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Editorial

CAN WE CONTROL DENGUE ?

Namita Mohapatra[1], Santosh Kumar Swain[2]

Dengue fever represents a great burden for the public health systems worldwide and is considered the most prevalent mosquito-borne disease in tropical and subtropical regions of the world. It is rapidly expanding every year due to several factors such as climate change, deforestation associated with uncontrolled urbanization, overpopulation, and the emergence of mosquitoes resistant to common insecticides, amongst others. Climate change is influencing the incidence of Aedes aegypti and Aedes albopictus mosquito-borne dengue illnesses. More than half of the world's population is in danger, with an annual estimate of 100–400 million infections,1 96 million clinical symptoms, and 40 000 fatalities (1).This year, large dengue outbreaks have occurred in southeast Asia and Latin America.In India, according to provisional data, 94,198 cases and 91 deaths of dengue have been recorded until 17 September 2023 (2). In the absence of available therapy for the disease and with the expansion of the areas where dengue cases appear, control measures will be paramount to protect the millions of people at risk.

Development of effective vaccines for dengue is pivotal, but there are inherent challenges to achieve this goal. Dengue virus (DENV) has four serotypes and initial infection with one serotype induces long-term homotypic immunity to that serotype and shorter-term heterotypic immunity to the other serotypes. Because of the risk of severe disease in case of secondary heterotypic infections, the ideal dengue vaccine should elicit a robust homotypic, and long-lived immune response to all serotypes of DENV. At the moment there are two vaccines licensed for use, though with restrictions. Dengvaxia (Sanofi) is a three-dose live vaccine based on a modified yellow fever virus. In the phase 3 trial, it was observed that children who were originally seronegative for DENV and received the vaccine were at higher risk to develop severe dengue upon a new infection with a different DENV serotype. Thereafter the uptake of the vaccine decreased and now Dengvaxia is approved only for individuals aged 6–16 years with laboratory confirmed previous dengue infection and living in endemic areas.The other vaccine licensed in several countries is TAK-003 (Takeda), but yet to get approval from the US Food and Drug Administration. It is a two-dose live vaccine whose efficacy in trials was 62% against virologically confirmed dengue after 3 years. However, even with TAK-003, there are some concerns about the incomplete protection against all four DENV serotypes induced by the vaccine. There are also other vaccines being developed that might become important players in the future (3).

The other area for dengue control is to control this mosquito.The use of modified mosquitoes looks promising. It has been discovered that mosquitoes infected with the bacterium Wolbachia have limited capacity to transmit arboviruses. Pioneering programmes of introduction of Wolbachia-infected mosquitoes have been started in Brazil, Indonesia, Colombia, and Singapore. Most countries are testing the introduction of both female and male Wolbachia-infected mosquitoes in pilot programmes at the city level.When Wolbachia-infected female mosquitoes breed, they pass Wolbachia to their offspring, thus self-sustaining the establishment of the bacterium in the local mosquito population and consequently reducing the transmission of arboviruses (4). Singapore is instead testing the incompatible insect method, that consists of introducing only Wolbachia-infected male mosquitoes in the target areas of the city, when they mate with wild-type female mosquitoes.These male mosquitoes

[1]Professor & HOD
General Medicine, PGIMER & Capital Hospital, Bhubaneswar
[2]Associate Professor
General Medicine, SJMCH, Puri

produce an offspring that is not viable, thus reducing the mosquito population and indirectly affecting the transmission of arboviruses (5). Though fascinating, the feasibility of these programmes above city level remains challenging and it is doubtful that they can represent a solution for rural areas or islands.

The availability of these tools to control dengue is important, but the spread of the disease is intertwined with the dramatic alterations brought by climate change. Thus it is critical to greatly improve control measures and to develop a universal and highly effective vaccine to counteract dengue. Any effort to control dengue will need to go in parallel with developing measures to counteract climate change.The time to act is now, we cannot delay.

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Original Article

PREVALENCE OF COMORBIDITIES AMONG ELDERLY HOSPITALISED PATIENTS IN A TERTIARY CARE CENTRE OF ODISHA

Surabhi Mishra[1], Premakanta Mohanty[2], Susanta Ku. Bhuyan[2], Namita Mohapatra[3]

ABSTRACT

Introduction : Older adults generally have multiple medical problems, making it difficult to evaluate and treat them as a single medical issue. An increase in longevity and decrease in mortality in the present times have lead to an increase in multiple co-morbid conditions in the elderly. We aimed to study the prevalence of comorbidities among hospitalized elderly patients.

Materials and Methods : This was a hospital based cross-sectional observational study. All consecutive hospitalised patients aged 60 years or more, admitted to the Medicine department for various causes over a 10 months period were taken up for the study. Detailed clinical history, thorough physical examination and necessary laboratory tests were done for the diagnosis of various morbidities. Previous medical records were also checked and recorded.

Results : 295 elderly hospitalized patients were included in the study whose average age was 77 years (± 7.2 SD),out of which 155 (52.54%) were females and 140 (47.45%) were males. The various comorbidities seen in our patients were diabetes mellitus in 160 (53.3%), hypertension 145 (48.3%), dyslipidemia 82 (27.79%), neurological diseases 75(25.4%), cardiovascular diseases 45 (15.2%), lung diseases 33 (11%), renal 22 (7.3%), rheumatic diseases 18 (6%), and cancer in 5 (1.7%). Most of the cases admitted had a single morbidity seen in 117 (39.66%) or 2 comorbidities seen in 106 (35.93%) patients. 2 (1.29%) female patients had five comorbidities.

Conclusion : Most prevalent comorbidity among the elderly was Diabetes Mellitus followed by Hypertension. Multimorbidity was seen in 178 (60.33%) of our hospitalized elderly patients. All hospitalized elderly patients should be evaluated for the various comorbidities and treated accordingly to provide them a good quality of life.

Keywords : Comorbidity, Diabetes Hypertension, Elderly Hospitalised Patients.

INTRODUCTION

India is experiencing unprecedented changes in demographic and social structure in recent decades [1]. India is also experiencing an epidemiological transition which witnesses a rising in non-communicable diseases especially due to lifestyle changes [2]. Physiological changes occur in human body with increasing age contributing to multiple health problems. Older adults generally have multiple medical problems, making it difficult to evaluate and treat elderly patients in a single medical issue [3].

