakshmi K, Sathiya S, Renuka S — Trends in ectopic pregnancy: a retrospective clinical study of 79 cases. *Int J Reprod Contracept Obstet Gynecol* 2017; **6(7):** 3009-13.

11 Khedar S, Mital P, Rajoria L, Gupta D, Shekhawat U, Singhal S — A case-control study to evaluate risk factors for ectopic pregnancy. *Int J Reprod Contracept Obstet Gynecol* 2016; **5(8):** 2828-35.

12 Saritha K, Sowjanya R, Sudha S — Outcome Of Ectopic Pregnancy: A Prospective Clinical Study In A Teaching Hospital. *J Evolution of Med Dental Sciences* 2015; **4(93):** 15831-3.

13 Tahmina S, Daniel M, Solomon P — Clinical Analysis of Ectopic Pregnancies in a Tertiary Care Centre in Southern India: A Six-Year Retrospective Study. *Journal of Clinical and Diagnostic Research* 2016; **10(10):** QC13-QC16

14 Yadav ST, Kaur S, Yadav SS — Ectopic pregnancy an obstetric emergency: retrospective study from medical college Ambala, Haryana, India. *Int J Reprod Contracept Obstet Gynecol* 2016; **5(7):** 2210-4.

15 Moini A, Hosseini R, Jahangiri N, Shiva M, Akhoond MR — Risk factors for ectopic pregnancy: A case–control study. *J Res Med Sci* 2014; **19(9):** 844-9.

16 Jacob S, Nath AG — Changing Trends In Risk Factors Of Ectopic Pregnancy- A Case Control Study. *J Evolution Med Dent Sci* 2017; **6(11):** 831-6.

17 Shaikh SB, Jampala S, Devi SS, Mallika M — A Study of Ectopic pregnancy in a Tertiary Care Teaching Hospital. *Indian Journal of Obstetrics and Gynecology Research* 2016; **3(2):** 132-6.

18 Pradhan HK, Dangal G, Karki A, Shreshtha R, Bhattachan K — Profile of ectopic pregnancy at Kathmandu Model Hospital. *Nepal J Obs Gyn* 2015; **20(2):** 10-3.

19 Madan A, Nitin KH, Kaur A, Neki NS — Ectopic Pregnancy: A life threatening emergency. *International Journal of Current Research in Medical Science* 2017; **3(7):** 144-51.

Original Article

Correlation between Magnetic Resonance Imaging & Histopathological Findings In Retinoblastoma : A Prospective Study

Wilhemina Ashish Asari[1], Ashish Ashokbhai Bhojak[2], Sonali Nitesh Shah[3], Bansari Parshottambhai Sorathiya[4], Monika Kamleshbhai Prajapati[5]

Background : Retinoblastoma is the most common primary intraocular malignancy of childhood has one of the best survival rate. Therefore, early and appropriate diagnosis is of the highest importance in survival of patients.The present study was undertaken to evaluate the incidence of high risk factors on histopathology in retinoblastoma and to determine the diagnostic accuracy of MRI in detecting tumor invasion and to correlate them.

Aims and Objectives : To determine sensitivity, specificity and accuracy of MRI in optic nerve invasion. To find if any correlation exists between MRI findings and high risk histopathological findings.

Materials and Methods : A non-randomized prospective study was conducted among 49 eyes of 49 patients clinically diagnosed as Retinoblastoma, who underwent MRI for staging of the disease. Treatment of all the patients were recorded and postoperative results were studied to determine the diagnostic accuracy of MRI in tumor invasion.

Results : Out of the 49 patients, their mean age of presentation was 30 months and Standard Deviation (SD) was 16.4 months. Among Histopathological findings, choroidal involvement was found in 77.5%,followed by optic nerve involvement in 42.9%, anterior chamber seeding in 12.2%, scleral involvement in 10.2%, and among MRI reports, optic nerve involvement was found in 32.6% cases, followed by choroidal involvement (12.2%), scleral Involvement (8.2%), anterior segment involvement (8.2%). Hence, there is a clear discrepancy seen in our study between MRI and HISTOPATHOLOGY findings in patients with Retinoblastoma.

Conclusion : It is concluded from our study that Though high-contrast MRI is considered to be an accurate tool for pre-treatment staging of Retinoblastoma, high risk features such as microscopic choroidal and optic nerve invasion are often missed on it. Since these are the important prognostic indicators of survival, we can't rely upon MRI only for further treatment in terms of Chemotherapy.

[*J Indian Med Assoc* 2023; **121(11):** 26-9]

Key words **: Retinoblastoma, MRI, Histopathology in Retinoblastoma, Intraocular Malignancy.**

Retinoblastoma is the most common primary intraocular malignancy of childhood[1]. It has two distinct clinical presentations: a bilateral or multifocal, heritable form (25% of all cases), characterized by the presence of germline mutation of Rb1 gene; and the other one being a unilateral or unifocal form (75% of all cases), 90% of which are non-hereditary[2]. The mean age at diagnosis is 18 months, which is 24 months for unilateral cases and 12 months for bilateral cases[3].

Retinoblastoma (RB) is potentially curable, but the prognosis for survival is heavily dependent on early stage diagnosis and appropriate therapy. Mortality is as high as >50% in rural areas that are lacking good medical care and in many cases, those who seek treatment there are already at an advanced stage of the studies[4] from our country reveal a major population of affected children with delayed presentation having mortality as high as 24%[5]. The management of RB is highly individualized and complex and it needs a multidisciplinary team approach.

The modern methods of diagnosis now available are CT scan and Magnetic Resonance Imaging (MRI) for studying tumor characteristics and the extent of tumor invasion. The present study was undertaken to evaluate the incidence of High Risk Factors (HRF) on histopathology in retinoblastoma and to determine the diagnostic accuracy of MRI in detecting tumor invasion and to correlate them.

Editor's Comment :

- Awareness, early diagnosis and accurate use of diagnostic tool can make huge difference in survival of this curable disease.
- Our children are our future we should fighting harder to find cures for them.

Department of Ophthalmology, M & J Institute of Ophthalmology, Ahmedabad, Gujarat 380016
[1]MBBS, MS, Assistant Professor
[2]MBBS, MS, Assistant Professor
[3]MBBS, MS, Associate Professor
[4]MBBS, MS, Senior Resident and Corresponding Author
[5]MBBS, Resident Doctor

Received on : 23/12/2022
Accepted on : 18/01/2023

Aims and Objectives

Aim :

To correlate high risk histopathological findings with MRI findings and determine diagnostic accuracy of Magnetic Resonance Imaging (MRI) in detecting tumor invasion.

Objectives :

(1) To determine sensitivity, specificity and accuracy of MRI in optic nerve invasion.

(2) To find if any correlation exists between MRI findings and high risk histopathological findings.

Materials and Methods

Study Setting :

The study was conducted among 49 eyes of 49 patients clinically diagnosed as Retinoblastoma, who underwent MRI for pre-treatment staging of the disease. It was a non-randomized prospective study and the patients have been followed up periodically. Treatment of all the patients were recorded and postoperative results were studied to determine the diagnostic accuracy of MRI in tumor invasion.

Inclusion Criteria :

- All patients presenting at out patient department, clinically diagnosed with retinoblastoma IIRC Group D and Group E.
- Guardian giving informed written consent

Exclusion Criteria :

- Retinoblastoma patients IIRC Group A, B and C with salvageable vision or globe.
- Guardian unwilling for regular follow-up.
- Guardian not giving any informed consent.
- Dropped out cases and death of patient in between study.

Ethical measures were adhered to and after taking informed written consent from guardian, a careful ocular and systemic history was taken from each patient's guardian including name, age, sex, address, presenting complaints and their duration, birth history and family history of similar complaints.

Indirect ophthalmoscopy was performed under general anesthesia to examine the fundus with 360 degree scleral indentation.

An MRI of the orbit and brain was performed with a 1.5 Tesla system (MagnetomAvanto, Siemens, Erlangen, Germany), with the use of a standard head coil. Pre-contrast orbital images acquired were axial and sagittal T1- weighted images with repetition time (TR) msec/echo time (TE) msec of 350-380/8-10 and 3 acquisitions and axial T2-weighted images with TR/TE 3000- 3300/70- 100 and 1 acquisition. After intravenous injection of gadolinium based contrast material gadopentetatedimeglumine (Magnevist, Schering, Berlin, Germany), images acquired were TI-weighted axial, sagittal and coronal images (TR/TE 560-630/8-12, 3 acquisitions) with fat suppression. For fat suppression, frequency-selective technique was used. A slice thickness of 2 mm and interslice gap of 0.2 mm was used. Postcontrast MRI of the brain was performed and images acquired were axial TI-weighted images (TR/TE 380-420/10-12) and T2-weighted images (TR/TE 3200-3400/80-120), with a slice thickness of 5 mm. For imaging, spin echo sequences with a matrix of 256*256 and a resolution of 0.8*0.8 mm was used. For the patients who underwent chemoreduction, we have considered post chemotherapy MRI for the correlation study.

Primary enucleation was performed in patients having non salvageable eye or no potential of vision in unilateral cases of Retinoblastoma, while in phthisical globe with no residual lesion after chemoreduction underwent for secondary enucleation under general anesthesia. After the enucleation procedure, the eyeball was fixed in 4% formaldehyde for 24 hours, washed with alcohol for 24 hours and embedded in paraffin. After macroscopic examination, sections were prepared from the specimen and stained with hematoxylin and eosin for microscopic examination. Histopathological findings in terms of tumor differentiation, presence or absence of calcification and necrosis, vitreous seeding, anterior chamber seeding, Iris and ciliary body infiltration, extraocular muscles and scleral involvements, high risk characteristics like choroid and optic nerve invasion and extraocular involvement is noted and tumor graded according to AJCC[10]. Adjuvant chemotherapy was advised in a patient with High Risk Features (HRF) on histopathology. At our institute, consideration of high risk factors given to massive choroidal invasion (>3mm), optic nerve invasion, invasion of iris, anterior chamber and ciliary body.

Statistical Analysis :

To find out whether a correlation exists between two variables, to check if that correlation is actually valid and statistically significant and then to obtain the degree of the correlation, we need to use statistical correlation tests. In our dataset, we have several nominal (binary) variables and some continuous (scale) variables. To find out the correlation between 2 binary variables (eg, Involvement of Optic Nerve in Histopathological findings and Gender), we have used the Chi-square method.

Chi-square method assumes the null hypothesis

(h0) to be that no correlation exists between the two binary variables in question. It gives out the p-value of the test (also called Pearson's p), using which we can determine if there's a statistically significant correlation between our two binary test variables.

A p-value less than 0.05 usually indicates a statistically significant correlation. And then we find out the value of Phi Coefficient to know the degree of correlation. However, in certain cases of binary correlation tests where the number of data points available is not in large quantity and if the expected values of certain outputs are very low, the Pearson's p-value tends to lose its accuracy. In most such cases, it ends up suggesting a higher statistical significance than what it actually might be.

Such a scenario demands the use of Fisher's exact test, which works well even for a small dataset. Since our dataset consists of 49 patients, which is not very large, we have used Fisher's exact test in our binary correlation tests (wherever more than 20% of the expected values are low) to obtain highly accurate results. If the 2-sided significance value obtained through Fisher's exact test is less than 0.05 (5%), then we accept the correlation and proceed to find the degree of correlation using Phi Coefficient[7].

All the data was first entered in an Excel master-chart and subsequently analyzed using the statistical analysis software IBM SPSS.

Observation and Analysis

Out of the 49 patients who were part of this study, 27 (55%) were Males and 22 (45%) were Females. Their mean age of presentation was 30 months and Standard Deviation was 16.4 months.

A total of 41 (83.7%) cases were Unilateral and 8 (16.3%) were Bilateral. 3 patients (6%) had a positive family history of Retinoblastoma.

In our study, Leukocoria was the most common present symptom with 95.9%. Followed by Proptosis (26.5%), Squint (22.4%), Red Painful Eye (20.3%), Fungating Mass (10.2%) and Orbital Celluloitis (4.1%).

Among other clinical features, Secondary Glaucoma and Iris Neovascularization were present in 16.3% cases, followed by Ectropean Uveae (10.2%), Hyphema (8.16%), and Pseudohypopyon (2.1%).

Among Histopathological findings, choroidal involvement was found in 77.5%, followed by optic nerve involvement in 42.9%, anterior chamber seeding in 12.2%, scleral involvement in 10.2% and uveal involvement in 6.1%.

And among MRI reports, optic nerve involvement was found in 32.6% cases, followed by choroidal involvement (12.2%), scleral Involvement (8.2%), anterior segment involvement (8.2%) and ciliary body involvement (4.1%).

For the objective of identifying clinical predictors of high risk histopathology, we ran the correlation tests in IBM SPSS to figure out the authenticity of various MRI findings in indicating high risk Histopathological findings (Tables 1&2)(Figs 6a & 6b).

Following are some of the noteworthy results where appropriate correlation tests were performed to find out if a statistically significant correlation exists and if it does, what is the degree of the correlation.

Discussion

In the present non randomized prospective study, we have managed to better define the relationship between MRI findings and high risk histopathological features at our centre. In our study, high risk factors included massive choroidal invasion (53%), iris invasion (2%), ciliary body invasion (6%), anterior chamber involvement (12%), scleral invasion (8%), pre laminar optic nerve invasion (42.9%), post laminar optic nerve invasion (36.7%), and invasion to the transection end of the optic nerve (18.4%). These figures are in partial agreement with Chawla, *et al*[8] for Indian patients wherein they obtained 25.3% massive choroidal invasion, 10% iris invasion, 9.3% ciliary body invasion, 4% anterior chamber involvement, 8% scleral invasion, 22.3% post laminar optic nerve invasion and 5.3% invasion to the transection end of the optic nerve.

Delayed presentation is responsible for higher incidence of high risk histopathological features in

Table 1 — *The following table suggests optic nerve and choroidal involment seen in MRI findings and histopathological finding*

	MRI	HISTOPATHOLOGY
Optic Nerve Involvement	16	21
Choroidal Involment	6	38

Table 2 — *MRI Characteristics of 49 Eyes Compared with Histopathology Findings*

Parameter	TP (n)	FP (n)	TN (n)	FN (n)	Accuracy (%)	Sensitivity (%)	Specificity (%)
ON INVASION :							
Prelaminar	8	4	24	13	65.3	38.1	85.7
Laminar	5	4	24	16	59.2	23.8	85.7
Postlaminar	5	5	25	14	61.2	26.3	83.3
Transection end	2	3	35	9	75.6	18.2	92.1
AC invasion	1	4	37	5	77.6	16.66	90.24
Choroid Invasion	2	1	9	36	22.4	5.4	90
Scleral/Extrascleral invasion	1	3	43	2	89.8	33.3	93.47

TP : True Positive, TN : True Negative, FP : False Positive, FN : False Negative
ON : Optic Nerve, AC : Anterior Chamber

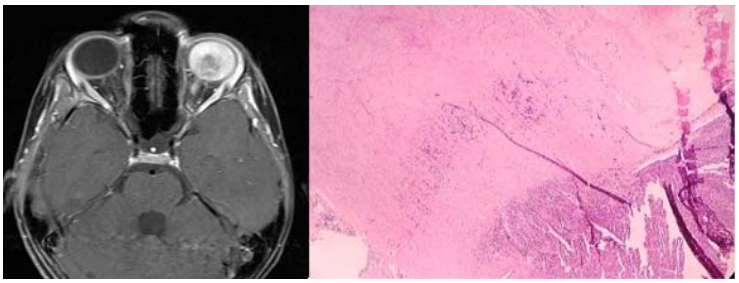


Fig 6a **Fig 6b**

24-month-old female patient with Bilateral Retinoblastoma post Chemotherapy

Fig 6a — Axial post contrast T1- weighted magnetic resonance image showing a large tumour mass in the left globe with normal postlaminar optic nerve signal intensity

Fig 6b — This photograph shows pre-laminar, intralaminar and post laminar optic nerve invasion with transection end infiltration. (Stain : Hematoxylin and Eosin)

Asian patients compared to the west[9]. Similar observation was found in our study wherein we were able to find positive correlation between choroid involvement in histopathological study with age of presentation. We included the following high risk clinical features in our study: age at presentation, intraocular pressure, positive family history, iris neovascularization, proptosis and secondary glaucoma. It was observed that these parameters, individually, weren't able to correlate positively with a high risk histopathological finding; but when considered together, we managed to find their moderate positive correlation with choroidal involvement in histopathological findings.

MRI is useful in determining the important prognostic factors for survival, which makes its interpretation very critical. In our study, MRI's accuracy in detecting choroidal invasion was 22.4%, sensitivity was 5.4%, and specificity was 90%. While in a previous study[8], the accuracy was 57%-72%, sensitivity was 36%-100% and specificity was 40%-100%. These numbers indicate that MRI often fails to detect microscopic choroid invasion. This can be due to partial volume averaging effect that occurs because of 2 mm slice thickness in our study. The accuracy can be improved by reducing the slice thickness to 1mm. We obtained 89.8% accuracy in scleral or extra scleral invasion, while specificity in that case was 93.5%. These numbers are comparable to the study by Chawla, *et al*[6], wherein they obtained accuracy of 98.7% and specificity of 100%.

Suspected post laminar involvement in MRI can influence the results. In our study, the accuracy of MRI in predicting pre-laminar optic nerve invasion was 65.3% and specificity was 85.7%. In predicting postlaminar optic nerve invasion, accuracy was 61.2% and specificity was 83.3%. Only MRI findings cannot be relied upon to give chemotherapy to the patient, which is evident by the fact that we obtained no correlation in our Fisher's exact test between MRI findings and critical histopathological findings.

Conclusion

It is concluded from our study that delayed age at presentation is the clinical predictors of high risk histopathology findings in Retinoblastoma. Also, awareness about the disease among parents, and early diagnosis and treatment at primary and secondary health care services can make a huge difference in survival of this curable disease.

Though high-contrast MRI is considered to be an accurate tool for pre-treatment staging of Retinoblastoma, high risk features such as microscopic choroidal and optic nerve invasion are often missed on it. Since these are the important prognostic indicators of survival, we can't rely upon MRI only for further treatment in terms of Chemotherapy.

References

1 Shields J, Shields C — Atlas of intraocular tumors. Philadelphia, Pa.: Lippincott Williams & Wilkins; 1999.

2 RETINOBLASTOMA : 2014 Review of Cancer Medicines on the WHO List Of Essential Medicines [Internet]. Who.int.2014.Availablefrom:https://www.who.int/selection_medicines/committees/expert/20/applications/Retinoblastoma.pdf?ua=1.

3 Shields J, Shields C, Shields J — Intraocular tumors. Philadelphia: Wolters Kluwer/Lippincott Wiliams & Wilkins; 2008.

4 Shields C, Shields J — Diagnosis and Management ofRetinoblastoma. *Cancer Control* 2004; **11(5):** 317-27.

5 Chawla B, Hasan F, Azad R, Seth R, Upadhyay A, Pathy S, *et al* — Clinical presentation and survival of retinoblastoma in Indian children. *British Journal of Ophthalmology* 2015; **100(2):** 172-8.

6 Chawla B, Sharma S, Sen S, Azad R, Bajaj M, Kashyap S, *et al* — Correlation between Clinical Features, Magnetic Resonance Imaging,and Histopathologic. Findings in Retinoblastoma: A Prospective Study. *Ophthalmology* 2012; **119(4):** 850-6.

7 Yule G — On the Methods of Measuring Association Between Two Attributes. *Journal of the Royal Statistical Society* 1912; **75(6):** 579.

8 Pierce C, Block R, Aguinis H — Cautionary Note on Reporting Eta-Squared Values from Multifactor ANOVA Designs. *Educational and Psychological Measurement* 2004; **64(6):** 916-24

9 Devesa S — The Incidence of Retinoblastoma. *American Journal of Ophthalmology* 1975; **80(2):** 263-5.

10 Edge S— AJCC cancer staging handbook. 7th ed. Chapter 52. (561-568). New York: Springer; 2010.

Original Article

Falls – Its magnitude, Influencers and Associated Complications among the Elderly of a Block, West Bengal

Prince Kerketta[1], Kuntala Ray[2], Mausumi Basu[3]

Background : Among the elderly population, Fall was a major public health problem. This study aimed to estimate the magnitude of Falls, to identify the factors influencing Falls and to assess the complications associated with Falls among the elderly of Budge-Budge II block, West Bengal.

Methodology : A community based cross-sectional study with mixed method approach was conducted on elderly of Budge-Budge II block, West Bengal; for a period of four months. Considering pre-valence of fall 24.98% in a study conducted in greater Mumbai; using multistage simple random sampling method and Cochran's formula, sample size was 159 and data were collected by interview using a predesigned, pre-tested and structured schedule. Data analysis was done using SPSS ver 16.0. Univariate and Multivariable logistic regression was used to determine the factors associated with Falls. A p-value of <0.05 was considered significant.

Results : The magnitude of Falls in this study was 31.44%. Age group of 60-69 years, nuclear family had lower odds as compared to reference group, considering significant association. Majority of Falls among the elderly were in the night 32.20%, in indoor 78.0%, in setback area 46.0%. Most common cause was due to slip 80.0% and most common complication was sprained in ankle or wrist 70.0% followed by cut and abrasion 48%. About 92.0% of Fall cases took medical consultation and among them 36% required hospitalisation.

[*J Indian Med Assoc* 2023; **121(11):** 30-4]

Key words **: Aged, Rural population, Risk factors, Frailty, Accidental Fall.**

A Fall can be defined as one's lost balance and collapse or move from higher to a lower level or on the ground inadvertently[1]. Falls in elderly may occur due to external and internal factors; whereas external factors are likely due to environmental factors and internal factors are due to pathological causes. However, more or less accidental Falls are due to environmental factors which are unlikely to re-occur but Fall due to pathological are usually recurrent and more likely to re-occur. Recurrent Falls are an important cause of morbidity and mortality in the elderly and are a marker of poor physical and cognitive status[2]. Globally, people aged 60 years and above Fall about 28-35% in each year and this proportion increases as age and frailty level increases[3]. India as the second most populous country in the World has 76.6 million people at or over the age of 60, constituting above 7.7% of total population[4]. In India, prevalence of Falls among the elderly ranges from 14% -53%[5]. According to WHO 6.8 million people die due to Fall and most of the population 80% are from low and middle-income countries[1]. Among the elderly population, Fall is a major public health problem[5]. As the age advances many usual reactions of the elders gradually starts fading which makes the elderly more prone to Fall[6]. The second most common cause of death in Fall is related to unintentional injury and it ultimately leads to economic burden to the family. The complication of Fall may be fatal or non-fatal which includes bruise, abrasion, dislocation, fracture and head injury[5]. The fatal cases require higher rate of hospitalization and stay duration is longer; whereas non-fatal cases duration is less as compared to fatal cases. Most of the non-fatal Falls are not addressed properly and may lead to recurrent Falls. One-third of the Fallers are more likely to Fall again[4]. Falls are associated with fear of Falling. Fear of Falling are more with who had a near Fall experience and it also affect reduction in activity, anxiety and depression. Elderly people are more prone and frequently encountered to mental disorders due to ageing. Increase in expeditious urbanization and modernization has breakdown the framework of family support, social isolation and elderly abuse leading to psychological disorders[7].

Editor's Comment :

- This study reveals that the factors influencing Falls in elderly people help in incorporating effective, comprehensive geriatric assessment and adopting multidimensional treatment strategies.
- Careful consideration of health priorities is required for development of Falls prevention. Participatory action may increase acceptability of initiatives to prevent Fall-related injury among older people in India. Thus the elderly people can enjoy this 'decade of healthy aging' in a much better way.

Department of Community Medicine, IPGME&R and SSKM Hospital, Kolkata 700020

[1]MBBS, MD, 3rd year Postgraduage Trainee

[2]MD, Associate Professor and Corresponding Author

[3]MD, Professor and Head

Received on : 26/05/2023

Accepted on : 29/05/2023

The elderly living alone with Co-morbidities and having history of Falls, poor balance, joint disorders, poor vision and gait are carrying risk factor for further Falls[8]. This risk factors are modifiable, if the associated factors are removed or modified. The Falls can be prevented in most of the cases and can also planned for preventive measures for Fall.There is a dearth of recent data on Fall among elderly in West Bengal. This study aimed to estimate the magnitude of Falls, to identify the factors influencing Falls and to assess the complications associated with Falls among the elderly of Budge-Budge II block, West Bengal.

Materials and Methods

Study Type, Design, Setting :

A community based cross-sectional observational study with mixed method approach. It is a sequential explanatory approach quantitative dominant followed by qualitative part [QUAN qual]. It was conducted in Budge Budge II Block of South 24 Parganas District of West Bengal. There are 11 gram panchayats in this Block.

Study participants :

All elderly ≥60 years of age who were present at the time of data collection and were permanent residents for more than three years were included in the study after obtaining informed written consent. Those who were severely ill and mentally unstable to respond were excluded from the study.

Sample size estimation and sampling technique:

The sample size was calculated using the Cochran's formula, $N = Z\alpha^2.p.q/l^2$, where $Z\alpha = 1.96$, p = prevalence of Fall, q = 1-p, l = 10% absolute error. Considering prevalence of 24.98% (Pitchai, *et al* 2019)[5] with a precision of 5% and confidence level of 95%, the sample size was calculated as 72. Considering, design effect of 2 (multistage sampling) total sample size was calculated 72 x 2 = 144. After considering a non-response rate of 10%, the final sample size was calculated to be 159. Thus, the quantitative part of study was conducted among the sample size. Multistage sampling technique was used to select the study participants from Budge-Budge II Block. 1st stage, selection of gram panchayats; 6 were selected out of 11 gram panchayats by Simple Random Sampling (SRS) technique. 2ndstage, selection of sub-centres; 3 sub-centres were selected from 6 gram panchayats by SRS. 3rd stage, selection of villages; 1 village was selected from each sub-centre by SRS. The villages selected were Muchisa, Chandipur and Dongaria. For qualitative part, criterion based qualitative sampling was used emphasis on similarity. The study participants with a history of Fall were selected purposively amongst the participants for in-depth interview. Seven participants were interviewed for qualitative part, as no new sight of data was available and data was also getting saturated, the interview was ended with desired sample size.

Study period : The study was conducted for a period of 4 months starting from November, 2021 to February, 2022.

Data collections and study tools:

Data was collected after obtaining permission from Institutional Ethics Committee;ensuring anonymity & confidentiality. Initially a face-to-face interview was conducted on the selected sample using a pre-designed, pre-tested and structured schedule which included Socio-demographic profiles, Morbidity profile, Tilburg frailty indicator, Fall efficacy scale.

- ***Tilburg Frailty Indicator (TFI)[9]*** —TFI is a self-reported schedule for assessment of frailty through its three important components, such as physical, psychological and social. Eight questions regarding physical component, four questions on psychological and three questions on social component were asked. Total attainable score was ranged from 0-15. An individual with a score of ≥6 was considered to be frail.
- ***Fall Efficacy Scale[10]*** — It assesses an ongoing concern about Falling. It consists of 16 items, the level of concern on each item was measured on a four-point Likert scale (1=not at all concerned, 2=somewhat concerned, 3=fairly concerned, 4=very concerned). The maximum possible score is 64 and depending on the number of responses, they were classified as the low concern (16-19), moderate concern (20-27), severe concern (28-64) for Falls.

Study tool validation :

Thorough literature review was done to find out a validated questionnaire/ schedule on Fall. In consultation with the guide and co-guides and the faculties of the Department of Community Medicine, IPGME&R and SSKM Hospital, Kolkata correction of the schedule was done. The schedule was validated by three experts: one public health specialist, one expert from internal medicine and administration and one epidemiologist. The schedule was translated into Bengali and back-translated into English by two separate persons with expertise in both languages. Then it was back translated into English version and was compared with the original English version any discrepancies were corrected. Pre-testing was done on 15 elderly, who had a history of Fall in last one month, after fulfilling the selection criteria.

Study technique :

(1) Face to Face Interview.
(2) Review of Medical Records.
(3) In-depth Interview (IDI).

Statistical analysis :

Data collected were entered and analysed in Microsoft Office Excel 2016 (Microsoft Corp, Redmond, WA, USA) and SPSS ver 25.0 Statistical package for the Social Sciences (IBM, New York City, USA). Descriptive statistics, such as frequency, percentage, mean, median and Standard Deviation (SD) were applied to summarize the data. Data was checked for multi co-linearity, Variance Inflation Factor was found to be less than 10 and tolerance was greater than 0.1. Thus, Pearson's Chi-square test, Univariate and multivariable logistic regression were performed. A p-value of <0.05 was considered statistically significant. The data obtained from in-depth interview was analysed thematically.

Analysis of Transcripts — The discussions were transcribed verbatim by two independent research assistants and compared for accuracy. The qualitative data were transcribed, translated and expressed as verbatim. Transcription was made in Bengali and subsequently translated into English. From the transcription, codes were established. Then these codes were combined to categories from which themes were developed.Using thematic analysis with a framework of the main analytic categories listed in table.

Ethical Consideration :

Institutional Ethics Committee permission was obtained prior to start of the study from the institution (IPGME&R/IEC/2021/590, dated- 29-11-2021). Informed written consent was obtained from each participant and all ethical principles were strictly adhered to throughout the course of the study.

Results

A total of 159 elderly participant were interviewed of which 66.0% belonged to age group of 60-69 years,15.7% belonged to 70-79 years and 18.2% belonged to more than equal to 80 years with the mean age of 68.89 ±8.3years. More than half 56.6% of the participants were males. One-third of the participants 30.2% had primary education and 23.3% were middle school as well as illiterate. Nearly half (40.2%) were unskilled, semi-skilled worker and rest 59.8% were homemaker/retired. Majority 79.2% of them stay in a joint family; nearly half 40.3% live in pucca house and 39.6% live in a mixed house. Half of the study participants 51.0% are in class III Socio-economic status as per modified BG prasad scale 2020. More than half 58.4% are currently married and 41.6% were either widow, widower, separated or divorced.

Table 1 shows the distribution of study participants according to their responses in Fall efficacy scale and association with Fall. More than half 59.1% of participants had mild Fall efficacy. Those with a history of Fall had a significantly higher odds of having severe fear of Fall compared to the reference group.

Table 2 shows the distribution of study participants according to Tilburg frailty indicator questionnaire and frailty status. A total of 30.1% of the study populations were found to be frail as per TFI scale. Mean score in physical component is 2.26 ±2.39, Mean score in psychological component 1.04 ±1.01, mean score in social component is 1.35 ±0.66.

Table 1 — *Distribution of study populations according to their response in fall efficacy scale and association with fall (n=159)*

	Frequency	Percentage	H/O fall	OR(95%CI)	p-value
Fall efficacy scale category :					
Mild	94	59.1	6	Ref	
Moderate	28	17.6	19	36.02(11.19-115.85)	0.0001
Severe	37	23.3	25	37.91(12.56-114.43)	0.0001

Table 2 — *Distribution of study populations according to TFI questionnaire and frailty status (n=159)*

Question	Yes (%)	No (%)	Descriptive statistics (score)
Physical Component :			
Do you feel physically healthy?	96 (60.3)	63 (39.7)	Mean: 2.26
Have you lost a lot of weight recently without wishing to do so?	17 (10.6)	142 (89.4)	Median: 1 SD: 2.398
Do you experience problems in your daily life due to Difficulty in walking?	49 (30.8)	110 (69.2)	Range [Min, Max]:
Difficulty maintaining your balance?	35 (22.0)	124 (78.0)	8 [0-8]
Poor hearing?	32 (20.1)	127 (79.9)	
Poor vision?	36 (22.6)	123 (77.4)	
Lack of strength in your hands?	52 (32.8)	107 (67.2)	
Physical tiredness?	76 (47.8)	83 (52.2)	
Psychological component :			Mean: 1.04
Do you have problems with your memory?	20 (12.6)	139 (87.4)	Median: 1
Have you felt down during the last month?	50 (31.4)	109 (68.6)	SD: 1.015
Have you felt nervous or anxious during the last month?	72 (45.3)	87 (54.7)	Range [Min, Max]:
Are you able to cope with problems well?	135 (84.9)	24 (15.1)	4 [0-4]
Social component :			Mean: 1.35
Do you live alone?	4 (2.5)	155 (97.5)	Median: 1
Do you sometimes miss having people around you?	93 (58.4)	66 (41.6)	SD: 0.665
Do you receive enough support from other people?	42 (26.4)	117 (73.6)	Range [Min, Max]: 3 [0-3]
FRAILTY STATUS			Mean: 4.65
Score	Number(%)		Median: 3.0
<6 Normal	111 (69.9)		SD: 3.046
≥6 Frail	48 (30.1)		Range [Min, Max]: 11 [2-13]

Table 3 Univariate logistic regression showed that age group [OR: 4.643, CI: 1.94-11.08], Occupation [OR: 0.52, CI: 0.25-1.07], type of family[OR: 5.94, CI: 1.72-20.5], Socio-economic status [OR: 0.31, CI: 0.10-0.96]. Multivariable binary logistic regression showed age group 60-69 years has lesser odds as compared to ref group [OR: 0.250, CI: 0.084, 0.743, p- 0.013], nuclear family has lower odds as compared to joint family [OR: 0.235, CI: 0.063, 0.871, p-0.030], Class I SES has higher odds of Fall as compared to reference group [OR: 3.90, CI: 1.07, 14.15, p-0.038] were significantly associated with Fall.

Table 4 Thematic analysis for qualitative data that emerged out from in-depth-interview are described in themes, codes and verbatims as "Falls occur at night…..on the way to toilets which are away from the house", "…..slippage on the floor or stairs results in Falls". "The elder people are at.. greater risk of Falling".

Discussion

The present study reported that 31.44% of elderly had experienced Falls in last one month. Current study estimates magnitude of Falls, identifying factors influencing Falls and to assess the complications associated with Falls among the elderly of Budge-Budge II block, West Bengal. Tilburg frailty indicator scale was used to estimate the frailty status and Fall efficacy scale was used to assess the fear of Fall in the study participants. More than half 59.1% of participants had mild Fall efficacy. Fall was found to be significantly associated with age group, type of family and socio-economic status.

Distribution of complications of falls among the study population as most common complication was cut and abrasion 35 participants followed by sprained in ankle with 32 participants, Back and Spine injuries 29 participants, Knee injury 12 participants, Head injuries 8 participants, Shoulder & Other injuries 4 participants.

Distribution of co-morbidities present among the study populations. The most common were related to cardiovascular 90 participants which includes hypertension, coronary artery disease; Musculoskeletal includes arthritis, low back pain (85); Endocrinal includes diabetes, hypothyroidism 56 participants; Respiratory 30 participants; Visual & hearing impairment 61 participants, Neurological 12 participants.

This is higher than the study reported by Pitchai, *et al* 2019[5] in greater Mumbai where 24.98% of the study population had experienced Falls. Another study from West Bengal by Dasgupta A, *et al* 2019[11] reported 38.8% of Falls among the study population. A study from Hyderabad among the elderly by Marmamula S, *et al* 2020[12] reported 29.1% of Falls. A study of Falls among elderly persons in a rural area of Haryana by Sirohi A, *et al* 2017[6] reported 36.6% of Falls. A study conducted in Banglore by Patil S S, *et al* 2010[4] reported 29.8% of Falls.

In the current study, Pitchai, *et al* 2019[5] in their study among the elderly population 2049 in greater Mumbai reported that age group, education, marital status and socio-economic status were significantly associated with Fall.

Dasgupta A, *et al* 2019[11] in their study among 165 elderly population in rural area reported education and chronic diseases more than two were found to be significantly associated with frailty. Marmamula S, *et al* 2020[12] in their study with1074 elderly population in Hyderabad reported Fall was significantly associated with visual impairment.

Jagnoor J, *et al* 2012[13] in their study among older people in northern India found that Fall related

Table 3 — *Multivariable binary logistic regression of fall among elderly on socio-demographic variables and other predictors (N=50)*

Independent variables	Number (%)	OR (95% CI)	AOR (95% CI)	p-value
Age group :				
60-69 years	22(44.0)	4.643(1.94-11.08)	0.250(0.084-0.743)	0.013
70-79 years	12(24.0)	1.33(0.456-3.899)	1.38(0.41-4.59)	0.597
≥80 years	16(32.0)	0		
Gender :				
Male	31(62.0)	0.72(0.36-1.43)		
Female	19(38.0)	0		
Highest level of education :				
High school	11(22.0)	1.13(0.42-3.03)		
Primary school	27(54.0)	1.03(0.45-2.35)		
Illiterate	12(24.0)	0		
Occupation :				
Homemaker/retired	35(70.0)	0.52(0.25-1.07)	0.823(0.319-2.12)	0.686
Unskilled/Semi-skilled worker	15(30.0)	0		
Type of house :				
Pucca	23(46.0)	0.77(0.36-1.61)		
Kuccha	8(16.0)	1.29(0.49-3.39)		
Mixed	19(38.0)	0		
Type of family :				
Nuclear	3(6.0)	5.94(1.72-20.5)	0.235(0.063-0.871)	0.030
Joint	47(94.0)	0		
Socio-economic status as per Modified BG Prasad Scale 2020 :				
Class I (Upper middle)	8(16.0)	0.31(0.10-0.96)	3.90(1.07-14.15)	0.038
Class II (Middle)	30(60.0)	0.42(0.19-0.92)	3.27(1.31-8.17)	0.011
Class III (Lower middle)	12(24.0)	0		
Marital status :				
Married	30(60.0)	0.91(0.46-1.80)		
Unmarried/Widow/separated	20(40.0)	Ref		

Table 4 — *Thematic analysis for qualitative data*

Themes	Codes	Qualitative illustration
Awareness of fall	When fall is common	"…During night and rainy season as the toilets are outside the house"
	How fall happened	"…Due to imbalance or slippage on the floor or stairs"
	Accompanying person	"…Most of the time no one was accompanying no caregiver is there"
Reason	Demographic factors	"With increasing age, there is a fear of fall". "As the housing condition are not good enough". "I am Living alone so I need to be conscious"
	Historical factors	"I have a previous history of fall".
	Physical deficits	"difficulty in rising from a chair";"difficulty in seeing at night";"post stroke weakness";"poor vision"
	Others	"fallen from a bed" "imbalance"
Pattern	Fall related injury	"Cut or abrasion may be fracture and head injury"
	Recurrence	"Same event occurs repeatedly"
	Duration	"Overnight and sometimes rescued by the neighbour"
Prevention strategy	Individual initiative	"It is part of our life" "Use of sticks as and when needed",
	Home environment modification	"Regular washing of the toilets and provision of light at night"

injuries were common at their age, most of them experienced Fall while walking at parks or on road or uneven surfaces. Some also experience loss of balance while changing clothes in bathroom.

Yardley L, *et al* 2006[14] in their study on older people's view of advice about Falls prevention found that older people do not reject Falls prevention advice because of ignorance of their risk of Falling but because they see it as a potential threat to their identity and autonomy. The warning about Falls risk might play a necessary role in adjustment to ageing, reminding of need to adapt their activities. Prevention materials to overcome the feelings of anxiety and helplessness associated with their awareness of Falling risk.

Conclusion

The magnitude of Falls among the elderly of Budge Budge II Block, West Bengal was around one-third of study population.The factors associated influencing Falls in the study population were higher age group, joint family and protective factor was higher Socio-economic status.The factors influencing Falls in the study population was due to slip followed by imbalance. The complications of the Falls among the study population were fracture/sprained, cut & abrasion.

Limitations : The sample size was small and was restricted to only one block. There could have been a possibility of recall bias.

Implications : Frailty can be detected in primary care setting using TFI or any other tools and will initiate the preventive, supportive and self-care measures; ultimately will reduce the burden of Fall, hospitalization and disability. The identified factors influencing Falls help in effective, comprehensive geriatric assessment in adopting multi-dimensional treatment strategies.