A study in India showed that the medical beneficiaries aged 65 years or older had four or more chronic conditions and the proportion increased to 31.4% among those persons 85 years or older [4]. Most developing nations are inadequately equipped with the multi-morbidity challenge; as shown in a study conducted in Vietnam [5]. An increase in longevity and decrease in mortality in the present times have lead to an increase in the multiple co-morbid conditions [6,7].

Even in healthy older adults and those with a single clinically manifest disease are likely to have subclinical pathology in multiple organ systems [8]. Patients suffering from these chronic conditions have higher levels of morbidity, poor physical functioning and

[1]Post Graduate Trainee, [2]Associate Professor, [3]Professor & HOD Department of Medicine
PGIMER and Capital Hospital, Bhbaneswar

quality of life, a greater chance of persistent depression, and lower levels of social wellbeing [9,10]. About 23.3% comorbidity prevalence has been observed in India in a study conducted in 2017, where Kerala showed the highest prevalence of multimorbidity with 42%, followed by Punjab (36%), Maharashtra (24%) and West Bengal (23%) [11].

The rich older adults in India were more likely to have poor health due to long-term comorbidity conditions [12]. Common comorbidities in elderly are Obesity, Hypertension, Diabetics mellitus, Dyslipidaemia, ischemic heart disease, hypothyroidism, malignancies, chronic obstructive pulmonary diseases, cerebrovascular diseases, osteoporosis, osteoarthritis and rheumatoid arthritis.

Justification of the study:

This study is to find out common comorbidities among the elderly. Necessary steps may be taken to prevent and timely manage those conditions, so that our elderly population lead a healthy life.

AIMS & OBJECTIVE:

To study the prevalence of comorbidities among hospitalised elderly patients aged above 60 years in a tertiary care centre.

MATERIALS AND METHODS:

All elderly patients aged more than 60 years admitted to the hospital for various causes were our study subjects.

Type of study: Hospital based cross-sectional observational study.

Place of study: Indoor patients at Dept. of General Medicine, PGIMER and Capital Hospital, Bhubaneswar, Odisha, India

Period of study: From January 2023 to October 2023 for a period of 10 months.

Study population: All consecutive hospitalised patients aged 60 years or more, hospitalized for various reasons.

Selection criteria:

Inclusion criteria:

1. All hospitalised patients aged 60 years and above.

2. Those giving consent to participate.

Exclusion criteria:

1. Persons aged below 60 years.

2. Outdoor patients.

3. All patients or attendants not giving consent for study.

Method of study:

An informed consent was obtained from the patients and subsequently were interviewed. Detailed clinical history and thorough physical examination necessary laboratory test were done for the diagnosis of various morbidities. Previous medical records were also checked for evaluation. Patients with newly diagnosed hypertension, their blood pressure was rechecked within a few minutes in resting condition in both arms with validated sphygmomanometer. Diabetic patients were included who had history of diabetes, on drug therapy and in new cases with FBS or PPBS after 75 gm glucose load or HbA1c level either alone or in combined parameter compatible with diabetes. Ischemic heart disease patients were selected by compatible clinical history, present or past ECG evidence and by cardiac biomarkers. All routine investigations were done. All the information were recorded in a predesigned proforma.

Statistical analysis

Statistical analysis of the data was done using the Statistical Software SPSS v.26 and appropriate parameters were analysed.

RESULTS

This is a cross sectional observational study conducted on 295 elderly patients who had one or more than one diseases.

Table 1: Distribution of Age and Gender

Age (year)	60-79 years	>/= 80 years	Total (%)
Female	102 (65.80%)	53(34.19%)	155 (52.54)
Male	113 (80.71%)	27 (19.28%)	140 (47.45)
Total	215	80	295

The average of their age was 77 years (± 7.2 SD), 155 (52.54%) were females and 140 (47.45%) were males(Table 1).

Table 2: Distribution of Comorbidities

Comorbidities	MALE (n=140)	Percentage (%)	FEMALE (n=155)	Percentage (%)	Total (n=295) (%)
Diabetes Mellitus	93	66.42	67	43.22	160 (53.3)
Hypertension	81	57.85	64	41.29	145 (48.3)
Dyslipidemia	33	23.57	49	31.61	82 (27.79)
Neurological Disease	48	34.28	37	23.8	75 (25.42)
Cardiovascular Disease	27	19.2	18	11.61	45 (15.25)
Pulmonary Disease	13	9.28	20	12.9	33 (11.18)
Renal Disease	14	10	8	5.1	22 (7.3)
Rheumatic Disease	7	5.0	11	7.09	18 (6.1)
Cancer	3	2.14	2	1.29	5 (1.7)

Most of the comorbidities in elderly patients were diabetes mellitus in 160 (53.3%), hypertension 145 (48.3%), dyslipidemia 82 (27.7%), neurological diseases 75 (25.4%), Cardiovascular diseases 45 (15.2%), lung diseases 33 (11%), renal 22 (7.3%), rheumatic diseases 18 (6%), cancer 5 (1.7%), (Table 2).

Most of the comorbidities in elderly male patients were diabetes mellitus 93 (66.42%), hypertension 81 (57.85%), Dyslipidemia33 (23.57%), neurological diseases 48 (34.28%) Cardiovascular diseases 27 (19.2%), lung diseases 13 (9.28%), renal 14 (10%), rheumatic diseases 7 (5.0%), cancer 3 (2.14%), (Table 2).