Acknowledgements : The author would like to acknowledge the study participants who spend their valuable times and for full cooperation.

Financial support and sponsorship : Nil.

Conflict of interests : There are no conflicts of interest.

References

1 Ageing and health [Internet].World Health Organisation; [cited 2021 Oct 7]. Available from: https://www.who.int/news-room/fact-sheets/detail/ageing-and-health [last accessed on 7th Dec 2021]
2 Vaishya R, Vaish A — Falls in Older Adults are Serious. *Indian J Orthop* 2020; **54(1):** 69-74.
3 Ageing and Life Course, Family and Community Health . WHO-Global-report-on-falls-prevention-in-older-age. World health organisation; 2008. Available from: https://extranet.who.int/agefriendlyworld/wp-content/uploads/2014/06/WHo-Global-report-on-falls-prevention-in-older-age.pdf
4 Patil SS, Suryanarayana SP, Dinesh R, Shivraj N S, Murthy N S — Risk factors for falls among elderly: A community-based study. *Int J Health Allied Sci* 2015; **4:** 135-40.
5 Pitchai P, Dedhia HB, Bhandari N, Krishnan D, D'Souza NRJ, Bellara JM — Prevalence, risk factors, circumstances for falls and level of functional independence among geriatric population - A descriptive study. *Indian Journal of Public Health* 2019; **63(1):** 21.
6 Sirohi A, Kaur R, Goswami AK, Mani K, Nongkynrih B, Gupta SK — A study of falls among elderly persons in a rural area of Haryana. *Indian J Public Health* 2017; **61:** 99-104.
7 Ingle GK, Nath A — Geriatric health in India: Concerns and solutions. *Indian J Community Med* 2008; **33:** 214-8.
8 Prevention I Of M, Us D, Berg RL, Cassells JS — Falls in Older Persons: Risk Factors and Prevention [Internet]. The Second Fifty Years: Promoting Health and Preventing Disability. US: National Academies Press; 1992. [last accessed on 7th Dec 2021]
9 Gobbens RJJ, van Assen MALM, Luijkx KG, Wijnen Sponselee MTh, Schols JMGA — The Tilburg Frailty Indicator: Psychometricproperties. *J Am Med Dir Assoc* 2010; **11:** 344 55.
10 Yardley L, Beyer N, Hauer K, Kemp en G, Piot Ziegler C, Todd C, *et al* — Development and initial validation of the falls efficacy scale international (FES I). *Age Ageing* 2005; **34:** 614-9.
11 Dasgupta A, Bandyopadhyay S, Bandyopadhyay L, Roy S, Paul B, Mandal S— How frail are our elderly? An assessment with Tilburg frailty indicator (TFI) in a rural elderly population of West Bengal. *J Family Med Prim Care* 2019; **8(7):** 2242-2248. doi: 10.4103/jfmpc.jfmpc_445_19.
12 Marmamula S, Barrenkala NR, Challa R, Kumbham TR, Modepalli SB, Yellapragada R, *et al* — Falls and visual impairment among elderly residents in 'homes for the aged' in India. *Sci Rep* 2020; **10(1):** 1338-9.
13 Jagnoor J, Keay L, Jaswal N, Kaur M, Ivers R — A qualitative study on the perceptions of preventing falls as a health priority among older people in Northern India. *Inj Prev* 2014; **20(1):** 29-34.
14 Yardley L, Donovan-Hall M, Francis K, Todd C — Older people's views of advice about falls prevention: a qualitative study. *Health Educ Res* 2006; **21(4):** 508-17.

Original Article

Epidemiological Study on Mandibular Fracture and Its Association with Anatomical Location Presenting to Emergency Department

Vijay Kumar S S[1], Shabbir Shekhli[2], Anila Jose[3]

Background : Emergency Department (ED) is usually crowded with sick patients. Assessment of patients suffering from trauma starts with primary and secondary survey to look for life threatening injuries. Management of these patients within the Golden hour (first 60 minutes of post trauma) has reduced mortality and morbidity. But there are challenges to their management and one such challenge is maxillofacial injuries, which can be easily missed by ED physician. Mandibular fracture compromises 15.5 to 59% of facial fractures and despite its importance; there is a scarcity of studies done with ED perspective[1,2]. This study aimed to identify fracture patterns in accordance with demographics and mechanism of injury which can assist ED physicians in delivering optimal treatment and can also help to formulate traffic regulation and education creating awareness at college and university levels.

Materials and Methods : This retrospective study was conducted on patients presenting to ED of S Nijalingappa Medical College, Bagalkot, over a period of 5 years (2017-22). Primary and secondary survey with demographic profiles and radiological investigations ordered were assembled and analyzed. Descriptive statistics were calculated by SPSS ver 16 software.

Results : Of 1211 patients with maxilla facial injury 218 had sustained mandibular fractures. Males were predominantly involved (70.6%). Pain and tenderness at the site were found in almost all cases, with face contusion and laceration (66.1%) being most frequent associated injuries. Urban population constituted 77.1% and high incidence was seen in months of July to September (38.1%) and mainly between 8 pm to 8 am (44.5%). Pain and tenderness Road Traffic Accidents (RTA) were most frequent etiology and fracture of parasymphysis (36.7%) was most common irrespective of etiology. Nasal bone fracture (22%) and face contusion (66.1) were common associated injuries.

Conclusion : Young men following RTA was the most frequent etiology of mandibular fracture. Patients complaining of pain, tenderness, facial contusion and lacerations should raise the suspicion of its fracture and considered for relevant radiological investigations. Parasymphysis was the commonest site irrespective of etiology.

[*J Indian Med Assoc* 2023; **121(11):** 35-9]

Key words **: Mandibular fracture, Trauma, Emergency Medicine.**

Maxillofacial injury constitutes a significant portion of visits to the Emergency Department (ED). The mandible is the second most common fracture after nasal bone comprising 15.5%-59% of facial fractures[1,2]. There is a recent shift in age distribution in mandibular fractures where adolescents and young adults are sustaining such injuries in high numbers.

The prevalence and causes of such injuries vary across countries which are mostly influenced by modern lifestyle with high-speed travel, increased violence in the society, socio-economic status, geographic location and educational status of the population[3]. In developing countries Road Traffic Accidents (RTA) is leading cause of mandibular fracture, while in developed countries assault and contact sport injuries are common causes[4,5]. Alcohol consumption is also an eminent contributing factor but not independent one[6,7].

The mandible has a role in speaking, chewing and most the importantly to maintain airway[8]. It is more prone to fracture due to its relative position to skull, which is designed to help as a defense mechanism and thus prevent the transmission of forces to skull and brain[9]. Mandibular fractures consist of fractures of coronoid, symphysis, parasymphysis, angle, trunk,

Editor's Comment :

- Mandibular fractures are a common and significant issue in emergency departments, necessitating focused care.
- Understanding the specific fracture locations helps tailor treatment, improving patient outcomes.
- This study underscores the need for injury prevention and enhanced emergency management for mandibular fractures.

[1]MD, DNB, Assistant Professor, Department of Emergency Medicine, KS Hegde Medical Academy, Karnataka 575018 and Corresponding Author

[2]MD, Assistant Professor, Department of Emergency Medicine, S Nijalingappa Medical College & HSK Hospital & Research Centre, Bagalkot, Karnataka 587102

[3]MD, DNB, Assistant Professor, Department of Medicine, Sree Narayana Institute of Medical Sciences, Chalakka, Kerala 683594

Received on : 20/01/2023

Accepted on : 27/03/2023

alveolar and condylar[10]. If such injuries are missed in ED it may lead to life-threatening complications like airway compromise and bleeding[11].

The mechanism and direction of force transmitted can be extremely helpful in diagnosis. Patients with RTA tend to have multiple fractures of the mandible as compared to assaults who usually sustain single, undisplaced fracture[12]. Despite many reports about the epidemiology there is inadequate information about the specific type or pattern of Mandibular Fractures in India and South Asian countries. The aim of this study was to identify patterns of fracture in accordance with demographics and mechanism of injury which can assist ED physicians to deliver optimal treatment to patients presenting with poly-trauma.

Materials and Methods

The records of Maxillofacial injury patients who presented to ED of S Nijalingappa Medical College, Bagalkot, Karnataka, India, a Tertiary Care Hospital, from June, 2017 to June, 2022 were retrieved from hospital data base. A retrospective analysis was conducted where among 1211 patients presenting with facial injuries 218 had sustained mandibular fractures. The data of these patients were assembled which included primary and secondary survey at ED along with age, sex, mechanism of injury, seasonal variation, number and radiological investigation (CT scan and X-rays) determining the anatomical location of the fractures were collected. Those patients who left against medical advice or whose records were incomplete/missing were excluded from the study.

Statistical analysis was done by SPSS ver 16 statistical software (SPSS Inc, IBM company, New York, US) and the descriptive statistic was used.

Ethical Clerance :

The Institutional Ethics Committee of S. Nigalingappa Medical College & Hospital has approved the Research work proposed to be carried out at S. Nijalingappa Medical College. Date: 16 th June 2022 with Reference no SNMC/IECHSR/2021-22/A-69/1.2

Results

Of 1211 patients who presented to ED with pan facial injuries, 218 had some form of mandibular fractures (18%) in which 154 patients sustained single fracture (70.6%) and 64 patients had multiple fractures (29.4%) of the mandible. The total number of fractures was 351; with mean number of fractures per mandible was 1.6. Patients age ranged from 14 to 78 years, with 154 men (70.6%) and 64 women (29.4%). The highest incidence was in the age group of 20-39 years (42.7%), followed by 40-59 years (29.9%), urban populations constituted 77.1%, higher incidence (44.5%) was between 8pm to 8am and the injuries were frequent between July to September (38.1%). (Table 1).

Table 1 — *Demographic Profile of Mandibular Fracture*

Demographic Variables	n	n%
Age :		
0-19 years	24	11
20-39 years	93	42.7
40-59 years	65	29.8
>60 years	36	16.5
Sex :		
Male	154	70.6
Female	64	29.4
Residence :		
Urban	168	77.1
Rural	50	22.9
Time :		
8am – 2pm	52	23.9
2pm – 8pm	69	31.6
8pm – 8am	97	44.5
Season :		
January - March	33	15.1
April - June	61	28
July – September	83	38.1
October - December	41	18.8

The most frequent cause of Mandibular fracture was RTA (65%) followed by falls (17%), assault (10%), sports (6%) and miscellaneous (2%) which included animal bites, gunshot injuries, dental extraction etc. RTA was the most frequent cause irrespective of the gender [males (74, 48.1%), females (29, 45.3%)](Fig 1).

Pain and local tenderness were the most common presentation to ED (100% and 93.6% respectively) with an average pain score of 6. Other findings included malocclusion (77.1%), limited mouth opening (60%) and surgical emphysema (2.8%)(Table 2).

Out of the 351 fractures of mandible, parasymphysis was the most frequent anatomical location (36.7%) followed by the angle of mandible (16.8%). Coronoid fractures were found to be rarest (1.1%) irrespective of the etiology. When fractures are subdivided as per etiology, parasymphysis fracture was most common in RTA (47.8%),condyle fracture (41.7%) in falls and angle (40%) in assault, and 33.3% in sports injuries (Table 3).

Nasal fractures were the commonest concomitant injuries (48, 22%) and face contusion with laceration being the frequent associated soft tissue injury (144,

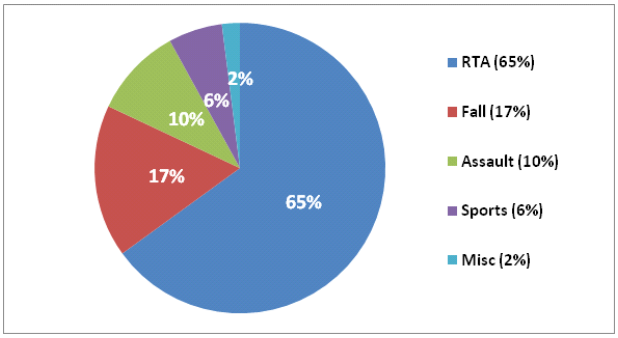


Fig 1 — Distribution of Mandibular Fracture according to etiology

Table 2 — Clinical presentation in mandibular fractures

Signs and Symptoms	n (%)
Pain	218 (100)
Malocclusion	168 (77.1)
Limited mouth opening	131 (60)
Tenderness	204 (93.6)
Paresthesia	18 (8.3)
Crepitation	59 (27)
Edema	77 (35.3)
Facial assymetry	41 (18.8)
Hematoma	61 (28)
Surgical emphysema	6 (2.8)

66.1%). Life-threatening complication like airway compromise was found in 2.8% of patients, mainly seen in patients with high-speed motor vehicular accidents (Table 4).

Discussion

One of the concerns in traumatic patients arriving to ED is Maxillofacial fractures[13]. Failure to identify the underlying Facial fractures during primary and secondary survey can lead to difficult airway management especially with procedures like oro-tracheal intubation. Other complications like facial asymmetry and restricted mouth opening can also be seen. Thus identifying and ordering appropriate investigation with early initiation of treatment in ED is essential for early recovery[14]. This retrospective analysis was undertaken to review the incidence, study the etiological factors correlating with anatomical location of the fracture along with associated injuries.

The highest incidence was observed amongst 20-39 years of age group (42.7%), with male predominance (70.6%) and it also coincides with previous reports[1,15-17]. This can be explained as second and third decade of life is most active period and men usually being involved in most of the outdoor activities.

Male to female ratio of 2.4:1 was found in our study and 5.1:1 in a study by Subhashraj, *et al*[18]. If Male to female proportion is considered as an indirect index for social engagement, this increased proportion in female mandibular injury could be attributed to high mobility and social engagement of females especially in towns and cities where women empowerment and equal opportunities have slowly begun shifting the previous norms of work culture. Thus we can expect increase in likelihood of such injuries among females in developing societies, but this is not the sole reason.

Table 4 — *Associated injuries in mandibular fracture*

Associated Injuries	n (%)
Associated fractures :	
Maxilla fracture	22 (10.1)
Zygomatic fracture	30 (13.8)
Nasal bone	48 (22)
Base of skull fracture	15 (6.9)
TMJ Dislocation	4 (1.8)
Soft tissue injury :	
Lip laceration	65 (29.8)
Face contusion and laceration	144 (66.1)
Laryngeal injury	6 (2.8)
Vision loss	5 (2.3)
Nasal Septal hematoma	12 (5.5)
Complication :	
Airway compromise	6 (2.8)
Aspiration of tooth	2 (0.9)
Alveolar or mental nerve injury	2 (0.9)
CSF Leak	1 (0.5)
CSF Rhinorrhea	1 (0.5)
CSF Ottorhea	0 (0)

Incidence is higher in urban population (77.1%) which may be due to rapid urbanization and high population in cities. In developing countries like India bad road conditions with inadequate engineering structures and lesser safety regulations on driving motor vehicles are also contributing factors[19]. In months of July, August and September more than one third of fractures are witnessed, (38.1%), similar to Johnson *et al* [21], which can have to do with monsoon seasons leading to slippery roads, low visibility and inability to judge potholes on roads causing road traffic accidents and falls among pedestrians. Higher incidence was observed between 8 pm to 8 am, also supported by other studies [20] which can be due to reckless driving, unauthorized speeding, road rage by youths, low visibility, and absence of traffic police at junctions.

There is a distinct contrast in the etiology of mandibular fractures where RTA is the most common cause in developing countries, like India, whereas assault in developed nations. These findings

Table 3 — *Distribution of anatomical location of mandibular fractures according to etiology*

Site of Fracture	Etiology											
	RTA		Fall		Assault		Sports		Others		Total	
	n	n%	n	n%	n	n%	n	n%	n	n%	n	n%
Body	20	8.8	2	3.3	4	11.4	2	9.5	0	0	28	8
Angle	29	12.7	8	13.4	14	40	7	33.3	1	14.3	59	16.8
Symphysis	25	11	6	10	1	2.9	1	4.8	0	0	33	9.4
Parasymphysis	109	47.8	8	13.3	7	20	3	14.3	2	28.6	129	36.7
Condyle	26	11.4	25	41.7	1	2.9	0	0	1	14.3	53	15.1
Ramus	11	4.8	4	6.7	3	8.6	4	19	0	0	22	6.3
Dentoalveolar	7	3.1	5	8.3	4	11.4	4	19	3	42.8	23	6.6
Coronoid	1	0.4	2	3.3	1	2.8	0	0	0	0	4	1.1
Total	228 (65)		60 (17)		35 (10)		21 (6)		7 (2)		351 (100)	

are in line with other studies and reports from WHO[18,22]. Higher incidence in developing countries is due to surge of motorcyclist population, where majority of motorcycles are unsafe, lacking strict norms for active and passive safety measures in them. The rise of motorcyclists in India is due to the post pandemic effects with restricted use of public transportation, low cost to maintain a motorcycle and availability of rental bike in cities making them popular choice of transit. Lack of safety equipment like full cover helmet, gloves, shoes and elbow/knee straps further adds to the danger of mandibular fractures in patients with RTA.

Falls was second common cause for mandibular fracture in our study. India being an agricultural land, fall from trees, like coconut and areca nut are common. Other causes of falls were slip from stairs and in bathroom, especially in geriatric population who are easily susceptible to fractures[23]. Assault constituted only a fraction of cases which could be due to social inequality and alcohol/drug abuse, such cases usually go undocumented due to patient's fear of medico legal procedures and involvement of police[6, 24].

Pain, tenderness and limited mouth opening are important presentations at ED which will help to identify the underlying mandibular fractures. Similar results were found in other studies as well[25,26]. The pain score assessment helps to appropriately manage pain. Numeric pain rating scale range from 1 to 10 and are classified as score of 1-3 as mild, 4-6 moderate and 7-10 as severe pain[27]. In our study 6 was the common score reported by the patients, and appropriate analgesics, Acetaminophen (1000mg) and Diclofenac (75 mg) via intravenous routes, were commonly used for patients with moderate pain score. Rare presentations like surgical emphysema were found in 6 patients, who also had underlying tracheal injury with airway compromise. There is a scarcity of studies on ED presentation of mandibular trauma and thus needs more insight.

The commonest fracture site, irrespective of etiology, in our study was parasymphysis 36.7% consistent with Lin, *et al*[28]. When classified as per site and etiology of fracture parasymphysis was frequently involved in RTA, while falls resulted in condylar fractures and assault patients sustained fracture in angle of mandible. These variations are related to direction and magnitude of force, nature of objects causing injury and patient factors. For example symphysis and parasymphsysis being the most prominent part of the mandible, are vulnerable in motorcyclist who are not wearing helmet or wearing only a Half-face helmet. Condylar fracture is involved when direct blow to chin from the front like in steering wheel injury, especially in cars lacking air bags and seat belt pretensioner as a standard safety[29]. Such type of figures is barely reported in the literature. Other reason for parasymphysis fracture are due to length of canine roots leading to weakening of the structure and mandible having an arch type of architecture where force is usually distributed along its length and rarely along the curved edges.

Nasal bone, Zygomatic and maxillary fractures were most prevalent with Mandibular fractures, whereas dreaded complications like airway compromise are rarely seen, even supported by other studies[23].

Mechanism of injury has significant correlation with anatomical location of the fracture and knowledge of these associations is of great importance at ED which guides in appropriate management and imaging of patients with facial injuries.

Conclusion

The majority of people suffering from Mandibular fracture were young men of working age following road traffic accidents. The etiology is closely linked with anatomical location. A fracture found at parasymphysis should raise a suspicion of RTA, angle involvement in assault and condyle to that of a fall. Thus ED physicians should always have a keen observation on primary and secondary surveys to look at signs like pain, tenderness, and limited mouth opening suggesting maxillofacial injuries in trauma patients.

There is a dire need for traffic regulation on motor vehicles and epidemiological study like ours can help in formulation of education programs at college and university levels for young adults, creating awareness about the importance of adherence to traffic rules and motorcyclists should be emphasized in road safety programs to use of full-face helmet.