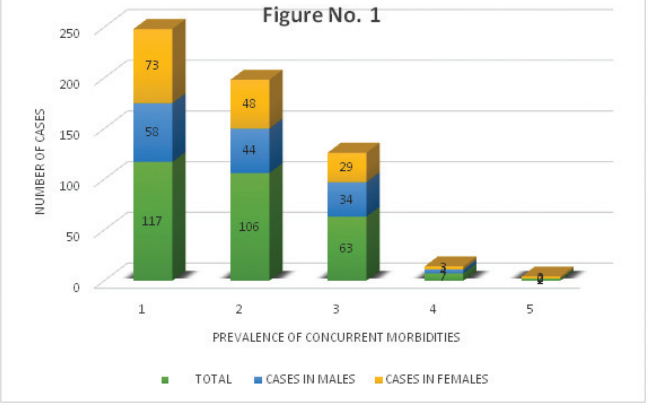
Most of the comorbidities in elderly female patients were diabetes mellitus 67 (43.22%), hypertension with 64(41.29%), Dyslipidemia 49(31.61%), neurological diseases 37 (23.8%) Cardiovascular diseases 18 (11.61%), lung diseases 20 (12.9%), renal 8 (5.1%), rheumatic diseases 11 (7.09%), cancer 2 (1.29%), (Table 2).

Table 3: Frequencies of concurrent morbidities:

No of Concurrent Diseases	TOTAL (n=295) (%)	MALES (N= 140) (%)	FEMALES (N= 155)(%)
1	117 (39.66%)	58 (41.42%)	73 (47.09%)
2	106 (35.93%)	44 (31.42%)	48 (30.96%)
3	63 (21.35%)	34 (24.28)	29 (18.7%)
4	7 (2.3%)	4 (2.8%)	3 (1.9%)
5	2 (0.67%)	0	2 (1.29%)

Most of the cases admitted were having a single morbidity in 73(47.09%) elderly female patients and 58 (41.42%) elderly males, while 44 (31.42%) male and 48 (30.96%) female had two concurrent morbidities. It was also seen that 34 (24.28%) males and 29 (18.7%) females had three morbidities while 4 (2.8%) males and 3 (1.9%) females had four concurrent morbidities. Only 2 (1.29%) elderly females were having five comorbidities.

Figure No. 1



DISCUSSION

This Hospital based cross sectional study conducted on a total 295elderly patientswho had one or more than one particular diseases with mean age 77 years (± 7.2 SD) in which 155 (52.54%) were female and 140 (47.45%) were males. It shows total 215 (72.88%) were within age 60-79 years and 80 (27.11%) were above 80 years which is comparable with the study done by Sara et al in Bangladesh [13] The prevalence of multimorbidty among elderly males and females were found to be almost equal in numbers which is similar to the study done by Gupta P. et al [14]

This study found that the major diseases among the hospitalized elderly population of Eastern Odisha were Diabetes Mellitus followed by hypertension, dyslipidemia, neurological diseases in the form of Stroke and Cardiovascular disease mostly Coronary Artery Disease. Similar results were also found in several other studies done in foreign countries. [15,16,17]

Our study also shows that comorbidities among elderly is highly prevalent with highest numbers being diabetes with dyslipidemia followed by hypertension with dyslipidemia. The results shows how changes in prevalence by age derive from diverse prevalence patterns among patients who differ in their comorbidities. For instance, by age 65 patients are more likely to have both hypertension and dyslipidemia than either condition alone. The results make apparent that approaches to improve the health of Indian should be comprehensive, targeting multiple conditions. Among combinations of systems, the respiratory and cardiac combination is of particular concern because of a synergistic negative effect. [18].

Although not explored in this article, creating more homogenous subgroups of patients may help to identify poorly managed patients. By examining factors such as recommended screening tests, medication adherence, emergency department use, preventable hospitalizations, and office visit patterns among patients with similar conditions, a subgroup of especially poorly managed individuals might be recognized. [19]

The study results illustrate the increased prevalence of patients with multiple chronic conditions that is projected to occur with the increasing age. Aging populations challenge existing health care systems and will increasingly do so in the future. [20] The broader healthcare implications of an aging population are harder to anticipate. New technologies and treatments may partially reduce the consequences of morbidity. [21] Recent evidence suggests that illness burden in many developed countries has been decreasing as evidenced by self-reported ratings of health status, as well as reports of activities of daily living and instrumental activities of daily living among the elderly. [22] With longer average life spans an increasing proportion of the population will live for greater years with morbidities. Complications from morbidities preceding death often requires acute care that comes with exceptional costs. A recent review concluded that in recent years this critical phase may be shrinking. [23] The pattern in the future may be longer years of life spent with chronic diseases but with lower rates of acute events, and a shorter acute period near death. The extent this pattern unfolds has substantial health care consequences as the most rapid shifts toward older populations are still ahead. [24] Recent articles have questioned if the current evidence is adequate to guide the management of the most complex patients.[25]. The results, by quantifying the prevalence of comorbid conditions at specific ages, offer a starting point toward characterizing medically complex patients beyond enumerating the number of morbidities they might have. The characterization could easily be extended to include other information for the same patients such as rates of hospitalizations and emergency department visits. [26]

CONCLUSION

Most prevalent comorbidity among the elderly is Diabetes Mellitus followed by Hypertension. About 106 (36%) elderly patients were having two diseases or more and up to five concurrent chronic diseases were also found in two patients. As India paves its way to being a developed country, the population keeps on shifting to a aged one with declining birth and death rates with advent of advanced care in medical science. Nevertheless newer challenges keep on emerging to combat this aging population with a myriad comorbidities. Our target should always be to identify and treat them at an earlier stage so as to provide

them a good quality of life and reduce the burden on our existing health infrastructure.

LIMITATIONS OF THE STUDY

As a hospital-based study is very challenging to explain to the respondents and their family members about the reason behind this study and the underlying benefit to them. In addition, the study was limited to only one Tertiary Care Centre. This research can be extended to other districts in future to provide a probable solution to the problems faced by the elderly that can be useful for the decision-makers for policy implications.

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CONFLICT OF INTEREST

The authors confirm that they have no conflicts of interest.

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Review Article

RESTRICTED ANTIBIOTICS IN THE ERA OF ANTIMICROBIAL RESISTANCE

Dr. Amitav Mohanty

Abstract

Multidrug-resistant bacteria pose a serious threat to public health, as they can cause infections that are challenging to manage and have higher mortality rates. Common examples include methicillin-resistant Staphylococcus aureus (MRSA), carbapenem-resistant Enterobacteriaceae (CRE) etc. These bacteria have acquired genetic mutations or acquired resistance genes, allowing them to survive exposure to various antibiotics. Reserve antibiotics, also known as last-resort antibiotics or antibiotic "drugs of last resort," are a subset of antimicrobial agents that are preserved for the treatment of severe infections caused by multidrug-resistant bacteria. These antibiotics are reserved as a last line of defense when other treatment options have failed or are ineffective. The purpose of reserving these antibiotics is to minimize the development and spread of further antibiotic resistance. The development of new antibiotics is crucial to replenish the arsenal of reserve antibiotics. Research and development efforts are ongoing to discover novel antimicrobial agents and alternative treatment strategies. In addition to discovering new antibiotics, it is essential to implement comprehensive infection prevention and control measures to reduce the incidence of drug-resistant infections and safeguard the effectiveness of reserve antibiotics in the long term.