References

1 Natu SS, Pradhan H, Gupta H, Alam S, Gupta S, Pradhan R, *et al* — An epidemiological study on pattern and incidence of mandibular fractures. *Plastic Surgery International* 2012; 2012: 1-7.

2 Uppada UK, Sinha R, Susmitha M, Praseedha B, Kiran BR — Mandibular fracture patterns in a rural setup: A 7-year retrospective study. *Journal of Maxillofacial and Oral Surgery* 2020; **21(4):** 1349-54.

3 van den Bergh B, van Es C, Forouzanfar T — Analysis of mandibular fractures. *Journal of Craniofacial Surgery* 2011; **22(5):** 1631-4.

4 Eskitaþçioðlu T, Özyazgan Ý, Çoruh A, Günay G, Yontar Y, Altiparmak M — Fractures of the mandible: a 20-year retrospective analysis of 753 patients. *Ulusal Travma ve Acil Cerrahi Dergisi* 2013; **19(4):** 348-56.

5 Sobin L, Kopp R, Walsh R, Kellman RM, Harris T — Incidence of concussion in patients with isolated mandible fractures. *JAMA Facial Plastic Surgery* 2016; **18(1):** 15-8.

6 O'Meara C, Witherspoon R, Hapangama N, Hyam DM — Mandible fracture severity may be increased by alcohol and interpersonal violence. *Australian Dental Journal* 2011; **56(2):** 166-70.

7 Scherer M, Sullivan W, Smith D, Phillips L, Robson M — An analysis of 1,423 facial fractures in 788 patients at an urban trauma center. *The Journal of Trauma: Injury, Infection, and Critical Care* 1989; **29(3):** 388-90.

8 Sand LP, Ramadhan A, Gavelin P, Hirsch JM — A retrospective study of patients with mandibular fractures treated at a Swedish University Hospital 1999-2008. *Annals of Maxillofacial Surgery* 2014; **4(2):** 178.

9 Mohajerani H, Ebrahimzadeh SZ — The epidemiology of mandibular fractures in patients referred to oral and maxillofacial department of Taleghani Hospital of Tehran, 1999-2003. *Journal of Dental School, Shahid Beheshti University of Medical Sciences* 2005; **22(4):** 685-9.

10 Nosrati K, Babaei S, Ashrafi Moshkabadi J — A survey of mandibular fracture regions of patients of Boualisina, Shafa, Nime shaban hospital in Sari from 2005 until 2006. *Journal* of *Ghasr-e-Baran* 2009; **1(1):** 37-41.

11 Czerwinski M, Parker WL, Chehade A, Williams HB — Identification of mandibular fracture epidemiology in Canada: Enhancing injury prevention and patient evaluation. *The Canadian Journal of Plastic Surgery* 2008; **16(1):** 36-40.

12 Yadav S, Tyagi S, Puri N, Kumar P, Kumar P— Qualitative and quantitative assessment of relationship between mandibular third molar and angle fracture on North Indian population: A Clinico-Radiographic Study. *European Journal of Dentistry* 2013; **7(2):** 212-7.

13 Yazdani J, Kaviani F, Anoush S — Survey and prevalence of maxillofacial fracture and radiologic examination in patients refered to Imam hospital of Tabriz university of medical sciences. *Medical Journal* of *Tabriz University* of *Medical Sciences* 2007; **29(3):** 129-33.

14 Shintaku WH, Venturin JS, Azevedo B, Noujeim M — Applications of cone beam computed tomography in fractures of the maxillofacial complex. *Dental Traumatology* 2009; **25(4):** 358-66.

15 Thorn JJ, Møgeltoft M, Hansen PK — Incidence and aetiological pattern of jaw fractures in Greenland. *International Journal of Oral and Maxillofacial Surgery* 1986; **15(4):** 372-9.

16 Mwaniki DL, Guthua SW — Occurrence and characteristics of mandibular fractures in Nairobi, Kenya. *British Journal of Oral and Maxillofacial Surgery* 1990; **28(3):** 200-2.

17 Ogundare BO, Bonnick A, Bayley N — Pattern of mandibular fractures in an urban major trauma center. *Journal of Oral and Maxillofacial Surgery* 2003; **61(6):** 713-8.

18 Subhashraj K, Ramkumar S, Ravindran C — Pattern of mandibular fractures in Chennai, India. *British Journal of Oral and Maxillofacial Surgery* 2008; **46(2):** 126–7.

19 Bither S, Mahindra U, Halli R, Kini Y— Incidence and pattern of mandibular fractures in rural population: A review of 324 patients at a tertiary hospital in Loni, Maharashtra, India. *Dental Traumatology* 2008; **24(4):** 468-70.

20 Pal R, Ghosh A, Kumar R, Galwankar S, Paul SK, Pal S — Public health crisis of road traffic accidents in India: Risk factor assessment and recommendations on prevention on the behalf of the Academy of Family Physicians of India. *Journal of Family Medicine and Primary Care* 2019; **8(3):** 775.

21 Johnson A, Ravindran V, Ravindran N, Manoj M — Variation of Incidence of Maxillofacial Trauma due to Road Traffic Accidents during monsoon and non-monsoon period in Malabar region, Kerala, India. *International Journal of Current Research* 2020; **12(11):** 14505-9.

22 Road traffic injuries [Internet]. World Health Organization. World Health Organization; [cited 2023Jan19]. Available from: https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries

23 Manodh P, Prabhu D, Pradeep D, Santhosh R — Incidence and patterns of maxillofacial trauma—a retrospective analysis of 3611 patients—an update. *Oral and Maxillofacial Surgery* 2016; **20(4):** 377-83.

24 Anyanechi CE. Mandibular fractures associated with domestic violence in calabar, Nigeria. *Ghana Medical Journal* 2010; **44(4):** 155-8.

25 Tatsumi H, Nakatani E, Kanno T, Nariai Y — Clinical features and treatment modes of mandibular fracture at the Department of Oral and Maxillofacial Surgery, Shimane University Hospital, Japan. *PLOS ONE* 2015; **10(9)**.

26 Jain P, Rathee M — Mandible Body Fracture [Internet]. Treasure Island (FL): StatPearls Publishing; [cited 2022Jan]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK553119/

27 van Zanden JE, Wagenaar S, ter Maaten JM, ter Maaten JC, Ligtenberg JJ— Pain score, desire for pain treatment and effect on pain satisfaction in the emergency department: A prospective, observational study. *BMC Emergency Medicine* 2018; **18(1)**.

28 Lin F-Y, Wu C-I, Cheng H-T — Mandibular fracture patterns at a medical center in Central Taiwan. *Medicine* 2017; **96(51)**.

29 Singh RK, Kumar V, Ganguly R, Patel J, Daga D — Helmet shielding effect in mandibular fractures during road traffic accident. *National Journal of Maxillofacial Surgery* 2021; **12(1):** 56-61

Case Series

Ovarian Torsion in Postmenopausal Women with varied Clinical Presentations — A case series

Karthiga Prabhu J[1], Shanmugapriya Chandrasekaran[2], Maitrayee Sen[3]

Ovarian Torsion, a gynaecological emergency though common in reproductive age group can also occur in extremes of ages. In the postmenopausal age group it may be diagnosed late or missed due to non-specific symptoms. Among 42 cases of adnexal torsion operated in a two year period in our institute, 5 were found in the postmenopausal age group (11.2%). Among the cases, there were two benign epithelial cell tumours, one granulosa cell tumour, one mature teratoma and histopathology couldnot be determined in a patient due to necrosis. In our case series only 2 out of 5 cases presented with severe acute abdominal pain suggesting a possibility of torsion and required immediate surgery. Remaining patients presented only with vague abdominal pain and bloating sensation which were nonspecific. In our case series all patients had undergone Laparotomy and proceeded with Abdominal hysterectomy and bilateral salpingo-oopherectomy. Two patients in our case series had huge ovarian mass which had undergone torsion. Adnexal torsion in postmenopausal women has varied presentations and malignancy risk should always be considered before surgery in the postmenopausal women.

[*J Indian Med Assoc* 2023; **121(11):** 40-2]

Key words **: Postmenopausal, Adnexal Torsion, Ovarian Torsion, Malignancy, Abdominal pain.**

Ovarian Torsion accounts for 3% of all gynaecologic emergencies. Among women undergoing surgical treatment for adnexal masses, Ovarian Torsion occurs in around 2%-15% of patients. Though it is considered common in reproductive-aged women it can also occur rarely in the postmenopausal women[1]. Diagnosis of ovarian torsion in the postmenopausal group may be delayed or missed due to non-specific symptoms. It maybe associated with increased risk of malignancy and complications associated with advanced age of the patient. Here, we are reporting 5 cases of Ovarian Torsion which occurred over a two year period in our institute.

Case 1

A 55-year-old postmenopausal multiparous lady presented to our emergency department with severe acute lower abdominal pain, fever and vomiting for a day. She hadattained menopause 5 years ago. On examination, she was febrile, tachycardic and a tender mass of size 10*8 cm was felt in the suprapubic region and right iliac fossa with guarding and rigidity. Her Total Leukocyte Count was 17000 with neutrophilic preponderance. Ultrasound showed a mass 10*10cm in the right adnexa with moderate free fluid. With a suspicion of Adnexal Torsion, emergency laparotomy was proceeded with. Intra-operatively there was a haemorrhagic cystic mass 10*7cm on right side which had undergone torsion once around the pedicle and another 5*5 cm ovarian cyst was present on the left side.Total abdominal hysterectomy with bilateral salpingo-oopherectomy was performed. Histopathology reported as serous cystadenoma.

Editor's Comment :

- Although torsion is not an usual phenomenon of postmenopausal ovarian tumour, it can occur irrespective of the size and histopathology of tumour.

Case 2

A 50-year-old postmenopausal multiparous lady who has attained menopause 2 years ago presented with vague lower abdominal pain for 6 months and postmenopausal bleeding on and off. On examinations her vitals were stable and a mass of size 10*7 cm was palpated in the suprapubic area with mild tenderness. On imaging she was found to have a solid ovarian mass 10*7 cm on the right side with no free fluid. Her tumour markers CA125 and CEA were found to be normal. On her pre-operative evaluation her total leukocyte count was found to be 13,600. Endometrial biopsy revealed proliferative phase endometrium. At laparotomy, intra-operatively there was torsion of right ovarian mass twice around the pedicle (Fig 1). Total abdominal hysterectomy with bilateral salpingo-oophorectomy was done. Histopathology was reported as granulosa cell tumour and she is on regular follow-up.

Department of Obstetrics and Gynaecology, SRM Institute of Science and Technology, Kattankulathur, Chengelpet, Tamilnadu 603203
[1]MD, Professor and Corresponding Author
[2]MD, Associate Professor
[3]DNB, Associate Professor

Received on : 28/09/2022
Accepted on : 12/10/2023

Fig 1 — Intraoperative finding of a solid right ovarian mass twisted twice around the pedicle

Case 3

A 67-year-old multiparous lady who is postmenopausal for 20 years presented to gynaecological out patient department with complaints of bloating and abdominal distension for 1 week. On examination there was a huge mass filling the abdominal cavity. In imaging a huge complex right ovarian mass 25*20 cm was seen. Other abdominal organs were normal and there was no free fluid. Her tumour markers were normal and she was planned for staging laparotomy. Her pre-operative evaluation showed mildly elevated white blood cell count 13,800. Intra-operative findings were a 25*20 cm right ovarian mass filling the abdominal cavity which had torsed around the pedicle once. The other ovary was normal. Histopathology confirmed it as a mature teratoma.

Case 4

A 55-year-old multiparous woman postcaesarean who has attained menopause 6 years ago presented with acute lower abdominal pain for 2 days. On examining she had tachycardia and mild abdominal tenderness on left iliac fossa. On bimanual examination a tender 8*8cm mass was felt in the right fornix. As she had acute symptoms and ultrasound findings were suggestive of torsion she was planned for emergency surgery. Her Total Leukocyte Count was markedly elevated. Intra-operatively, a 8*7 cm necrotic ovarian mass twisted thrice around its pedicle was seen. Uterus was totally plastered to the anterior abdominal wall and Pouch of douglas was obliterated. Total abdominal hysterectomy with bilateral salpingo-oopherectomy was done. Histopathology reported as haematosalpinyx with right Ovarian Torsion. Retrospectively her tumour markers were found to be normal. Probably the adhesions were due to chronic pelvic inflammatory disease.

Case 5

A 59-year-old postmenopausal lady presented with acute abdominopelvic pain for 1 day and abdominal distension for the past 3 months. She had attained menopause 18 years ago. On examination patient was obese and an abdominopelvic mass was felt in the suprapubic, right iliac fossa and right lumbar region with minimal free fluid. Imaging studies showed a thick walled cyst occupying the abdomen just short of xiphisternum. She had Leucocytosis with neutrophilc preponderance 86%. Her tumour markers were normal. She was planned for staging laparotomy and intra-operatively a left ovarian tumour of size 20*24 cm twisted around its pedicle was seen. She was proceeded with total abdominal hysterectomy with bilateral salpingo-oopherectomy (Fig 2). Histopathology revealed a benign mucinous cystadenoma.

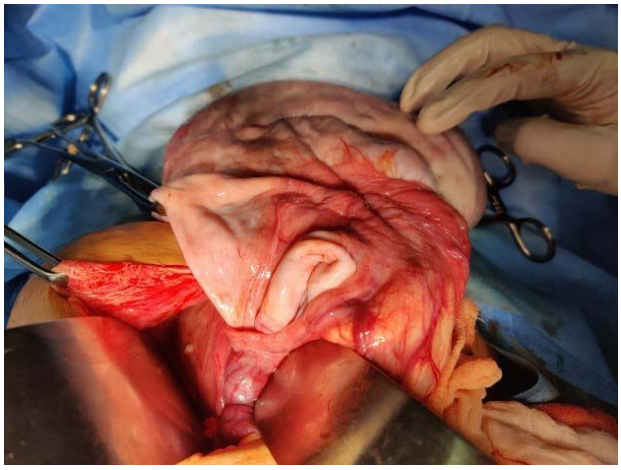


Fig 2 — Intra-operative picture of a large thickwalled ovarian cyst twisted around its pedicle

Discussion

Ram Eitan, *et al* in a retrospective cohort study found that among postmenopausal women with Adnexal Torsion 22% were malignant tumours, 11% were fibroma, 8% were cystadenomas and 8% were mature teratoma[2]. In our case series, we found two benign epithelial cell tumour, one granulosa cell tumour and one mature teratoma and all of them underwent torsion irrespective of their size and histopathology.

Though Adnexal Torsion is more common in reproductive age it can occur rarely in postmenopausal women. Among 42 cases of Adnexal Torsion operated in a two year period, 5 were found in the postmenopausal age group (11.2%). Zohreh Yousefi, *et al* found the incidence of Ovarian Torsion in postmenopausal women to be 22.6% with mean age of presentation as 59±5.8 years[3].

In our case series only 2 out of 5 cases presented with acute features suggesting a possibility of torsion and required immediate surgery. Remaining patients presented only with non-specific symptoms like vague abdominal pain and bloating sensation. Cohen, *et al* in a cohort study among postmenopausal women with Ovarian Torsion found continuous dull pain as the major presenting symptom in the postmenopausal group (57%), compared to acute-onset sharp pain in the pre-

menopausal group (86%)[4].

There was increased Total Leukocyte Count in all our cases with increased neutrophil count.

According to Herman, *et al* complex ovarian masses and larger ovarian masses were more common among postmenopausal patients[5]. In our case series also two patients had ovarian mass more than 20 cm.

Ovarian Torsion occur more commonly with a benign tumour and the incidence of Malignancy in Ovarian Torsion is reported in <2%[5]. In our case series malignancy was detected in one patient (20%). Malignant tumours less likely causes torsion as malignancy leads to the adhesion of the ovary with surrounding tissues.

According to Herman, *et al* postmenopausal women undergo extensive surgery including bilateral salpingo-oophorectomy with or without Total Abdominal Hysterectomy as opposed toconservative surgery in pre-menopausal surgeries[5]. In our case series all patients had undergone Abdominal Hysterectomy and bilateral salpingo-oopherectomy. Abdominal hysterectomy with Bilateral salpingo-oophorectomy was preferred in the postmenopausal age group probably due to increased risk of Malignancy and re-operation. Extensive surgery can be avoided where frozen section facilities are available[5].

According to Cohen, *et al*, laparoscopic surgery was preferred in the pre-menopausal group when compared to postmenopausal group (87.5% *versus* 50%)[4]. In our case series all patients had undergone laparotomy.

In our case series two patients with huge ovarian mass had undergone torsion. One was a solid ovarian tumour and the other was a thick walled ovarian cyst. Probably torsion with partial occlusion of vessel has occurred when the ovarian mass was small and the mass has grown continuously.

Conclusions

Adnexal torsion in postmenopausal women is an uncommon entity and torsion can present with varied clinical features. Malignancy risk should always be considered before surgery in the postmenopausal women necessitating extensive surgery.

References

1 Huang C, Hong MK, Ding DC — A review of ovary torsion. *Ci Ji Yi Xue Za Zhi* 2017; **29(3):** 143-47.
2 Eitan R, Galoyan N, Zuckerman B, Shaya M, Shen O, Beller U — The risk of malignancy in post-menopausal women presenting with adnexal torsion. *Gynecol Oncol* 2007; **106(1):** 211-4.
3 Yousefi Z, Farazestanian M, Mottaghi M, Pourmoghadam N — Ovarian Torsion in Postmenopausal Women and risk of malignancy. *Journal of Midwifery and Reproductive Health* 2015; **3(4):** 479-82.
4 Cohen A, Solomon N, Almog B, Cohen Y, Tsafrir Z, Rimon E, Levin I — Adnexal Torsion in Postmenopausal Women: Clinical Presentation and Risk of Ovarian Malignancy. *J Minim Invasive Gynecol* 2017; **24(1):** 94-7.
5 Ganer Herman H, Shalev A, Ginath S, Kerner R, Keidar R, Bar J, Sagiv R — Clinical characteristics and the risk for malignancy in postmenopausal women with adnexal torsion. *Maturitas* 2015; **81(1):** 57-61.

Case Report

An Unusual Cause of Jaundice in the Tropics

Nikhila Avinash Phadnis[1], Govind Shiddapur[2], Prateek Harsh[3], Nidhi Rana[3]

In the tropical and subtropical regions of the World, Dengue and Leptospirosis are commonly found diseases. There have been an increasing number of reports about the overlapping spectrum of both conditions, which can leave clinicians confused. A 24-year-old female gives a history of mild abdominal pain since 3 days, which was associated with yellowish discolouration of bilateral sclera and skin since 4 days, fever spikes since 1 week and bilateral lower limb swelling since 10 days. Patient was conscious, oriented. Pallor and icterus were present. Patient was vitally stable. Haemoglobin was 11.1 g/dl, TLC was 14,500/mm, Platelets were 33,000 per microlitre. Total Bilirubin - 9.56 mg/dl and Direct Bilirubin - 6.99 mg/dl D dimer was over 10,000 CECT abdomen and pelvis: suggestive of edematous gall bladder wall, mild splenomegaly and mild ascites. Dengue IgM and Leptospira IgM results both came to be positive. Thrombocytopenia and a low serum albumin level, pointed towards dengue fever as the pre-dominant infection. During inpatient stay, patient responded well to antibiotic therapy as well as adequate fluid measures. She was discharged and asked to follow-up after one month. Dengue and Leptospira are common conditions in tropical regions, which can present as an overlap. Hence, it is important to differentiate between the two so as to initiate early treatment and decrease the chances of morbidity and mortality.

[*J Indian Med Assoc* 2023; **121(11):** 43-4]

Key words **: Dengue, Leptospirosis, Overlap, Co-infection.**

Leptospirosis and Dengue are both common diseases in the tropics and subtropics. There have been an increasing number of reports of co-infection of Dengue and Leptospirosis in these regions. Increased awareness about the presence of co-infection is necessary, so that a high index of suspicion can be maintained.