Multidrug resistance

In the sphere of medicine, the growth of multidrug resistance has turned into a potentially fatal problem. The prognosis of people with bacterial illnesses was significantly changed by the development of antibiotics. However, their excessive and careless use has resulted in the development of "superbugs" that jeopardise their effectiveness. Global public health is seriously threatened by antimicrobial resistance (AMR). Due to the stress on health care, it raises morbidity and mortality and is linked to substantial economic expenses. Multidrug-resistant (MDR) bacterial infections also significantly affect clinical and financial consequences.[1] Currently, antimicrobial resistance (AMR) causes 700 000 patient deaths annually around the globe. According to projections, this number of fatalities will rise to 10 million by 2050, which will cause the gross domestic product (GDP) to fall by at least 2.5%.[2]

Incidence of resistance against different antimicrobials

World Health Organization's (WHO) recent report (Global Antimicrobial Resistance and Use Surveillance System (GLASS) Report: Early implementation 2020) published some key facts about the increasing AMR rates from 78 countries. The major findings of the reports were 1. A significantly higher rates of AMR against common bacterial infections 2. Median frequency of resistance in pathogens isolated from patients with bloodstream infections i. Methicillin-resistant S. aureus (MRSA): 12.11% ii. E. coli resistant to third-generation cephalosporins: 36.0% iii. K. pneumoniae resistant to third-generation cephalosporins 57.6%, with 12 countries reporting 80–100% resistance iv. Acinetobacter spp.: aminoglycosides 41.2%; carbapenems 63.2% 3. Median resistance to ciprofloxacin in urinary tract infections i. 43.29% for E. coli in 33 reporting countries, territories and areas ii. 38.1% for K. pneumoniae in 34 reporting countries, territories and areas.[3] India has been reported to have one of the highest rates of antibiotic resistance worldwide. According to the authors' calculations using data from the Global Burden of Disease 2019 for India, the mortality rate from infectious diseases in the country is 216.4 per 100,000 people, with an estimated 56 524

MD, FICP, Fellow Diabetes India
Senior Consultant, Medicine & Diabetes
Apollo Hospital, Bhubaneswar

newborn fatalities each year due to sepsis brought on by antibiotic resistance. With a 47% growth from 5,411 to 7,976 million defined daily doses between 2010 and 2020, India has the second-highest global consumption of antibiotics. The over-the-counter (OTC) availability of affordable antibiotics in the context of lax compliance and enforcement of prescription-only restrictions has led to increased usage.[4]

WHO pathogens priority list

In the WHO's list, bacteria are divided into three priority categories: critical, high, and medium priority, depending on how urgently new antibiotics must be developed to tackle these pathogens. The pathogens in the most dangerous category are multidrug resistant bacteria, which are a hazard to people requiring medical devices like ventilators and blood catheters as well as to people residing in nursing homes and hospitals. Acinetobacter, Pseudomonas, and certain Enterobacteriaceae, including K. pneumoniae, E. coli, and Enterobacter spp., are among the microorganisms with a critical priority. These pathogens can cause serious and frequently fatal infectious illnesses such bloodstream infections and pneumonia and are resistant to numerous medications. Bacteria like Enterococcus faecium and Staphylococcus aureus that are resistant to a variety of antibacterials, including vancomycin and fluoroquinolones, fall under the high priority group. Shigella and Streptococcus pneumoniae are examples of bacteria in the medium priority category that, despite some resistance, are still treatable with the available effective medicines.[5]

Access, Watch, Reserve (AWaRe) classification for antibiotics use

The WHO Expert Committee on Selection and Use of Essential Medicines developed the AWaRe classification of antibiotics in 2017 as a tool to support antibiotic stewardship efforts at local, national, and international levels. It stands for Access (to be widely available and affordable), Watch (to be used only for specific indications because their use increases the potential for the emergence of antimicrobial resistance), and Reserve (for situations when all other alternatives have failed). To emphasize the significance of their proper usage, antibiotics are divided into three categories: Access, Watch, and Reserve. These categories take into account the effects of various antibiotics and antibiotic classes on antimicrobial resistance. A total of 258 antibiotics are included in the 2021 update of the AWaRe classification. Countries can use this classification as a tool to support monitoring and stewardship initiatives for antibiotics. However this classification model does not propose its use in determining the inclusion of antibiotics in national essential medication lists.[6]

Table: Reserve group antibiotics and antibiotic classes (WHO AWaRe 2021)

Antibiotic	Class	Category	Listed on EML 2021
Aztreonam	Monobactams	Reserve	No
Carumonam	Monobactams	Reserve	No
Cefiderocol	Other-cephalosporins	Reserve	Yes
Ceftaroline-fosamil	Fifth-generation cephalosporins	Reserve	No
Ceftazidime/avibactam	Third-generation-cephalosporins	Reserve	Yes
Ceftobiprole-medocaril	Fifth-generation cephalosporins	Reserve	No
Ceftolozane/tazobactam	Fifth-generation cephalosporins	Reserve	No
Colistin_IV	Polymyxins	Reserve	Yes
Colistin_oral	Polymyxins	Reserve	No
Dalbavancin	Glycopeptides	Reserve	No
Dalfopristin/quinupristin	Streptogramins	Reserve	No

Daptomycin	Lipopeptides	Reserve	No
Eravacycline	Tetracyclines	Reserve	No
Faropenem	Penems	Reserve	No
Fosfomycin_IV	Phosphonics	Reserve	Yes
Iclaprim	Trimethoprim-derivatives	Reserve	No
Imipenem/cilastatin/relebactam	Carbapenems	Reserve	No
Lefamulin	Pleuromutilin	Reserve	No
Linezolid	Oxazolidinones	Reserve	Yes
Meropenem/vaborbactam	Carbapenems	Reserve	Yes
Minocycline_IV	Tetracyclines	Reserve	No
Omadacycline	Tetracyclines	Reserve	No
Oritavancin	Glycopeptides	Reserve	No
Plazomicin	Aminoglycosides	Reserve	Yes
Polymyxin-B_IV	Polymyxins	Reserve	Yes
Polymyxin-B_oral	Polymyxins	Reserve	No

Antibiotics and antibiotic classes included in the Reserve group should only be used to treat infections caused by known or suspected multi-drug-resistant organisms. Antibiotics from the reserve group should only be used as a "last resort". Some of the antibiotics from the reserve group are aslo included in the WHO Model Lists of Essential Medicines when they have a favourable risk-benefit profile and clinical activity against "Critical Priority" or "High Priority" bacterial pathogens according to the WHO Priority Pathogens List 1, notably carbapenem resistant Enterobacteriaceae. These antibiotics should be used in the patients only when all other options have been exhausted or are inappropriate for the patient and the situation demanding a highly specific intervention. To maintain their effectiveness, these antimicrobials could be protected and prioritized as essential priorities of national and international stewardship programmes that involve monitoring and utilization reporting of them in specific settings.[6]

Antimicrobial stewardship (AMS)

Antimicrobial stewardship (AMS) is defined as "an organizational or healthcare-system-wide approach for fostering and monitoring judicious use of antimicrobials to preserve their effectiveness. In order to improve patient treatment outcomes and safety by reducing AMR development, AMS brings together healthcare leaders, microbiologists, infectious disease experts, doctors, nurses, farmers, veterinarians, IT experts, and clinical chemists. The major core principles of Antibiotic Stewardship Program mainly consists of 1)The leadership commitment to the required human, financial, and information technology. 2) Accountability for programme management and results through a single doctor/pharmacist leader. 3) Utilizing a single pharmacy leader's drug expertise will aid in directing implementation efforts to increase antibiotic use. 4) Taking steps to put interventions into effect, such as preauthorization, prospective audit, and feedback. 5) Monitoring prescription usage, the effects of therapies, patterns of resistance, and other significant outcomes. 6) Directly informing hospital administration, chemists, nurses, and prescribers of prescription and resistance information. 7) Educating patients and healthcare workers (prescribers, chemists, and nurses) on adverse antibiotic reactions, antibiotic resistance, and appropriate prescribing.[7]

AMS implementation to curb antimicrobial resistance

Implementing a proper AMS policy and its benefits were justified by a prospective real-world Indian study conducted to evaluate the prudent use of high-end antibiotics among inpatients for a period of three

months. Department-specific educational interventions were used, and feedbacks revealed that meropenem was the most frequently used high-end antibiotic. After the feedback and intervention, there was a 51.2% decrease in the unjustified antibiotic usage. From the pre-intervention observation of 77% to the post-intervention observation of 88%, the appropriateness of the usage rose. The study came to the conclusion that it is necessary to maintain the rising compliance of prudent use of expensive antibiotics. Therefore, it is essential to continually develop antimicrobial stewardship practises. 1 Antimicrobial usage must be drastically reduced if AMR is to be eradicated. Long-term AMR containment treatments would place a focus on laws and policies that support a more rational and appropriate use of antibiotics. There are numerous instances where modifications to antibiotic prescribing practises have significantly reduced the occurrence of resistant disease outbreaks. An key tactic for maintaining antibiotic efficacy in the treatment of infectious illnesses is their prudent use. 90% of all antibiotics are used in the community for non-hospitalized patients. But it was discovered that more than half of these were either superfluous or improper. Drug use evaluation (DUE) for the more expensive antibiotics would not only increase the effectiveness of the treatment but also aid in cost-conservation and AMR prevention.

The main reason why doctors employ broad-spectrum antibiotics is that it is difficult to quickly and accurately identify the microorganisms that cause infectious diseases, and their susceptibility profiles. Poor outcomes, including increased morbidity and mortality rates and longer stays in healthcare institutions, are linked to ineffective treatment of infections. Narrowing the spectrum of antibiotics and combining chemotherapeutic principles can improve efficacy, reduce toxicity and the overall cost of care, and prevent AMR in the population. An alternative approach to decrease the cost is the repurposing of withdrawn and underused antimicrobial drugs which can provide an alternative or Additional approach to de-novo drug discovery and the impact of latency with new drug discovery and clinical trials. This is evident with the return of colistin and Fosfomycin use for multidrug-resistant Gram-negative infections.[8]

Conclusion

In conclusion, the multidrug resistant pathogens can lead to drastic fatality and outcomes. Although these bacteria differ genetically, they share a number of resistance mechanisms, including reduced drug uptake, altered drug targets, drug inactivation, and activation of drug efflux pumps, that underlie the existence and persistence of these pathogens. This makes it crucial to be more vigilant in the surveillance and application of antimicrobial stewardship in order to restrict the spread of the resistant infections and antibiotic resistance. The reserve antibiotics as classified by the WHO AWaRe classification should be only used against specific targeted organisms which have a proven susceptibility against them. The nationwide implementation of these programmes, along with the creation of novel antibiotics or treatment modalities, will probably be the only means of limiting the global spread of multi-drug resistant bacteria.

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Review Article

FALL IN ELDERLY

Dr. Nihar Ranjan Sahoo

INTRODUCTION

A fall is an unexpected event in which the participant comes to rest on the ground, floor or other lower level. Inevitable accompaniments of aging. Fall account for one of the most common and serious issues contributing to a disability, especially among elderly individuals.Falls cause high morbidity and high mortality.Falls are under reported and under diagnosed.Injuries in elderly is 6th leading cause of death. It Contributes to 40% of hospital admissions in India.