Case Report

A 24-year-old female gives a history of mild abdominal pain, which was dull, diffuse, aching and continuous in nature in the last 3 days. It was associated with yellowish discolouration of bilateral sclera and skin in the past 4 days.

She also gives history of one episode of fever one week ago (99 degrees Fahrenheit).

She had one episode of epistaxis on the first day of admission.

On admission :

The patient was conscious, oriented to time, place and person.

Blood Pressure was 100/60mmHg, Pulse rate was 90/min and Respiratory rate was 20/min. The patient's saturation was normal.

On general examination :

Pallor and icterus (over bilateral sclera, upper and lower limbs, and abdomen) were present.

Bilateral pitting pedal edema was present up till the shin.

On examination of the abdomen :

There was no evidence of organomegaly.

Department of Medicine, Dr D Y Patil Medical College, Hospital & Research Centre, Pune, Maharashtra 411018

[1]MBBS, MD (General Medicine), Resident and Corresponding Author

[2]MBBS, MD (General Medicine), DNB (Medicine), Professor and Head

[3]MBBS, MD (General Medicine), Resident

Received on : 21/01/2023

Accepted on : 13/02/2023

Editor's Comment :

- Dengue and Leptospirosis remain important causes in the differential diagnosis for jaundice in tropical regions.
- As the severity of illness, as well as treatment, can differ for both, physicians should ensure that improved screening measures and clinical suspicion be practiced for the same.

Laboratory Parameters —

Hb - 11.1 g/dl, TLC - 14,500/mm^3, Platelets - 33,000

Total Bilirubin - 9.56 mg/dl Direct Bilirubin - 6.99 mg/dl

SGOT - 914 U/L SGPT- 331 U/L ALP - 418 U/L

Serum Potassium - 5.2 mmol/L S. Albumin - 2.4 g/dl

INR- 1.47

HBsAg, HCV, HIV - non reactive

D-Dimer>10,000 ng/ml, S. Fibrinogen - 88 mg/dl

On day 2 of admission, Dengue report was IgM+ve (NS-1, IgG negative)

On day 4 of admission, Leptospira was IgM+ve

Anti HAV IgM, anti HEV IgM were non-reactive

Radiological Investigations —

Ultrasonography Abdomen + Pelvis - Borderline hepatosplenomegaly was present, with mild to moderate ascites and bilateral mild pleural effusion.

CECT Abdomen Pelvis showed edematous gall bladder wall, mild splenomegaly and mild ascites

The patient was started on Injection Piptaz (Piperacillin + Tazobactam).

At a dose of 4.5 grams iv TDS for the next 7 days.

The patient was started on Tablet Doxycycline 100mg BD, Tablet Rifaximin 550 mg BD and Tablet Furosemide 20mg and Tablet Spironolactone BD. Infusion of 5% Albumin was given a total of 4 times. Adequate hydration was ensured.

During the course of IPD stay, patient improved clinically and according to laboratory reports.

On discharge, Total Bilirubin was 2 mg/dl and INR had

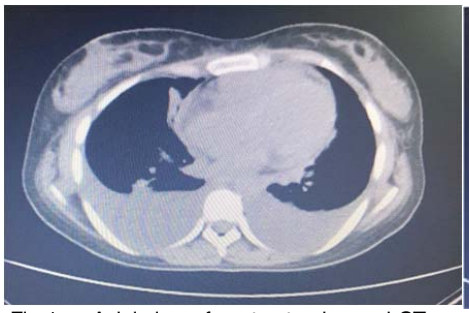


Fig 1 — Axial view of contrast enhanced CT scan of the abdomen showing bilateral pleural effusion

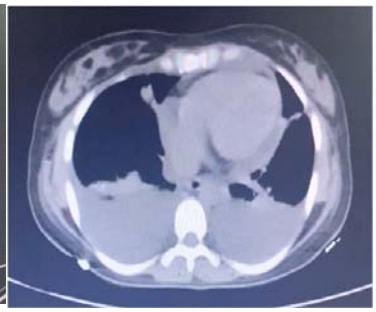


Fig 2 — Axial view of contrast enhanced CT scan of the abdomen showing oedematous gall bladder wall, mild splenomegaly and mild ascites

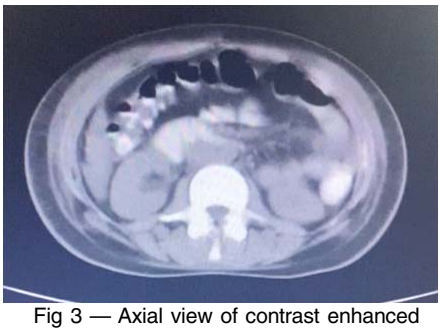


Fig 3 — Axial view of contrast enhanced CT scan of the abdomen showing oedematous gall bladder wall, mild splenomegaly and mild ascites

normalized to 1. Platelet count had increased to 1.28 lakhs. The patient was advised to follow up with Liver Function Tests and for repeat Ultrasonography after 1 month.

Discussion

Leptospirosis, caused by the bacterium *Leptospira*, is a zoonotic disease. As a mild infection, it presents as fever, headache, and myalgia[8]. In severe leptospirosis, the clinical features include jaundice, bleeding diathesis, and renal dysfunction[8].

Dengue fever is due to four serotypes of the *Dengue Virus (DENV)*[9] In severe cases ie, hemorrhagic fever or shock syndrome, patient can present in critical condition with bleeding manifestations and hypotension[9].

In tropical regions, Dengue and Leptospirosis have a widespread distribution[3]. For new infection, the detection of Leptospira IgM antibody is very useful[3]. It should be noted that IgM antibody in late acute or convalescent phase can be diagnostic for dengue infection[3].

Dengue IgM ELISA is most common method used for diagnosis. Immuno-chromatographic assay for the detection of NS1 antigen is also an option. RT-PCR method is not available in most laboratories[3]

For Leptospirosis, IgM-ELISA is suitable for early and definitive diagnosis of acute infection[5].

During the initial stages of the illness, it may be challenging to distinguish between Leptospirosis and Dengue on a clinical basis. Consequently, Leptospirosis and Dengue are frequently confused by medical professionals and public health officials[4].

Depending on the seriousness of the patient's condition, Leptospirosis is treated differently. In mild situations, some publications advise against using antibiotics[6,7]. Fluids can benefit these individuals as well as reducing their fever. Doxycycline, amoxicillin or ampicillin are examples of antibiotics that may be administered in specific mild situations[7].

Third-generation cephalosporins or erythromycin can be used[6] if the infection is severe[7]. Due to the possibility of developing multi-organ failure syndrome, patients with icteric leptospirosis typically require admission to an Intensive Care Unit and may need mechanical ventilation[7]. Leptospirosis typically resolves on its own, but the severe variant, known as Weil's disease, can be deadly[1,7].

In this patient, the dominating infection was dengue fever, as evidenced by Thrombocytopenia and low serum albumin levels. Hence, the requisite coverage was given, in the form of Piperacillin-Tazobactam, a broad-spectrumantibiotic, along with iv fluids. Doxycycline was also added as it has been proven to be beneficial in patients with mild leptospira infection.

Conclusions

There is a wide prevalence of co-infection of Dengue and Leptospirosis in recent studies conducted in tropical and subtropical regions. Clinicians should be aware of this condition so as to ensure early diagnosis and treatment, especially in critical cases[2,10].

Prior publication - Nil, **Support** - Nil
Conflicts of interest - Nil, **Permissions** - Nil

References

1 Wagenaar J, Goris M — Leptospirosis. Harrison's Principles of Internal Medicine 2022; **184(21):** 1417-21.
2 Suppiah J, Chan SY, Ng MW, Khaw YS, Ching SM, Mat-Nor LA, *et al* — Clinical predictors of dengue fever co-infected with leptospirosis among patients admitted for dengue fever - a pilot study. *J Biomed Sci* 2017; **24(1):** 40.
3 Sachu A, Madhavan A, Vasudevan A, Vasudevapanicker J — Prevalence of dengue and leptospirosis co-infection in a tertiary care hospital in south India. *Iran J Microbiol* 2018; **10(4):** 227-32. PMID: 30483374; PMCID: PMC6243148.
4 Sharma K, Kalawat U, Latha M — Coinfection of leptospirosis and dengue fever at a tertiary care center in South India. *Scholars Research Journal* 2012; **2(1):** 12, published January 2012. DOI:10.4103/2249-5975.119800
5 Niloofa R, Fernando N, de Silva NL, Karunanayake L, Wickramasinghe H, Dikmadugoda N, *et al* — Diagnosis of Leptospirosis: Comparison between Microscopic Agglutination Test, IgM-ELISA and IgM Rapid Immuno-chromatography Test. PLoS One. 2015 Jun 18;10(6):e0129236. doi: 10.1371/journal.pone.0129236. PMID: 26086800; PMCID: PMC4472754.
6 Sachu A, Madhavan A, Vasudevan A, Vasudevapanicker J — Prevalence of dengue and leptospirosis co-infection in a tertiary care hospital in south India. *Iran J Microbiol* 2018; **10(4):** 227-32. PMID: 30483374; PMCID: PMC6243148.
7 Wang S, Stobart Gallagher MA, Dunn N — Leptospirosis. [Updated 2022 May 2]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan
8 Haake DA, Levett PN — Leptospirosis in humans. *Curr Top Microbiol Immunol* 2015; **387:** 65-97. doi: 10.1007/978-3-662-45059-8_5. PMID: 25388133; PMCID: PMC4442676.
9 Gubler DJ — Dengue and dengue hemorrhagic fever. *Clin Microbiol Rev* 1998; **11(3):** 480-96. doi: 10.1128/CMR.11.3.480. PMID: 9665979; PMCID: PMC88892.
10 Md-Lasim A, Mohd-Taib FS, Abdul-Halim M, Mohd-Ngesom AM, Nathan S, Md-Nor S — Leptospirosis and Coinfection: Should We Be Concerned? *Int J Environ Res Public Health* 2021; **18:** 9411.

Case Report

Suspected Tigecycline and Levetiracetam induced raised Creatine Kinase (CK) and Rhabdomyolysis

Suparna Chatterjee[1], Rahul Ghiya[2], Debarshi Chatterjee[3]

Drug induced skeletal muscle toxicities are rare adverse effects which are often under reported. Rhabdomyolysis involves breakdown of skeletal muscle fibers leading to release of its cellular contents like Creatine Kinase (CK) and myoglobin into the bloodstream. Tigecycline (TG) has rarely been observed to cause elevated CK levels, but there are some published reports of Levetiracetam (LEV) associated Rhabdomyolysis.

We report a case of intracerebral haemorrhage and sepsis who developed Rhabdomyolysis suspected to be due to tigecycline and levetiracetam. This case report intends to sensitize clinicians of a rare and potentially life threatening Adverse Drug Reactions (ADR) of Rhabdomyolysis suspected to TG and LEV. Timely diagnosis and prompt management averted fatality.

[*J Indian Med Assoc* 2023; **121(11):** 45-7]

Key words **: Tigecycline, Levetiracetam, Rhabdomyolysis, Creatine Kinase (CK), Adverse Drug Reaction.**

Drug induced skeletal muscle toxicities are rare adverse effects which are often under reported. The spectrum of such Adverse Drug Reactions (ADR) vary from mild myalgia, muscle weakness to potentially fatal rhabdomyolysis.

Rhabdomyolysis involves breakdown of skeletal muscle fibers leading to release of its cellular contents like Creatine Kinase (CK) and myoglobin into the bloodstream. Elevated serum CK level is the most commonly used laboratory parameter to substantiate the clinical diagnosis of rhabdomyolysis.

Tigecycline (TG) is a broad spectrum parenteral antibiotic. It is chemically a tetracycline derivative (glycylcycline)[1-3]. The approved indications are complicated skin and soft tissue infections, intra abdominal infections and bacterial pneumonia in adults and children[2,3]. The listed ADR are anaphylaxis, anaphylactoid reaction, raised liver enzymes, jaundice and rarely hepatic failure[2,3].

Levetiracetam (LEV) is an anti seizure drug approved as adjunctive therapy for myoclonic, focal onset and primary generalized tonic clonic seizures in adults and children above 4 years of age. The common ADRs include fatigue, somnolence, ataxia, dizziness, behavioral abnormalities and psychotic symptoms[4,5].

[1]DTMH, MD, FRCP, Professor, Department of Pharmaoclogy, IPGME&R and SSKM Hospital, Kolkata 700020 and Corresponding Author

[2]MD, Consultant Neurointensivist, Department of Critical Care, Institute of Neurosciences, Kolkata 700017

[3]MCh, Consultant Neurosurgeon, Department of Neurosurgery, Institute of Neurosciences, Kolkata 700017

Received on : 13/02/2023

Accepted on : 18/02/2023

Editor's Comment :

- TG has rarely been observed to cause elevated CK levels.
- A patient with ICH and sepsis treated conservatively with Tigecycline showed marked elevation of serum CK level [nearly a 30 fold rise of upper limit of normal].
- After discontinuation, though significant decrease in CK level, but did not normalize.
- Levetiracetam was replaced with Lacosamide and CK level came to normal.

TG has rarely been reported to cause elevated CK levels, but LEV associated rhabdomyolysis has been reported. We narrate a rare case of rise of CK level with Rhabdomyolysis induced by tigecycline (TG) and Levetiracetam (LEV) in a patient of Cerebrovascular Accident (CVA) with sepsis.

Case Report

A 69-year-old male patient was admitted to a Critical Care Unit of Tertiary Care Neurosciences hospital in Kolkata with right sided hemiplegia. Imaging studies confirmed it as left sided Intracerebral Hemorrhage (ICH) with midline shift. Patient was hypertensive with Type 2 Diabetes adequately controlled by oral medications. His baseline biochemical, serological and hematological parameters were within normal range (Table 1). There was no history of convulsions, rigorous exercises or any musculo- skeletal disorders prior to admission. No significant abnormalities were noted in baseline EEG and ECG.

Patient received conservative management for ICH. He was hemodynamically stable and baseline tracheostomy was done and after 3 days he was successfully weaned off from mechanical ventilation. He

Table 1 — *Baseline parameters*

Parameter	Result
Hemoglobin (g/dl)	11.2
Serum Potassium (mEq/L)	3.5
Serum Sodium (mEq/L)	137
Serum Calcium (mg/dl)	7.8
Serum Magnesium (mg/dl)	1.96
Serum Creatinine (mg/dl)	0.9
AST (IU/L)	164
ALT (IU/L)	138
ALK (IU/L)	82
LDH (IU/L)	493
GGT (IU/L)	17
Total protein (g/dl)	4.66
Albumin (g/dl)	2.01
SARS CoV2 RT PCR	negative

AST- Aspartate Transaminase; ALT- Alanine Transaminase; Alk Alkaline Phosphatase; LDH- Lactate Dehydrogenase; GGT- Gamma Glutamyl Transaminase; RT PCR- Reverse Transcriptase Polymerase Chain Reaction

developed fever with raised CRP levels and was given injection meropenem from 18/4/22 to 26/4/2022 and injection teicoplanin 18/4/2022 to 23/4/2022. As his CRP levels remained high, injection tigecycline (100 mg loading dose followed by 50 mg twice daily) was added from 27/4/22. After receiving four doses of TG (100mg IV loading dose followed 50mg IV twice daily), his urine colour changed to dark brown.

There was marked elevation of serum Creatine Kinase level [approximately 30 fold rise of upper limit of normal- (ULN <308 IU/L in males]. The rise was nearly 90 fold from his admission CK level (103 IU/L to 9410 IU/L) and urine myoglobin was also raised (>30000µg/L). A transient elevation of serum potassium (6.1 mEq/L) was noted but other electrolytes and creatinine were within the ULN. EEG was also done to rule out non-convulsive seizures and CK -MB cardiac enzymes were also normal. His liver function parameters were normal and due to early interventions he did not develop acute kidney injury. Concomitant medications included-leviteracetam, metoprolol, metformin, ivabradine, pantoprazole, salbutamol with ipratropium and lactulose.

In the absence of other non-drug related causes like seizures, hypothermia, muscle trauma, cardiac injury, dyskinesia, vigorous exercise and hypothyroidism a detailed review of the prescribed medications was undertaken. Absence of drug exposure with known myotoxicity potential other than tigecycline and levetiracetam led to a clinical suspicion that TG as the primary suspect drug due to its closest temporal association. TG was discontinued but LEV was continued though were several published reports of LEV induced raised Creatine Kinase levels. The justification for such decision was based on the fact that we first wanted to discontinue the suspect medications one at a time. He was promptly treated with intravenous fluids, forced

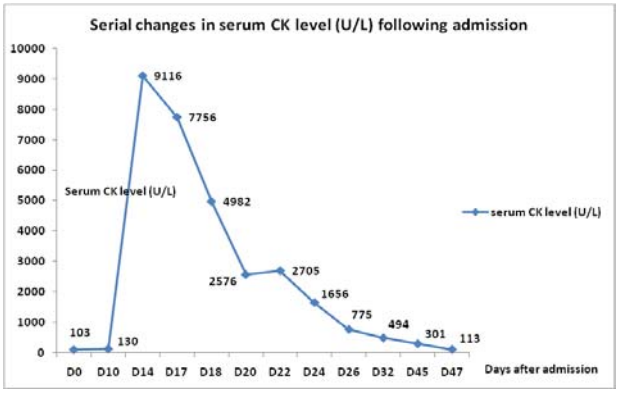


Fig 1 — Serial changes in serum creatine kinase (CK) levels

alkaline diuresis for management of rhabdomyolysis. The serial changes of Creatine Kinase levels are depicted in Fig 1.

Though there was a significant decline in the CK levels after TG discontinuation but it did not normalize even after 5 days so we suspected that LEV could also be additionally implicated. Hence, LEV was stopped LEV and replaced with lacosamide. Within 4 days of LEV withdrawal, the CK levels normalized. However, CK estimation was done only on admission and thereafter when the patient passed high colored urine. Therefore, we cannot rule out the possibility of any rise of CK levels after levetiracetam initiation and whether it was an additive ADR following TG administration. As the lag period between TG initiation and passage of high colored urine was the shortest so TG was considered as primary suspect drug but LEV was also implicated in the causation as CK levels reduced but did not normalize after TG withdrawal. Therefore, we suspect that concomitant administration of TG and levetiracetam may have increased the risk of the ADR.

A diagnosis of tigecycline and levetiracetam induced elevated CK was made on the basis of temporal association, exclusion of other known causes of raised CK levels and positive dechallenge outcome. Causality assessment as per Naranjo's[6] and the WHO-UMC causality assessment[7] scales categorized it as "Probable" for TG and LEV.

Discussion

A literature search of drug induced elevated CK and rhabdomyolysis was undertaken and summarized in Table 2. A review article [8] on drug induced myo-toxicties has suggested some underlying mechanisms - (a) direct damage to muscle cell organelles like the myofibrillar proteins, lysosomes and mitochondria, (b) immunologically mediated inflammatory damage, (c) alteration of muscle function secondary to drug induced changes in electrolytes, substrate availability and oxygen/blood supply to muscles. However, the mechanism of TG and LEV induced skeletal muscle toxicity has not been

explicitly stated in any published literature.

The WHO global spontaneous drug safety database (*Vigibase*)[9] as on July 16th 2022, showed 6 reports globally of TG and 420 reports of LEV induced rhabdomyolysis. A recently published review article [10] on LEV induced rhabdomyolysis has highlighted several cases.

Table 2 — *List of some drugs which may cause elevated creatine kinase (CK) and/or rhabdomyolysis*[8,10-14]

Groups	Drug
Lipid lowering drugs	statins, fibrates, niacin
Rheumatological drugs	D-penicillamine, chloroquine, hydroxychloroquine,
Antimicrobials	zidovudine, abacavir (especially when given with protease inhibitors), clarithromycin, ketoconazole
Dermatological	systemic retinoids
Antipsychotics	clozapine, olanzapine
Oncologic/ Immunomodulatory drugs	
• BRAF inhibitors	binimetinib
• Tyrosine Kinase inhibitors	dasatinib, nilitinib, bosutinib
• Immune check point inhibitors	pembrolizumab, avelumab, nivolumab
Others	colchicine, cocaine, MDMA (3,4-methylenedioxy-methamphetamine), amphetamines, alcohol, labetolol, pindolol nebivolol, leviteracetam

Conclusion

Patients in critical care setting require therapy with multiple drugs so careful monitoring of their safety is relevant. This case report sensitizes clinicians of a rare and potentially life threatening ADR of Rhabdomyolysis suspected to TG and LEV. Timely diagnosis and prompt management averted fatality.

References

1 Beaudy CE, Winston LG — Tetracyclines, Macrolides, Clindamycin, Chloramphenicol, Streptogramins, & Oxazolidinones. In: Katzung BG eds. Basic & Clinical Pharmacology, 14th edition. New York, United States: Mc Graw Hill Education; 2018: 818.

2 Prescribing information of Tygacil. Available from: https://www.accessdata.fda.gov/drugsatfda_docs/label/2010/021821s021lbl.pdf. [Last Accessed on 2022 May 02].

3 Summary of product characteristics Tygacil. Available from: https://www.ema.europa.eu/en/documents/product-information/tygacil-epar-product-information_en.pdf. [Last Accessed on 2022 May 02].

4 Smith DM, Metcalf CF, Wilcox KS — Pharmacotherapy of epilepsy: In: Brunton LL, Hilal- Dandan R, Knollmann BC eds. Goodman and Gilman's The Pharmacological Basis of therapeutics, 13th. ed., New York: McGraw Hill Education; 2018. p 317.

5 Levetiracetam prescribing summary. Available from: https://www.pdr.net/drug-summary/Levetiracetam-Injection-levetiracetam-23988. [Last Accessed on 2022 July 16].

6 CA Naranjo, U Busto, EM Sellers, P Sandor, I Ruiz, EA Roberts, *et al* — A method for estimating the probability of adverse drug reactions. *Clin Pharmacol Ther* 1981; 30: 239-45.

7 The use of the WHO-UMC system for standardised case causality assessment. Reproduced with permission of Uppsala monitoring centre. Available from https://www.who-umc.org/media/2768/standardised-case-causality-assessment.pdf. [Last accessed on 2022 July 28]

8 Janssen L, Allard NAE, Saris CGJ, Keijer J, Hopman MTE, Timmers S — Muscle Toxicity of Drugs: When Drugs Turn Physiology into Pathophysiology. *Physiol Rev* 2020; **100(2):** 633-672. doi: 10.1152/physrev.00002.2019.

9 Qualititative vigilyze search results of tigecycline and rhabdomyolysis. Available from: https://vigilyze.who-umc.org/. [Last accessed on 2022 July 28]

10 Moinuddin IA — Suspected Levetiracetam-Induced Rhabdomyolysis: A Case Report and Literature Review. *Am J Case Rep* 2020; **21:** e926064. Published 2020 Oct 28. doi:10.12659/AJCR.926064

Short Communication

Sample Size Calculation using Free Softwares – Part 1 : Prevalence Studies

Deepu Palal[1], Hetal Rathod[2], Sudhir L Jadhav[3], Prerna Verma[1], Vallari Jadav[1], Johnson S[1]

Calculating the sample size is one of the crucial steps in clinical research planning. The aim is to correctly sample the study population so that accurate conclusions about the population can be derived from the study findings. The feasibility of the study, given the resources, is a major determinant of the sample size. Since prevalence studies are the most commonly used studies in epidemiology, this article focuses on teaching researchers to calculate sample size using freely available softwares such as WinPepi and Epi Info 7. On WinPepi, click Describe → select K, Sample size → select prevalence rate → Enter assumed rate as well as acceptable difference while keeping denominator as 100 and click Run to obtain required sample. Open EpiInfo, Click Statcalc → select population survey → Enter Prevalence as expected frequency, acceptable Margin of Error. Choose sample size calculated automatically against 95% Confidence level. Sample size calculation and analysis using softwares brings a researcher close to self-reliance with accurate results and minimal human error.

[*J Indian Med Assoc* 2023; **121(11):** 48-50]

Key words **: Sample Size, Prevalence, Biostatistics, Cross-sectional Studies, Feasibility Studies, Software.**

Sample size calculation is an important element to be considered in designing a study. While the aim is to correctly sample the study population so as to obtain enough participants with and without having the condition at play, given specific power and confidence, the feasibility of the study, given the resources, is a major determinant of the sample size. Prevalence studies are the most commonly used studies in epidemiology. Though the simplest and the most accurate study design is the simple random sampling, occasionally cluster sampling and stratified random sampling are also used. The objective of this article is to empower researchers to calculate the sample size for prevalence studies using commonly available free softwares.

Editor's Comment :

- Sample size calculation is a crucial step in research.
- In prevalence studies the inputs for estimation are the prevalence, the allowable error and the confidence level.
- Simple tips on calculating it using freely available software like WinPepi, EpiInfo are provided.

Basic concepts :

Before diving into the calculation by software, a researcher must understand some of the terms and their implications. Expected Prevalence (P) should be obtained from previous literature where the population is as close as your study population. In case there is a range of prevalence available from various sources, one which is closer to 50% must be taken[1]. Even though some literature says if the prevalence is unknown, take P=50% for calculation; however, if the researcher thinks the disease is rare or too prevalent (P<10% or P>90%), it is advised to do a pilot[1] to get a rough estimate for calculation or can be assumed based on one's clinical experience. Level of confidence (Z) is used to quantify uncertainty is usually taken as 1.96 (95%CI). Allowable error (d) denotes the maximum permissible error in the sample size calculation, it can go either way. For prevalence ranging from 10% to 90%, an absolute allowable error of ±5% is usually taken for a small study and ±2-3% is taken for a large-scale study[2]; while a d = P/2 (when P is less than 10%) or d = (100-P)/2 (when P is greater than 90%) is taken for a small-scale study and d = P/4 or d = (100-P)/4 for a large study. The minimum sample size is calculated by the following equation[1].

$$n = \frac{(Z^2)P(100-P)}{d^2}$$

Optionally loss of subjects (10% standard) can also be added to account for non-response rate, dropouts, incomplete forms, etc which can be varied depending on the interest of study.

Sample size can be lowered by increasing the allowable error but should not be done beyond a point at which Prevalence ± allowable error is ≤0 or ≥100. Even though sample size is proportional to Confidence Level, reduction of CI is generally not practised.

Example Scenario : A researcher wishes to calculate the prevalence of utilisation of public hospitals in the area of Pimpri Chinchwad Municipal Corporation area for his

Department of Community Medicine, Dr D Y Patil Medical College, Hospital & Research Centre, Maharashtra 411018
[1]MBBS, Postgraduate Resident
[2]MD, Professor
[3]MD, Professor and Corresponding Author

Received on : 23/01/2023
Accepted on : 27/01/2023

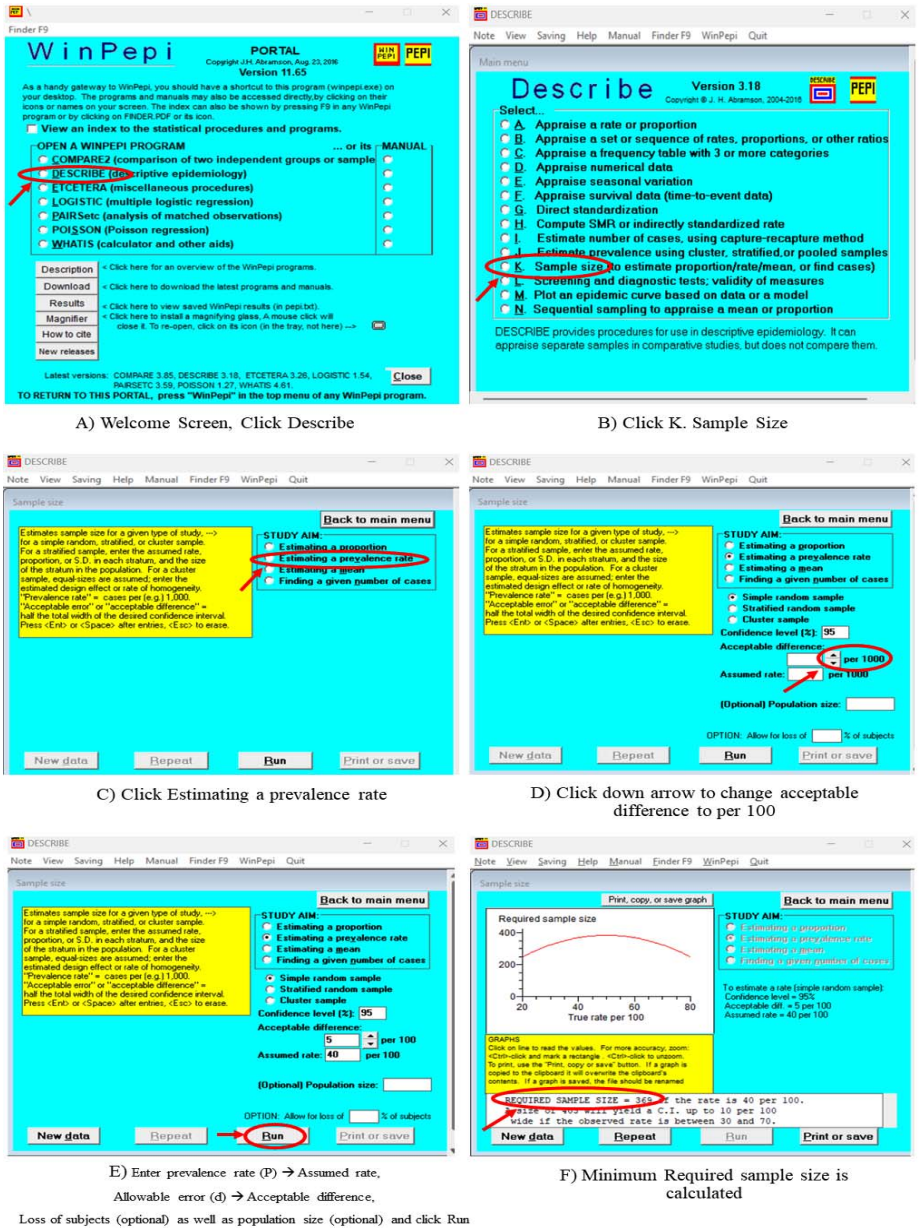
dissertation. The methodology also states that simple random sampling to be done. From the literature search, he came to realise that the utilization percentage in Maharashtra was ranging from 25% to 40%. What is the minimum sample size he needed for his study?

In this scenario, the prevalence (P) is taken to be 40% (as it is close to 50%) and absolute allowable error of 5%. Usually, the population size is ignored. Population size is entered only if sampling fraction (ie, sample/population proportion) is large >5%[3].

Sample size calculation using free softwares : In this article, we will cover sample size calculation for prevalence studies by simple random sampling using freely available software such as WinPepi[4], EpiInfo[5].

(1) WinPepi v 11.65

Open WinPepi, In the welcome screen, click Describe; Click on Sample size followed by tapping on Estimating a prevalence rate. Enter prevalence rate (P) as Assumed rate, Allowable error (d) as Acceptable difference, Loss of subjects (optional) as well as population size (optional). Make sure to change Acceptable difference from per 1000 to per 100 by clicking the down arrow. Hit run. The minimum required sample size is calculated on the next screen. For example, we have used P=40%, d=5% to get a minimum sample size of 369.



A) Welcome Screen, Click Describe

B) Click K. Sample Size

C) Click Estimating a prevalence rate

D) Click down arrow to change acceptable difference to per 100

E) Enter prevalence rate (P) → Assumed rate, Allowable error (d) → Acceptable difference, Loss of subjects (optional) as well as population size (optional) and click Run

F) Minimum Required sample size is calculated

Fig 1 — Steps of calculating sample size using WinPepi

(2) EpiInfo v7

Open EpiInfo to get the welcome screen. Click STATCALC to proceed then click population survey. The default value of Population Size is 999999, leave it unattended unless required. Enter Prevalence (P) in Expected frequency, Allowable error (d) in Acceptable Margin of Error, Design effect and clusters are irrelevant in simple random sampling. Sample size is automatically calculated on the right. Choose sample size calculated against 95% Confidence level.

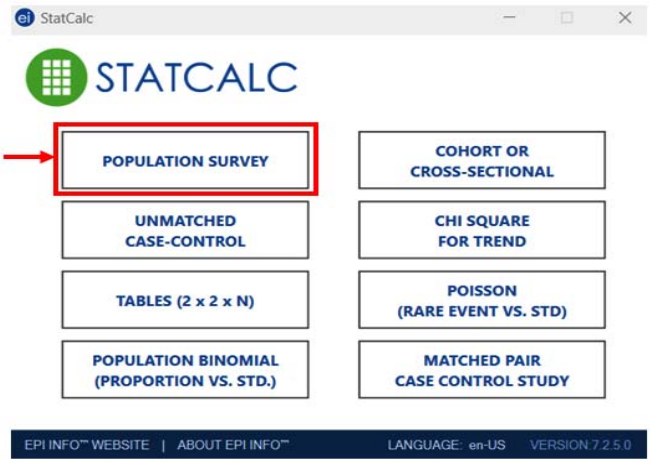
Reporting :

For the expected prevalence of 40% (quote reference from literature or pilot study), within 95% confidence level and acceptable difference of 5%, the minimum required sample size is 369. This sample size is calculated using *Software name with version* (software reference).

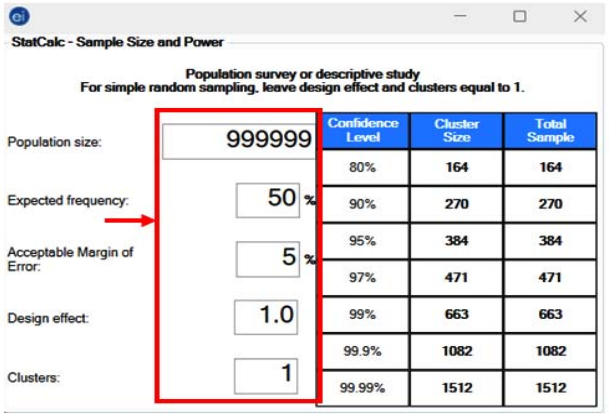
Conclusion :

In the present era of Digital Revolution, the softwares help the researchers in sample size calculation as well as analysis while reducing human errors and producing much accurate statistics. Sample size calculation by hand

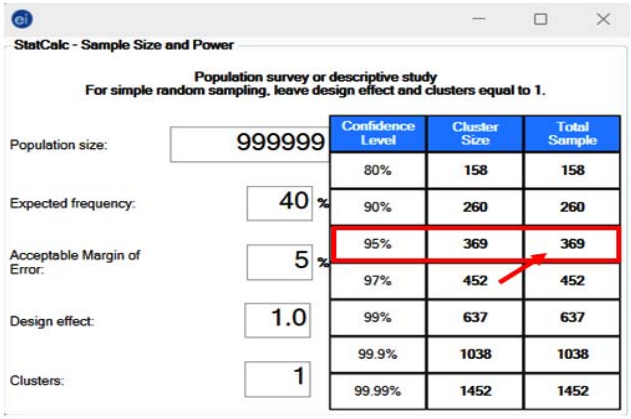
A) Welcome Screen, Click STATCALC



B) Click Population Survey



C) Enter Prevalence (P) in Expected frequency, Allowable error (d) in Acceptable Margin of Error, Disregard Population size (if not applicable)



D) Choose sample size calculated against 95% Confidence level

Fig 2 — Steps of calculating sample size using EpiInfo

is bygone now. Various softwares are now available with major limitations being expensive. Researchers should always familiarise themselves with multiple free softwares to be used for sample size calculation and analysis. Prevalence studies are widely used.

Prior publication : Nil

Support : Nil

Conflicts of interest : The authors declare that there are no conflicts of interest.

Permissions : Nil

References

1 Arya R, Antonisamy B, Kumar S — Sample size estimation in prevalence studies. *The Indian Journal of Pediatrics* 2012; **79(11):** 1482-8.

2 Naing L, Nordin RB, Abdul Rahman H, Naing YT — Sample size calculation for prevalence studies using SCALEX and scalar calculators. *BMC Medical Research Methodology* 2022; **22(1)**.

3 Stephanie — Finite Population Correction Factor FPC: Formula, Examples [Internet]. Statistics How To. 2021 [cited 2023Jan20]. Available from: https://www.statisticshowto.com/finite-population-correction-factor

4 Abramson JH — WINPEPI updated: computer programs for epidemiologists, and their teaching potential. Epidemiologic Perspectives & Innovations 2011, 8:1. https://www.brixtonhealth.com/winpepisetup.exe

5 Dean AG, Arner TG, Sunki GG, Friedman R, Lantinga M, Sangam S, *et al* — Epi Info™, a database and statistics program for public health professionals. CDC, Atlanta, GA, USA, 2011. https://www.cdc.gov/epiinfo/support/downloads.html

Drug Corner

Real World Evidence Study to Evaluate the Effectiveness and Tolerability of Lincomycin Injectable and Oral in the Treatment of Surgical Site Infection (SSI) and Skin & Soft Tissue Infection (SSTI)

Milind Ruke[1], Anish Desai[2], Sunaina Anand[3], Sreeni Nair[4]

Aim : The open-label, observational, real-world evidence study aimed to assess the effectiveness and tolerability of Lincomycin injectable and capsule in the treatment of Surgical Site Infections (SSIs) and Skin & Soft Tissue Infections (SSTIs).

Methodology : A total of 448 patients were included, with most of the patients falling in the age group of 21-30 years and 3 patients aged 70 years and above. The primary endpoints assessed signs and symptoms associated with SSI and SSTI using a scoring system ranging from 0 to 3, with 0 representing no symptoms and 3 indicating severe symptoms.

Result : The primary outcome measures showed significant improvements in signs and symptoms associated with SSI and SSTI after the treatment with lincomycin injection and capsule. Patients experienced symptomatic relief, with a considerable reduction in mean scores for fatigue, redness, pain around the area, and cellulitis ($P<0.05$). Complete resolution of folliculitis (0.84) and scar formation (0.04) was observed after lincomycin treatment ($P<0.05$). Drainage of fluid also significantly decreased from 2.19 to 0.15 ($P<0.05$). Lincomycin injectable and capsule was well-tolerated, with no patients experiencing readmission or reporting adverse events such as diarrhoea, Clostridium Difficile Infection (CDI), or anaphylaxis.

Conclusion : The study indicates that lincomycin injection as well as capsule are effective and well-tolerated treatment option for SSI and SSTI.

[*J Indian Med Assoc* 2023; **121(11):** 51-4]

Key words **: Surgical Site Infection, Skin & Soft Tissue Infection, Lincomycin, Surgery, Emergency Department.**

Surgical Site Infections (SSIs) refer to infections that develop within 30 days following surgery (or within one year in patients with implants) and impact either the incision or deep tissue at the surgical site. Despite advancements in prevention, SSIs continue to present a significant clinical challenge due to their strong links to mortality and morbidity, as well as the substantial burden they place on healthcare resources[1].

The global pooled incidence of SSI was found to be 2.5% (95% CI)[2].The pathogens responsible for numerous SSIs often originate from the patient's endogenous microbial population. The specific causative pathogens can vary depending on the type of surgery performed, with Staphylococcus aureus, coagulase-negative staphylococci, Enterococcus spp, and Escherichia coli being the most frequently isolated organisms in such cases[1].