EPIDEMIOLOGY-

Falls are the second leading cause of unintentional injury death worldwide. Each year an estimated 684000 individuals die from falls globally of which over 80% are in low-and middle-income countries. Adults older than 60 years of age suffer the greatest number of fatal falls.37.3 million falls that are severe enough to require medical attention occur each year. Prevention strategies should emphasize education, training, creating safer environment, prioritising fall related research and establishing effective policies to reduce risk. Fall risk escalates as the number of risk factors increases. Over 30% of individuals who are over the age of 65 fall every year. (! up to 40% — e”85 years) About half of the cases, falls are recurrent. Approximately 10% of falls result in serious injuries like hip fracture, other fractures, traumatic brain injury, or subdural hematoma.

ACOVE Indicators:ACOVE = Assessing Care of Vulnerable Elders.The 12 new ACOVE indicatorsare designed to improve the clinical approach to falls and mobility in older adults.Evidence based focus: 182 articles were reviewed to obtain these indicators.Some have practice guidelines which will be shared.

Assistant Professor, Medicine
MKCG Medical College, Berhampur

ACOVE Indicator1-All vulnerable elders should have ANNUAL documentation about the occurrence of recent falls,because Falls are common and Preventable.Frequently unreported.Often cause injury.Can restrict activity unnecessarily.A recent fall is a potent predictor of future falls.Need a multifactorial falls risk assessment for all of your vulnerable older adults.

ACOVE Indicator 2- If a vulnerable elder reports 2 or more falls in the previous year, THEN document a basic fall history within 3 weeks of the report, Because a basic fall history provides the necessary information to implement an individualized multifactorial falls risk intervention strategy.

ACOVE Indicator 3-If a vulnerable elder reports 2 or more falls (or 1 fall with injury) in the previous year, THEN there should be documentation of orthostatic vital signs within 3 months of the report…Because detection of orthostasis decreases the risk of future falls Is a part of the multifactorial falls prevention intervention. Supported by 13 studies including cohort and RCT’s (12-18). Some clinical guidelines that are recommended: Correct postural hypotension (19).Assess postural vitals in all older adults that have had a recent fall, report recurrent falls or demonstrate abnormalities in gait or balance (20).Include a cardiovascular examination when doing a falls risk assessment (21).

ACOVE Indicator 4-If a vulnerable elder reports a history of 2 or more falls in the last year, THEN there should be documentation ofan eye examination in the previous year or visual acuity testing within 3 months of the report.11 studies examined visual acuity as a falls risk factor.One study looked at falls improvement after expedited (within 27 days) and routine (71-212 days) cataract surgery in women over age 70 22.After 1 year, 49% of adults in expedited

group fell at least once compared to 45% in routine group 18% fell twice in expedited group compared to 25% in control group, because detection and treatment of some forms of visual impairment reduces the risk of falls.

ACOVE Indicator 5 and 6-IF a vulnerable elder reports 2 or more falls in the last year, OR IF a vulnerable elder has new or worsening difficulty with ambulation, balance or mobility, thenthere should be documentation of basic gait, balance and strength evaluation within 3 months ofthe report.Detection and treatment of gait and balance disorders reduces the risk of future falls as part of a multifactorial intervention. 9 studies looked at gait and balance assessments in falls prevention.Cohort and RCT's.In 3 studies, abnormal gait and balance alone were significant predictors of falls (6)

Clinical Guidelines for Gait and Balance-Provide interventions to improve balance, transfers and gait (19).Do a gait and balance assessment for those requiring medical attention because of a fall, report recurrent falls in the past year or demonstrate abnormalities of gait or balance (20).Risk assessment includes assessment of gait, balance, mobility and muscle weakness(21).

Screening and Examination of Gait and Balance-

- Timed Get Up and Go Test
- Single Leg Stand Test
- Dynamic Gait Index
- Berg Balance Scale

Timed Get Up and Go Test-Measures functional capacity rather than individual impairment – reflects multiple domains, useful in detecting mobility impairment.Time it takes to stand up from arm chair, walk 3 meters (10 feet), return to chair and sit down.

Interpretation of Performance on the Timed Get Up and Go Test

- <10 sec.Low fall risk; clients are freely mobile; encourage regular exercise.
- <20 sec.Moderate fall risk; clients are independent with basic transfers; most go outside alone and climb stairs; many are independence with tub and shower transfers. PT referral may be appropriate.
- 20-29 sec.High fall risk; "Gray zone"; functional abilities vary. Physician or multidisciplinary team assessment recommended.
- >30 sec.Very high fall risk; Many are dependent with chair and toilet transfers; most are dependent with tub and shower transfers; most cannot go outside alone; few, if any, can climb stairs independently. Physician or multidisciplinary team assessment recommended.

Nordin (2006)

Individual variation in performance high in institutionalized elderly.Variation increased with slower performance.Cognitive impairment or cuing did not increase variability.Could use mean of three trials to obtain a more accurate score.We do not know what this variability means in terms of falls risk prediction.

Bischoff (2003)

Community dwelling elderly women < 12 sec. on TUG normal.Women in residential care – only 9% performed in <12 sec.; 42% were below 20 sec; 32% were between 20-30 sec. and 26% > 30sec.Suggests that community dwelling woman with TUG > 12 sec. should be referred for PT evaluation.Over 50% of women in residential care at high or very high risk of falling.

Single Leg Stance Test-A measure of static balance that relates to foot/ankle strategies.Functional implications for gait, especially on uneven surfaces, and going up/down curbs or steps.Marker of frailty in elderly persons.Community dwelling older adults unable to stand for 5 sec had a 2 times risk of injurious falls.

Dynamic Gait Index-Developed to quantify gait dysfunction in older adults during level surface walking as well as more complex functional tasks.Dual task demands relevant to falls risk in elderly. Applicable to assessing balance in other groups of patients including those with vestibular disorders, multiple sclerosis, head injury, and Parkinson's Scores of 19 or less out of 24 indicate increased risk of falling in older adults (Shumway-Cook 1997).

Berg Balance Scale-Measure of static and dynamic balance in movements common in everyday life on 14-item scale (56 points). Useful for evaluating multiple falls risk in community living older adults. No longer recommends a dichotomous 45 point cut-off.

Likelihood of multiple falls increases as score decreases. Reliable test of balance in elderly in residential care – change of 8 points required to reveal genuine change in function. Discriminates persons with Parkinson's disease who fall vs. those who do not fall. Cut-off score of 44/56 recommended by Landers, 2008.