[1]MBBS, MS, DHA, FICS, FASI, PGCDFM, Head of Medical Surgery Department, Khan Bahadur Bhabha Hospital, Mumbai 400070

[2]MD, FCP, PGDHEP, Director, Medical Affairs, Intellimed Healthcare Solutions, Mumbai 400070

[3]Pharm D, DGM - Medical Affairs Intellimed Healthcare Solutions, Mumbai 400070

[4]Pharm D, Senior Executive - Medical Affairs Intellimed Healthcare Solutions, Mumbai 400070

Received on : 27/10/2023

Accepted on : 30/10/2023

SSTIs involve microbial invasion of the skin and underlying soft tissues which affects the subcutaneous tissue, fascia, or muscle and are characterised by fever, growing lesions, and bullae. SSTIs are most prevalent in emergency rooms and affect 7% to 10% of hospitalised patients[3].The most common microorganisms responsible for SSTIs in general include Staphylococcus aureus and/or streptococci. Staphylococcus aureus accounts for a major number of infections such as impetigo, abscess, furuncles, and carbuncles. Necrotizing fasciitis is generally caused by S.pyogenes, Vibrio vulnificus, Aeromonas hydrophila, and more recently, Methicillin Resistant Staphylococcus Aureus (MRSA)[4].

The present treatment strategies to prevent SSIs encompass enhanced hygiene practices, implementation of aseptic surgical techniques, decolonization, application of antibiotics directly to surgical site prior to wound closure and use of intravenous antibiotic prophylaxis[5]. The choice of antibiotic for skin and soft tissue infection primarily depends on the severity of illness and then further refined according to local susceptibility patterns, drug-related costs, toxicity or contraindications, and availability[6].

The effectiveness of antibiotics against highly resistant bacterial strains present in skin and soft tissue infections and postoperative infections is diminishing. Moreover, the clinical concern arises from the potential toxicity associated with various antibiotics. Current treatment options have potential risk of severe disorders like nephrotoxicity, unfavourable adverse event profiles and high expenses. Consequently, there is a need for novel antibiotic categories that possess with no or minimal potential for bacterial resistance, alongside exhibiting low toxicity, to address serious bacterial infections[7].

Lincomycin is the first antibiotic from the Lincosamide class, isolated from the actinomycete Streptomyces lincolnensis in 1964. Lincomycin is available in oral formulations of 500 mg capsules & 1000 mg SR tablet. Lincomycin is also available in intravenous and intramuscular infusion of 600 mg and maintaining therapeutic levels for 17 to 20 hours for most gram-positive susceptible organisms. The biological half-life after intramuscular administration is approximately 5 hours and is eliminated unchanged or in the form of various metabolites in bile and urine. It acts by inhibiting protein synthesis in susceptible bacteria by binding to the 50 S subunits of bacterial ribosomes and preventing formation of the peptide bond[7].

Lincomycin has an antibacterial effect on Gram-positive microorganisms (staphylococci, streptococci, pneumococci, diphtheria bacillus, and clostridia) and is usually reserved for serious bacterial infections like sepsis, osteomyelitis, septic endocarditis, pneumonia, pulmonary abscess, infected wounds, and purulent meningitis, that are resistant to penicillin and other antibiotics. Most Gram-positive cocci including staphylococci, pneumococci, and most streptococci are usually sensitive to lincomycin. Other organisms that are sensitive to lincomycin include Mycoplasma hominis and M. pneumoniae and Bacteroides spp[8].

There is scarcity of comprehensive information regarding the utilisation of lincomycin for postoperative infections. The available data on the application of lincomycin in such cases is notably inadequate and insufficient to establish effectiveness and tolerability in this specific context. The aim of this study is to evaluate the effectiveness and tolerability of Lincomycin injectionand capsule in the treatment of SSI and SSTI.

Materials and Methods

Study Design :

An open label, observational, real world evidence study was conducted to evaluate the effectiveness and tolerability of lincomycin injectable and capsule in the treatment of SSI and SSTI. Data was collected using a standardized case report form that included demographics, treatment dose and duration, symptom improvement, clinical condition, comorbidities, complications, and details of concomitant medication.

Study Participants :

Patients above 18 years, undergoing surgical operation with a clinical diagnosis of impetigo, folliculitis or minor soft tissue infection including secondarily infected eczema presumed to be caused by Staphylococcus aureus were included in the study. The patients meeting any of the following exclusion criteria, including being pregnant or breastfeeding, having known sensitivity to the study medication, exhibiting signs of systemic infection or evidence of abscess or cellulitis at the treatment site, having a known history of hypersensitivity to lincomycin or clindamycin, using a topical antibacterial medication to the treated area within the past 48 hours, were not eligible to participate in the study.

Outcomes and follow up :

The primary outcome measures included evaluation of signs & symptoms associated with SSI (reduction in incidence, severity, signs of infection at surgical site, wound healing, postoperative pain) & SSTI (erythema, purulence, crusting, edema, redness, swelling, warmth and pain) after the treatment with lincomycin injection and capsule. The secondary outcome measures included evaluation of the incidence of adverse events such as (allergic contact dermatitis, antibiotic resistance, and anaphylaxis), wound size at baseline & follow up, length of hospital stay and SSI & SSTI related 30-day readmission.

Results

Demography and baseline data :

A total of 448 patients were included in the study out of which majority of patients were of 21-30 years of age. The proportion of male patients (56.2%) was higher than female patients (43.08%)(Table 1).

The most common duration of treatment with lincomycin was 6-7 days (51.78 %) with minimum to maximum range of 4-10 days (Fig 1).

ESR and WBC count decreased from 33.51mm/hr, 14246.54million/mm^3 to 19.59mm/hr, 7935.79million/mm^3 respectively ($P<0.05$) and haemoglobin improved from 10.54g/dL to 10.82 g/dL ($P<0.05$), after end of the treatment (Table 2).

Effectiveness :

Study results indicated that the treatment with lincomycin had significant effect in primary outcome measures of signs and symptoms associated with SSI

Table 1 — *Demographics details of patients*		
Age Group	No of Patients	Percentage
< 20 Years	38	8.48%
21-30 Years	123	27.46%
31-40 Years	119	26.56%
41-50 Years	116	25.89%
51-60 Years	30	6.70%
61-70 Years	19	4.24%
> 70 Years	3	0.67%
Gender wise distribution		
Male	255	56.92%
Female	193	43.08%
Diagnosis wise distribution		
SSI	40	8.93%
Appendicitis	19	4.24%
Post surgical infection	9	2.01%
SSTI	94	20.98%
Abscess	51	11.38%
Cellulitis	90	20.09%
Diabetic foot infection	42	9.38%
Injury	6	1.34%
Wound Infection	25	5.58%
Other	72	16.07%

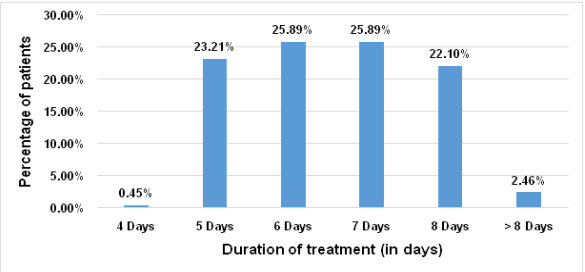


Fig 1 — Duration of Treatment

Table 2 — *Mean values of ESR, WBC, HB*					
Parameter		Mean	N	SD	P-Value
ESR (mm/hr)	BT	33.51	37	20.19	0.000
	AT	19.59	37	11.32	
WBC (million/mm^3)	BT	14246.54	76	5686.32	0.000
	AT	7935.79	76	2164.44	
Hb(g/dL)	BT	10.54	51	1.33	0.006
	AT	10.82	51	1.01	

and SSTI. Patients observed symptomatic relief as there was a significant reduction in mean score of fatigue, redness, pain around area and cellulitis from 0.39, 2,2.38,2.19 to 0.01, 0.14, 0.14, 0.91 respectively (P<0.05). Also, folliculitis (0.84) and scar (0.04) completely reduced after the treatment with lincomycin (P<0.05). Drainage of fluid was also decreased from 2.19 to 0.15 (P<0.05)(Fig 2).

Tolerability :

Lincomycin was shown to be safe and tolerated by all patients. Readmission was notobserved in any patients and no adverse events such as diarrhoea, CDI or anaphylaxis were reported.

Discussion

SSI and SSTI are common complications encountered in clinical practice. In this study, we aimed to evaluate the effectiveness and tolerability of both intravenous and capsuleforms of lincomycin in the treatment of SSI and SSTI. The current real-world evidence study highlighted the significant burden of SSI and SSTI as compared to other diagnosis in the patient population under investigation. Similar finding was observed in a study which suggested that in the most recent point prevalence survey of inpatients in England, SSI was again the third most frequently occurring Healthcare-associated Infection (HCAI), causing 15.7% of reported infections. Resulting in substantial morbidity and mortality to patients who have undergone surgical procedures, SSI contributes to the burden on providers of healthcare services by prolonging the duration of hospital stay and increasing costs[9]. The significant change in the laboratory parameters and the treatment duration ranged from 4 to 8 days with only small proportion of patients requiring extended duration of treatment suggests that majority of patients responded well to the lincomycin therapy within the standard treatment duration, indicating the efficacy of the regimen.

A study conducted by Kanee, *et al* suggested that clinically, lincomycin was eminently satisfactory in the treatment of lesions of dermatitis infectiosa eczematoides, folliculitis and cellulitis showed evidence of response within 24 hours and healed completely in three to seven days[10]. The treatment with intravenous lincomycin followed byoral lincomycin was found to be effective in managing the signs and symptoms associated with SSI and SSTI as patients reported symptomatic relief, as evidenced by the significant improvement in various clinical parameters. The high impact percentages of improvement in the symptoms of diarrhoea, anaphylactic reactions, fatigue, redness, drainage of fluid, surgical site scars, cellulitis and folliculitis further supported the efficacy of lincomycin in alleviating the clinical manifestations of SSI and SSTI.

In a recent Indian study, 30 patients with SSTIs were evaluated for response to Lincomycin 500mg oral capsules given twice/thrice daily. Complete relief of clinical signs and symptoms by day 14 was overall around 80% as follows: cellulitis 60%, folliculitis 85.7%, furuncles 66.7%, carbuncles 50%, oozing wounds 90.9%, and open wounds/surgical site infections 100%. Among SSTI, wound infections, including surgical ones, display a high response to Lincomycin. The response has been effective in bacterial dermatosis like folliculitis, furunculosis, impetigo and pyodermas,

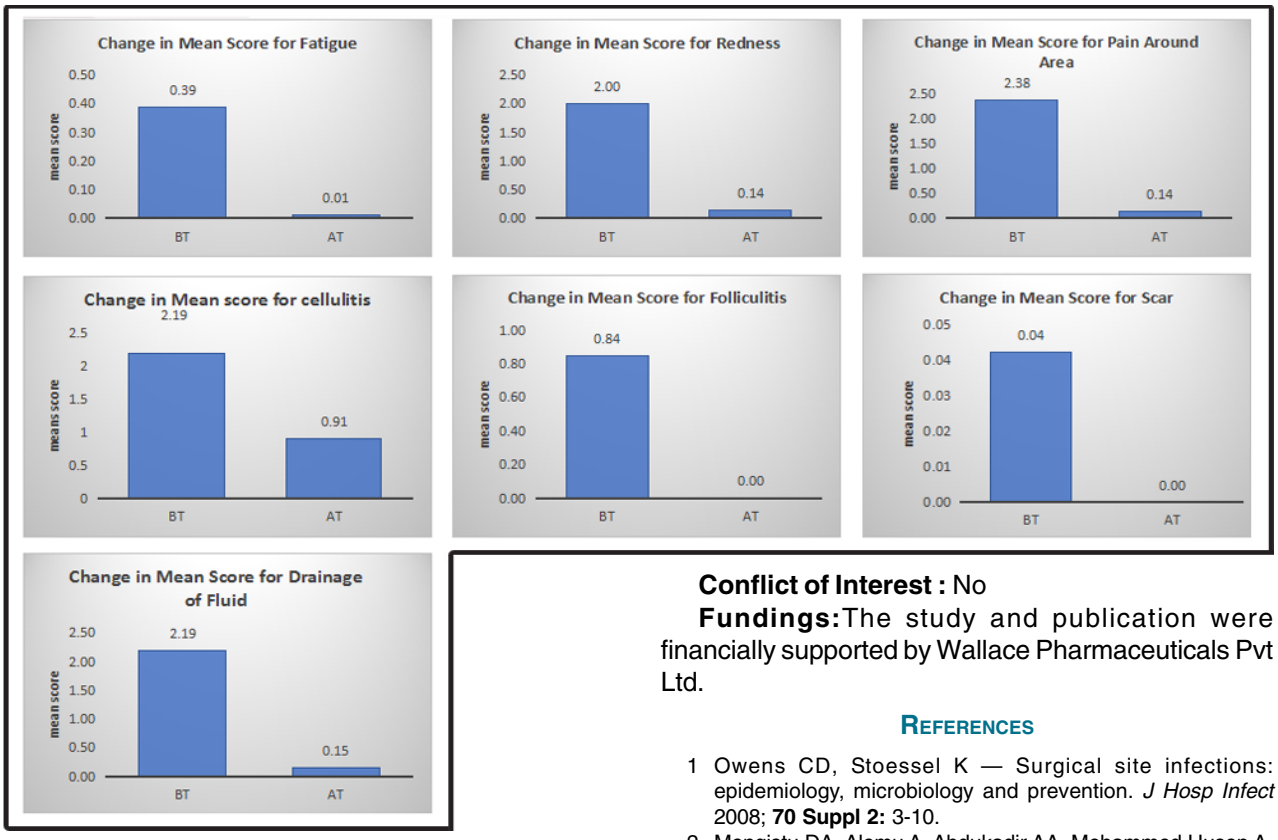


Fig 2 — Graphical representation of outcomes.

however deeper infections like cellulitis, and carbuncles may need more prolonged or injectable treatment[8]. Another early study in 1974 reported that lincomycin administered at the start of clean neurosurgical procedures reduced the infection rate from 5.1 to 2.3%. Another study reported that intravenous lincomycin and oral metronidazole show a higher cure rate among moderate diabetic foot infection patients with or without osteomyelitis[8].

Overall, this study provides valuable insights into the use of lincomycin both intravenously and orally, for the treatment of infections. The findings indicate that lincomycin therapy effectively alleviated symptoms associated with SSI and SSTI, leading to symptomatic relief and clinical improvement.

Conclusion

In this real-world study treatment with lincomycin injectable and capsule has shown to be effective and well tolerated to improve various signs and symptoms associated with SSIs and SSTIs.

Declaration : Article is not published / submitted in any other journal.

Acknowledgments : The authors thank all the study investigators, study coordinators, and other study personnel who participated in the study, for their contributions.

Conflict of Interest : No

Fundings: The study and publication were financially supported by Wallace Pharmaceuticals Pvt Ltd.

References

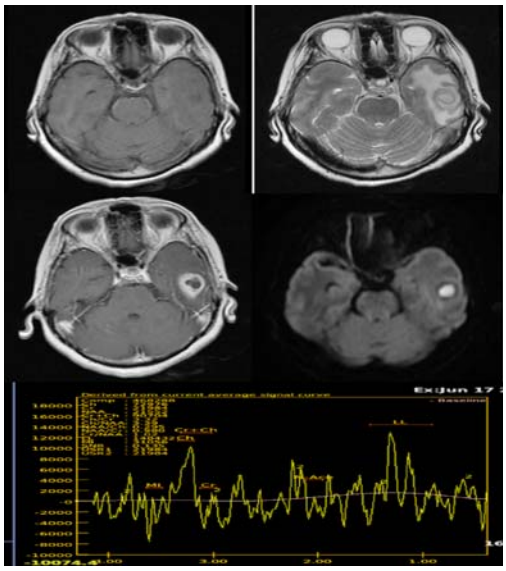
1 Owens CD, Stoessel K — Surgical site infections: epidemiology, microbiology and prevention. *J Hosp Infect* 2008; **70 Suppl 2:** 3-10.
2 Mengistu DA, Alemu A, Abdukadir AA, Mohammed Husen A, Ahmed F, Mohammed B, *et al* — Global Incidence of Surgical Site Infection Among Patients: Systematic Review and Meta-Analysis. *Inquiry* 2023; **60:** 469580231162549.
3 Skin and Soft Tissue Infections: Current Advancement in Epidemiology, Pathogenesis and Management [Internet]. Journal of Pure and Applied Microbiology 2023 [cited 2023 Jun 1]; Available from: https://microbiologyjournal.org/skin-and-soft-tissue-infections-current-advancement-in-epidemiology-pathogenesis-and-management/
4 Moffarah AS, Al Mohajer M, Hurwitz BL, Armstrong DG — Skin and Soft Tissue Infections. *Microbiology Spectrum* 2016; **4(4):** 10.1128/microbiolspec.dmih2-0014–2015.
5 Curcio D, Cane A, Fernández F, Correa J — Surgical site infection in elective clean and clean-contaminated surgeries in developing countries. *International Journal of Infectious Diseases* 2019; **80:** 34-45.
6 Hatlen TJ, Miller LG — Staphylococcal Skin and Soft Tissue Infections. *Infectious Disease Clinics of North America* 2021; **35(1):** 81-105.
7 Eisenstein BI — Treatment challenges in the management of complicated skin and soft-tissue infections. *Clinical Microbiology and Infection* 2008; **14:** 17–25.
8 Desai A, Narayanan V, Anand S — Lincomycin/ : A review and meta-analysis of its efficacy and tolerance in common infections encountered in clinical practice. *Journal of the Indian Medical Association* 2021; **119:** 69.
9 Jenks PJ, Laurent M, McQuarry S, Watkins R — Clinical and economic burden of surgical site infection (SSI) and predicted financial consequences of elimination of SSI from an English hospital. *J Hosp Infect* 2014; **86(1):** 24-33.
10 Kanee B — Lincomycin in dermatologic practice. *Can Med Assoc J* 1965; **93(5):** 220-2.

Image in Medicine

Bhoomi Angirish[1], Bhavin Jankharia[2]

Quiz 1

A 38-year-old male presented with short history of fever, convulsions and altered sensorium



Questions :

(1) What is the diagnosis ?
(2) What are the other differential diagnosis?

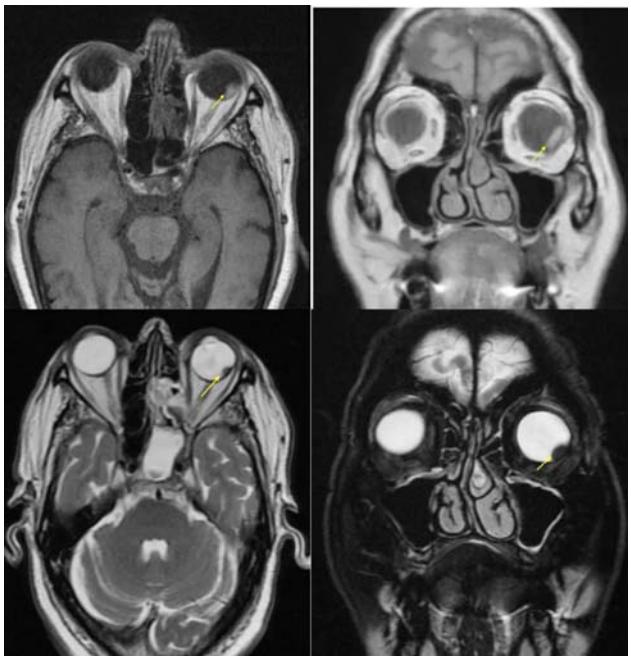
Answers :

(1) A well defined altered signal intensity lesion is seen in left temporal lobe which shows restriction on diffusion and peripheral post contrast enhancement. Spectroscopy of the lesion shows elevated lipid lactate peaks which are classical supportive findings suggestive of cerebral abscess.

(2) The differential diagnosis of ring enhancing lesions are :
Metastasis (abscess tend to have smoother inner wall), Subacute infarction, Demyelinating lesion

Quiz 2

A 55-year-male presented with double vision since 2 months.



Questions :

(1) What is the diagnosis ?
(2) What are the poor prognostic factors for systemic spread?

Answers :

(1) Well defined lesion which appears hyperintense on T1W images and hypointense on T2W images is seen in posterior chamber of left eyeball. These imaging findings are in favour of choroidal melanoma.

(2) Poor prognostic factors for systemic disease are old age (more than 60 years), large tumours, anterior location within the globe, epithelioid cells, extra-ocular extension. Systemic metastases may be widespread (liver > lung > bone > kidney > brain > breast).

Department of Radiology, Picture This by Jankharia, Mumbai, Maharashtra 400004
[1]MD, DNB (Radiology)
[2]MD, DMRD (Radiology)

Letters to the Editor

[The Editor is not responsible for the views expressed by the correspondents]

Mirtazapine Induced Acute Pancreatitis with Hypertriglyceridemia — a case report

Sir, — Acute pancreatitis has numerous aetiologies – commonest being gall stones, second most common being alcohol, while other etiological agents include post ERCP, hypertriglyceridemia, drugs, anatomical abnormalities like pancreas divisum or periampullary diverticulum, renal failure, hypercalcemia, trauma, post-operative, genetic mutations such as SPINK-1, PRSS1, CFTR genes etc.[1] Amongst more than 100 drugs causing acute pancreatitis, the common ones include valproate, 5-aminosalicylic acid, azathioprine, 6-mercaptopurine, sulphonamides, oestrogens, steroids, etc.[2] Mirtazapine, an atypical antidepressant, is found to cause hypertriglyceridemia in rare instances, which, in rarer conditions, can get highly elevated to cause acute pancreatitis.[3]

This report discusses a case of acute pancreatitis in a 52-year-old male, taking mirtazapine regularly for more than 3 years. At presentation, he had acute severe pancreatitis along with hypertriglyceridemia, and his triglyceride levels came back to near-normal after 2 weeks of cessation of mirtazapine during the course of hospital stay; he was retrospectively diagnosed to have had mirtazapine induced acute pancreatitis.

Case Report

A 52-year-old non-alcoholic male patient presented with acute epigastric pain radiating to the back along with vomiting for 2 days preceding admission. There was no history of similar episode in the past. He was taking paroxetine 20 mg/day and mirtazapine 15 mg/day for last 3 years for depression as prescribed by psychiatrist. On examination, his pulse rate was 128/ minute, regular; blood pressure was 80/40 mm of Hg; respiratory rate was 30/ minute; epigastric tenderness was present; auscultation of both the lung fields was normal.

Laboratory investigations showed Hb 14.0 g/dL, TLC – 7600/ mm^3, platelets 152000/mm^3, serum amylase 878 U/L, lipase 526 U/L, urea 202 mg/dL, creatinine 6 mg/dL, Na^+ 139 mEq/L, K^+ 4.8 mEq/L, ionised Ca^{2+} 1.10 mmol/L, total cholesterol 214 mg/dL, triglyceride 807 mg/dL, HDL 19 mg/dL, LDL 42 mg/dL. Arterial blood gas analysis showed pH 7.22, HCO_3^- 11.6 mmol/L, pCO_2 26 mmol/L, PaO_2 92 mm of Hg. He was thus diagnosed to have acute pancreatitis with acute kidney injury and metabolic acidosis probably due to hypertriglyceridemia. He was shifted to the intensive care unit where he was given conservative management for acute pancreatitis along with bicarbonate infusion and 4 rounds of hemodialysis was done over a period of 7 days after which renal function and metabolic acidosis improved. All his previous medications were discontinued. An Ultrasonography of the abdomen was done the following day which revealed bulky non-homogenous pancreas, normal main pancreatic duct. Both kidneys were normal in size & corticomedullary differentiation was mildly altered bilaterally. Non-contrast CT abdomen was done on the 4th day of admission which confirmed the diagnosis of acute pancreatitis (Fig 1).

His pain subsided and his appetite returned from about the 6th day when he was initiated on liquid diet which was later titrated to fat restricted diet with pancreatic lipase supplementation. On 14th day his lipid profile was repeated which revealed total cholesterol of 110 mg/dL, triglycerides 270 mg/dL, LDL 38 mg/dL, HDL 20 mg/dL. No lipid lowering agent had been administered in those 14 days.

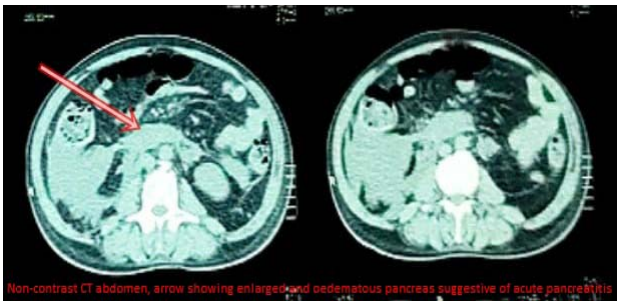


Fig 1 — Non-contrast CT abdomen, arrow showing enlarged and oedematous pancreas suggestive of acute pancreatitis

Discussion

Pancreatitis can have multiple aetiologies, of which drug induced pancreatitis is believed to account for less than 5% of the cases.[4] The pathophysiology varies according to the medication responsible. Mirtazapine, an atypical antidepressant, is being frequently prescribed for major depressive disorder and anorexia. The incidence of hypertriglyceridemia in patients taking mirtazapine is less than 10%, and in very rare instances it can cause very high level of hypertriglyceridemia and consequently may lead to acute pancreatitis.[5] The improvement in the lipid profile after cessation of one of those offending drugs lead to the possibility of mirtazapine induced acute pancreatitis in our patient as paroxetine is not known to be associated with such a high triglyceride level. Physicians must be aware of this association of mirtazapine with hypertriglyceridemia, so that lipid profile is being monitored in those patients who are being given mirtazapine. Also, a quick diagnosis based on the association can prompt cessation of the drug, which will help in reducing morbidity and mortality.

References

1 Banks PA, Bollen TL, Dervenis C, Gooszen HG, Johnson CD, Sarr MG, *et al* — Classification of Acute Pancreatitis—2012: revision of the Atlanta Classification and definitions by international consensus. *Gut* 2013; **62(1):** 102-11.
2 Badalov N, Baradarian R, Iswara K, Li J, Steinberg W, Tenner S — Drug-induced acute Pancreatitis: an evidence-based review. *Clin Gastroenterol Hepatol* 2007; **5(6):** 648-61; quiz 644.
3 Chen JL, Spinowitz N, Karwa M — Hypertriglyceridemia, acute pancreatitis, and diabetic ketoacidosis possibly associated with mirtazapine therapy: a case report. *Pharmacotherapy* 2003; **23(7):** 940-4.
4 Kaurich T — Drug-induced acute pancreatitis. *Proc (Bayl Univ Med Cent). a.* 2008; **21(1):** 77-81.
5 Bowers RD, Valanejad SM, Holombo AA — Mirtazapine-induced pancreatitis-a case report. *J Pharm Pract* 2019; **32(5):** 586-8.

Department of General Medicine,
Calcutta National Medical College,
Kolkata 700014
[1]MD, Assistant Professor
[2]MBBS, Postgraduate Trainee
[3]MD, Assistant Professor
[4]MD, Professor

Tuhin Santra[1],
Anustup Mukherjee[2],
Parinita Ranjit[3],
Partha Pratim Mukherjee[4]

Constitutional Ends Through Unconstitutional Means : A Doctor's View on Rajasthan Right to Health Care Act 2023

Sir, — The Rajasthan Right to Health Care Act 2023 has been in the news for several controversial reasons in the recent past. As the fiasco has ended with an eight-point agreement[1] between the government and the agitating doctors, one can say thatit is a piece of ill-conceived legislation by an overenthusiastic state government to entitle its population to the right to health.In fact, the right to health is a natural extension of the right to life and liberty guaranteed to all of us under Article 21 of the Constitution of India.The current legislation derives its basis from the fundamental rights, directive principles of state policy as well as several other judgments pronounced by the supreme court of India in this regard[2].

The major flaws in the legislation have already been thoroughly researched by several legal scholars so far and are mentioned here just for the sake of convenience. Primarily, the act has no explicit provision which covers the reimbursement of costs incurred by private healthcare establishments which violates their right to free and fair-trade practices under Article 19 (1)(g). This also, in turn, amounts to an act of hyper-regulating the private healthcare sector and impinging upon the professional rights of healthcare providers. Secondly, the act failed to contemplate privacy concerns regarding the collection, possession, transfer, and use of sensitive health information of patients. Lastly, implementing such enormous welfarist legislation involves a huge financial burden on the state which has not been properly looked into[3].

The major issue at the helm was projected as the unwillingness of the doctors working in private healthcareestablishments to cater their services to the needy by the mainstream media. The serious protests by the medical community in Rajasthan are not unfounded for any reason as alleged by a lot of armchair policy experts and pseudo-socialists. Similarly, this conflict between the parties is not a legal conundrum of *Article 21 versus Article 19* of the Constitution of India. The noble intention of the state in upholding the right to health of citizens is a welcome move but the means adopted by the state are outrightly unconstitutional because they would make private healthcare establishments commercially unviable.

This question of regulating the private healthcare sector in the interest of the upholding constitutional rights of citizens will surface in other Indian states as well in due course.It won't take long duration for this debate on*the right to health*to become a national political issue that could influence the outcome of general elections.The task at hand is not to take sides but find a harmonious and conducive way forward to achieve constitutional goals through constitutional means.

Before implementing a right to free emergency medicare, the first and foremost action desired from governments is the establishment of a statutory body with unbridled authority to reimburse healthcare institutions for all costs incurred. However, this seems like a perfect daydream under the present budgetary allocations to health by several states and the union government. Moreover, the quality of care provided at each private clinical establishment in our country is glaringly different. Healthcare establishments are a heterogeneous group that cannot be treated as a single unit for any purpose. Hence, the amount to be reimbursed to each institution for each particular procedure or healthcare service needs to be established beforehand by constituting a statutory commission for this purpose. Only after these things are done, and after due deliberations and consultations in this regard, can the state attempt to pass legislation of this sort. This may attract vast resistance from commercial establishments in the healthcare industry because it is extremely difficult to legally define and medically confirm when an individual has attained a stable medical state and is out of the need for emergency care. The practical dilemmas of shifting a patient to another center after providing emergency care may be betternot reduced to black and white. This can sometimes cause serious repercussions for patients and ethical dilemmas for medical practitioners. There is a strong necessity for developing a standard operating system for the referral of patients between institutions beforehand. This requires a scientific evaluation of existing resources on both infrastructure and human resources fronts. The state has a bound responsibility to address the refurbishment of these resources in both public and private sectors before opening the doors of all hospitals for claiming health care services as a matter of right. All in all, any legislation with public health ramifications requires thorough groundwork before trying to bring forward a gargantuan change.

The governments of the day should also attain a moral authority over and above the existing constitutional authority to persuade the medical community to prioritize public health needs. This canpartly be achieved by incentivizing medical practitioners in establishing clinics (securing lands, loans, and licenses to initiate practice), reducing the operational costs of organizations, giving tax breaks to individual practitioners, framing laws to prevent violence against doctors, using existing machinery to eliminate quackery in the hinterland, etc. A strong policy-based approach should be initiated in this regard separately towards both the individual practitioners running small nursing homes and big corporate companies running chains of hospitals.

On a personal note, the public needs to abandon the age-old perception of doctors as money-hungry individuals. The healthcare sector has evolved into a health industry driven by market forces, and doctors have become pawns in the chessboard of supply and demand. The private sector has brought about a revolutionary change in the Indian healthcare domain, which cannot be disregarded entirely in the light of its lion's share contribution during the COVID-19 pandemic. The simple principle that we would like to emphasize is that we should not try to stifle the private sector's growth at this moment, as it is destined to make healthcare more affordable in the long term due to economies of scale in a country like India.

Nevertheless, the persisting demand for upgrading public health infrastructure and human resources is something we would also like to emphasize once again. It is not just a matter of numbers and mere presence; the credibility of public health services has to take a rocket leap from current standards for the larger good of society. The public and private health insurance models in the country also require a strong revisit at this crucial moment of overhauling the healthcare sector.

In conclusion, the recent incident in Rajasthan is just the beginning of a trend towards increased state control over doctors in the private sector and the healthcare industry. All stakeholders in the private sector must make a more concerted effort to strike a balance between their public responsibilities and their legal rights, while also upholding the constitutional rights of citizens. Running away from these responsibilities is not a viable option. Instead, we must work towards finding a proper middle ground that benefits all parties involved.

Acknowledgments : We would like to express our sincere thanks to Prof Dr S Shavukath Ali, Dr Sravani Yandava, and Dr Miryala Rakesh for their input in improvising the content of this submission.

References

1 The New Indian Express. Rajasthan doctors call off strike against Right to Health Bill. Published 05 April 2023. [Internet][cited 25 Apr. 23]. Available from: Rajasthan doctors call off strike against Right to Health Bill- The New Indian Express

2 JSA Advocates and Solicitors Blog. Right to Health as a Fundamental Right Guaranteed by the Constitution. Published

March 22, 2022. [Internet][cited 25 Apr. 23]. Available from: https://www.jsalaw.com/covid-19/right-to-health-as-a-fundamental-right-guaranteed-by-the-constitution-of-india/.
3 Alaya Purewal, State Legislative Brief, Rajasthan, The Rajasthan Right to Health Care Bill, 2022, PRS Legislative Brief. [Internet][cited 25 Apr. 23]. Available from State Legislative Brief _Rajasthan Right to Health.pdf (prsindia.org).

Ananth Rupesh Kattamreddy[1]
Jitendra Durga Kanna Allu[2]
[1]MD, Assistant Professor, Department of Forensic Medicine and Toxicology, ACSR Government Medical College, Nellore, Andhra Pradesh 524004
[2]MBBS, Junior Resident, Department of Forensic Medicine and Toxicology, Andhra Medical College, Visakhapatnam, Andhra Pradesh 530002

Fostering Competent Medical Graduates : The Imperative of Medically Trained Teachers in Medical Education, Inspired by Dr Frances Oldham Kelsey

Sir, — Frances Oldham Kelsey, an extraordinary individual, embarked on a remarkable journey driven by her passion for Medicine and Science. Born in Cobble Hill, Vancouver Island, British Columbia, she nurtured an early fascination with the World of Science. Her academic pursuits led her to attain a Bachelor of Science from McGill University in 1934, followed by a Master of Science in pharmacology in the subsequent year. Driven by her determination to become a competent physician, she pursued further studies in Pharmacology at the University of Chicago, where she achieved both a PhD in 1938 and an MD in 1950. Dr Kelsey's dedication to medical knowledge and patient care led her to teach pharmacology at the University of South Dakota, while also practicing general medicine starting in 1954. Her zeal to make a meaningful impact on the medical field and safeguard the well-being of the public eventually led her to accept a position with the Food and Drug Administration (FDA). As one of the few medical officials at the FDA, Dr Kelsey faced a crucial responsibility: reviewing new drug applications to ensure their safety for public use. In this pivotal role, she was assigned one of the earliest applications for thalidomide, a drug already available in numerous countries. Despite immense pressure from the drug's manufacturer, Dr Kelsey staunchly refused to authorize the application due to the lack of sufficient evidence on its safety. With an unwavering commitment to scientific rigor and her duty to protect potential patients, Dr Kelsey emphasized the importance of thorough and reliable evidence before allowing any drug to be sold on the market. Her insistence on stringent evaluation procedures proved to be a crucial decision. Approximately a year later, researchers in Germany and Australia uncovered thalidomide's devastating link to severe and rare birth defects, impacting thousands of babies who were born with hands and feet projecting directly from their shoulders and hips.Thanks to Dr Kelsey's foresight and unwavering dedication, thalidomide was never marketed in the United States. Her exemplary actions played a vital role in the passage of the 1962 Drug Amendments, a transformative bill that revolutionized drug regulation, prioritizing patient safety and scientific evidence[1]. Dr Frances Oldham Kelsey's legacy remains an enduring testament to the significance of a well-trained physician's keen judgment and steadfast commitment to patient well-being and public health. Her contributions have saved countless lives, making her an exemplary role model for medical professionals Worldwide.

Dr Frances Oldham Kelsey[1], a distinguished pharmacologist, demonstrated the importance of medical training in shaping a well-rounded and clinically oriented approach in the field of medicine. Despite earning her PhD in non-medical pharmacology in 1938, she recognized the significance of medical education and pursued an MD degree in 1950. This historical context becomes particularly relevant in the current debates surrounding non-medical teachers in MBBS and MD curricula.

In the present context, India's National Medical Commission (NMC) is emphasizing competency-based medical education, underlining the necessity of clinical orientation in subjects like Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Microbiology and others[2, 3]. Dr Kelsey's life serves as an interesting example, illustrating how a distinguished Pharmacologist came to understand the value of medical training in improving clinical judgment.

The ongoing discussions urge the exclusion of non-medical teachers from medical courses. It is essential to acknowledge the expertise of MSc Postgraduates and PhD non-medical teachers in their respective subject domains. They can be effectively utilized in areas such as research and development, conducting laboratory work and contributing to various research activities.

However, the focus should be on providing medical students with the highest level of efficient training, considering the significant responsibility they carry in providing appropriate care for a population of over 130 crores. Drawing lessons from Dr Frances Oldham Kelsey's life, it becomes evident that clinical training is indispensable in upholding the best practices for both patient care and drug development.

In light of this, it is crucial for regulators and the Government to deliberate on appropriate guidelines for the future. Strengthening drug regulatory procedures requires a balanced representation of both medically trained professionals and non-medical professionals. Collaborative decision-making, incorporating insights from both domains, can enhance drug regulations in India and contribute to the overall well-being of society.

In summary, Dr Kelsey's extraordinary journey underscores the importance of medical training in shaping competent medical professionals. As the medical education landscape evolves, maintaining a clinically oriented approach becomes paramount to ensure the best possible care for patients and the advancement of drug development. A thoughtful and inclusive approach to regulatory procedures can further strengthen healthcare practices and ultimately benefit society at large.

References

1 Bren L — Frances Oldham Kelsey. FDA medical reviewer leaves her mark on history. *FDA Consum* 2001; **35(2):** 24-9. PMID: 11444245.
2 Raina SK, Kumar R, Kumar D, Chauhan R, Raina S, Chander V, *et al* — Game change in Indian Health Care System through reforms in medical education curriculum focusing on primary care – Recommendations of a joint working group. *J Family Med Prim Care* 2018; **7:** 489-94.
3 Sahadevan S, Kurian N, Mani AM, Kishor MR, Menon V — Implementing competency-based medical education curriculum in undergraduate psychiatric training in India: Opportunities and challenges. *Asia Pac Psychiatry* 2021; **13(4):** e12491. doi: 10.1111/appy.12491. Epub 2021 Dec 7. PMID: 34873854.

Shambo S Samajdar[1]
Santanu Munshi[2]
School of Tropical Medicine, Kolkata 700073
[1]MD, DM, Clinical Pharmacologist,
[2]MD, DM, Professor and Head,
Department of Clinical & Experimental Pharmacology

JOURNAL OF THE INDIAN MEDICAL ASSOCIATION :
Sir Nilratan Sircar IMA House, 53, Sir Nilratan Sarkar Sarani (Creek Row), Kolkata - 700 014
Phone : (033) 2237- 8092, Mobile : +919477493027; E-mail : jima1930@rediffmail.com
Website : https://onlinejima.com ; www.ima-india.org/ejima
Head office : Indian Medical Association, IMA House, Indraprastha Marg, New Delhi - 110 002
Telephones : +91-11-2337 0009, 2337 8680, Email : hsg@ima-india.org : Website : www.ima-india.org

Registration No. KOL RMS / 476 / 2023 - 2025

RNI Regd. No. 2557/1957
Vol. 67, No. 11, November 2023, Kolkata

Date of Publication : 20th November, 2023

If not delivered please return to
Journal of the IMA (JIMA)
53, Sir Nilratan Sarkar Sarani,
(Creek Row), Kolkata - 700014

Printed and Published by **Dr Jyotirmoy Pal** on behalf of Indian Medical Association and printed at Prabaha, 45, Raja Rammohan Sarani, Kolkata - 700009 and Published from Sir Nilratan Sircar IMA House, 53, Sir Nilratan Sarkar Sarani (Creek Row), Kolkata 700014, Editor : **Dr Tamonas Chaudhuri**