Limitations of Balance Scales and Screening Tools-Screening for falls may increase fear of falling. Falls are multifactorial.No scale captures all aspects. Scales and balance screening tools have not been well tested in a wide range of populations/settings. Uncertainty regarding predictive scores. Scales test different aspects of balance, sensitivity for prediction and examination may be best with multiple tests.

ACOVE Indicator 7-If a vulnerable elder reports 2 or more falls in the past year, THEN there should be documentation of a cognitive assessment in the past 6 months, Because, detection and management of cognitive impairment reduces the risk of falls as part of a multifactorial intervention. 4 studies recommend using the MMSE(15-17,23).Clinical Practice Guideline-Assess mental status as part of your fall evaluation for older adults who had a fall, report recurrent falls in the past year or show abnormal gait or balance (20).

ACOVE Indicator 8-If a vulnerable elder reports a history of 2 or more falls in the past year, THEN there should be documentation of an assessment and modification of home hazards recommended in the previous year or within 3 months of the report because Environmental factors can contribute to risk of falls and mobility problems.An assessment and modification of home hazards may decrease fall risk.

ACOVE Indicator 9-If a vulnerable elder reports a history of 2 or more falls, or 1 fall with injury, in the past year, THEN there should be documentation of a discussion of related risks and assistance offered to reduce or discontinue benzodiazepine use,Because, benzodiazepine use increases the risk of future falls.

ACOVE Indicator 10-If a vulnerable elder demonstrates poor balance or proprioception or excessive postural sway and does not have an assistive device, THEN an evaluation or prescription for an assistive device should be offered within 3 months.

ACOVE Indicator 11-If a vulnerable elder reports a history of 2 or more falls, or 1 fall with injury, in the past year and has an assistive device, then there should be documentation of an assistive device review in the past 6 months or within 3 months of the report…

ACOVE Indicator 12-If a vulnerable elder is found to have a problem with gait, balance, strength or endurance, then there should be documentation of a structured or supervised exercise program offered in the previous 6 months.

CHALLENGES-

Old age papulation is increasing day by day andin current scenario. Many old age persons are staying in Family/Old age home/Hospital. Most of them are Bed ridden and they are not able to take care of themselves.Financial condition is poor for most of the old age persons in India. Loss of independence is the biggest factor and most of them are dependent on care givers.Care giver issues are there and is very costly in India.Most of the old age persons cannot afford to pay for the care givers. Lack of self-Motivation and family support make them vulnerable for frequent fall. Multiple comorbidities like diabetes,hypertension,stoke contributes to frequent fall in older persons.Neglect by own children and society is more prevalent in india.it is more challenging to address the issues of older persons.

ETIOLOGY-

For normal gait there is effective coordination between basal ganglia brainstem system, regulated muscle tone, function processing of sensory information such as vision, hearing, and proprioception.

The risk of falling is increased in the elderly because,

1) These functions decline with age
2) The probability of accumulating medical issues increases with age,
3) Associated medications.

Who are at risk?

1. Parkinson's disease
2. Osteoarthritis
3. Blindness
4. Stroke
5. Alzheimer's disease
6. Overdose of sleeping pill
7. Alcohol

8. Unsteady gait
9. Hearing disturbance
10. Incontinence
11. Slippery floor
12. Low light or excessive light
13. Standing and sitting for prolonged time

PATHOPHYSIOLOGY –

- Sarcopenia
- Cognitive impairment
- Postprandial hypotension
- Obesity
- Osteoporosis
- Motor instability

EVALUATION-

Fall prevention and management must be multidimensional and inter-professional.Comprehensive Geriatric Assessment (CGA) is a multidisciplinary instrument used in the evaluation of elderly patients at risk of falling.There is no standard diagnostic testing for an individual at high risk for falls, based upon the history and physical examination, laboratory tests.

What is the Impact-

Decreases Quality of life.Fear of another fall.Social isolation.Injury related pain.Inoperable surgeries.Bed ridden.Some people may even avoid certain activities (e.g., shopping, cleaning) because of fear. Decreased activity can increase joint stiffness and weakness, further reducing mobility. Function and Quality of life deteriorate drastically after a fall.50% of elderly people who were ambulatory before fracturing a hip do not recover their previous level of morbidity.After falling, elderly people may fear falling again,so mobility is sometimes reduced and confidence is lost.Some people may even avoid certain activities (e.g., shopping, cleaning) because of fear.Decreased activity can increase joint stiffness and weakness, further reducing mobility.

How to predict?

The best predictor for an increased risk of falls is a history of falls. Giddiness on change of posture. Head reeling from getting up from bed. Watch while getting up from chair. Elder person is known case of diabetes, oldstroke. Person has history ofhypoglycaemia.

What to do when an elderly fall?

Look for Alertness whether is person is conscious or unconscious.if patient is having profuse sweating look for coronary artery disease. Look for hypoglycaemia,check the blood sugar. If you observe Tongue Bite rule outSeizures. If shortening of lower limb is there and swelling with pain is there rule out Fracture leg. Look for head injury if bleeding is present. ask for moving all limbs,any chest pain.

MANAGEMENT-

The goals of management are: -

1) Treat impairments where possible,

Old age home- Anti skid tiles on the floor should be fitted. Adequate lighting with natural lights should be there.Rails/Ramps should be there.Emergency support like ambulance,nursing officers,pharmacist andTraining of staff provision is an important aspect in old age home care.Big rest rooms with support fitting like big handles are essential.Anyone is at risk, seek medical help before fall.

2) Build on systems that work well to compensate for deficit,

3) provide physical and human resources to assist when necessary.

COMPLICATION-

Repeated Hospitalization leading to financial burden.Fracture and Traumatic brain injury,Sub dural-hematoma are very common.Pain at local siteand surgical intervention may be required.Decreased overall functional ability and social inhibition is very common complication.A fear of falling and Poor quality of life always follows a patient with fall.

CONCLUSION-

Falls are preventable. A fall prevention program should be oriented to both health care team and doctors.Falls are costly and harmful. Reducing falls and injuries are main goal in geriatric care. For quality of life, try for near independence.Physiotherapy and Rehabilitation plays vital role in recovery and quality of life. Falls are common in elderly people, Falls are not part of normal ageing, fall injuries can be lifethreatening and preventing inpatient fallsshould be the priority.

TABLE -1 Example of Management for Underlying Causes of Falls in Older Patient

CAUSES	EXAMPLES OF TREATMENT
Cardiovascular	
Arrhythmias	Antiarrhythmic medication, ablation, pacemaker (depending on nature of arrhythmia)
Aortic stenosis with syncope or near syncope	Valve surgery (transcatheter procedure if appropriate)
Postural hypotension	Reduce or eliminate hypotensive drugs Hydration, support stockings Medication (Proamatidine [midodrine], fludrocortisone, droxidopa) Adaptive behaviours (e.g., pausing and getting up slowly)
Hypertension	Manage carefully to avoid hypotension and near syncope; control may be important in patients with periventricular white matter changes in preventing further gait disturbance
Neurologic	
Autonomic dysfunction with postural hypotension	As above
Cervical spondylosis (with spinal cord compression)	Neck brace; physical therapy; consider surgery
Parkinson's disease	Antiparkinsonian drugs
Visual impairment	Ophthalmologic/optometric evaluation and specific treatment
Seizure disorder	Anticonvulsants
Normal pressure hydrocephalus	Surgery (ventricular-peritoneal shunt)
Dementia	Supervised activities Hazard-free environment
Benign positional vertigo (BPV)	Habituation exercises Anti-vertiginous medication
Others	
Foot disorders	Podiatric evaluation and treatment
Gait and balance disorders	Properly fitted shoes, Physical therapy, Exercise with balance training (including Tai Chi where available)
Muscle weakness, deconditioning	Lower extremity strength training
Drug adverse effects (e.g., sedatives, alcohol, other psychotropic drugs, anti-hypertensive)	Elimination of drug(s) when feasible
Vitamin D deficiency	Vitamin D supplementation
Recurrent falls	Fall alert system for those who live alone, protectors in selected patients

Source: Reproduced withpermission from RL Kane et al (eds): Essentials of ……. Geriatrics, 8th ed. New York, McGraw-Hill, 2017.

Table-2 : Management of impairments that contribute to instability and fails

Organ System	Impairment	Medical Management	Restorative Services	Environmental Modifications
Eye	Decreased acuity Reduced visual fields	Corrective lenses Prisms in spectacles	Low vision rehabilitation Low vision rehabilitation, teach to scan using head rotation	Lighting
	Loss of depth perception	Cataract removal, if indicated	Teach to use shadows to detect depth	Lighting to accent shadows, contrast
	Poor dark adaption	Switching to glaucoma medications that do not cause miosis		
Vestibular system	Benign paroxysmal positional vertigo (BPPV)	Epley manoeuvre	Vestibular rehabilitation	
	Meniere disease	Cautious use of meclizine, diuretics; rarely surgery	Vestibular rehabilitation	
Peripheral nerve	Neuropathy	Footwear to protect foot and maximize sensation	Assistive devices for hepatic enhancement	Hand holds, railings
Central circulation	Reduced brain perfusion	Treatment varies by cause Arrhythmias - medications to control rate and rhythm, pacemakers		
		Postprandial hypotension- frequent small meals		
	Orthostatic hypotension	Treatment varies by cause Adjust offending medications Autonomic neuropathy - Salt loading, fluorinated corticosteroids	Comprehension hose, calf muscle contractions	
		Dehydration - hydration, reduce diuretic dose		
Brain	Reduced attention	Medication adjustment	Practice dual tasks	
	Psychomotor slowing	Medication adjustment	Practice movement speed	
	Abnormal righting reflexes	Antiparkinsonian medication helps bradykinesia more than balance	Assistive devices, practice getting up after a fall	Protective clothing
Effector muscle	Weakness	Reduced activity - treat contributing causes (e.g., CHF, anaemia, COPD, arthritis)		
		Focal motor deficit due to spinal stenosis - sometimes surgery	Orthotics, exercise, assistive devices	
		Myopathy - adjust offending medications, possibly steroids for myositis		
Musculoskeletal	Deceased range of motion		Active and passive range of motion exercise, orthotics	
Pain	Bone and joint	Analgesics, injections	Physical modalities (e.g., heat, massage, assistive devices, orthoses, adaptive equipment)	
	Spinal cord, roots, nerves	Injections, surgery, analgesics	Orthoses, assistive devices	Place items within easy reach

CHF, Congestive heart failure, COPD, chronic obstructive pulmonary disease.

Table 3 : Modifications for the Physical Environment

Area	Modifications
Lighting	• Nightlights in the bedroom, bathroom, and hallways leading to the bathroom
	• Flashlight kept next to the bed
	• Timer or motion-activated lighting systems
	• Light switches located near all doors and both ends of stairways
Flooring	• Nonglare, non-skid flooring
	• Avoidance of loose area rugs or use of non-skid backing
	• Non-skid strips on steps
	• Bevel or ramp—uneven transitions between rooms
	• Increased contrast at level changes
Stairwells	• Sturdy handrails, sometimes on both sides of steps
	• Chair lift (stair glide)
	• Rearrange rooms for single-floor living arrangement
Bathroom	• Elevated toilet seat
	• Grab bars
	• Non-skid strips or mat on floor of shower or bathtub
	• Shower chairs
Kitchen	• Tub bench
	• Commonly used items placed at easily accessible height
	• Countertop clutter cleared to maximize working space
Walkways	• Clear and straight as possible
	• Increased width by removing obstacles and furniture to accommodate walkers
	• Elimination of e tripping hazards such as cords and tubing

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Review Article

NON-ALCOHOLIC FATTY LIVER DISEASE – COMPREHENSIVE REVIEW

Jayshree Swain

INTRODUCTION

The prevalence of non-alcoholic fatty liver disease (NAFLD) has increased in the past five decades, closely mirroring the rise in obesity and type 2 diabetes mellitus (T2DM). Both T2DM and NAFLD share common underlying mechanisms, such as insulin resistance and lipotoxicity. NAFLD is primarily linked to visceral adiposity, dysglycemia, atherogenicdyslipidemia, and hypertension. It encompasses a range of liver conditions, from simple fat accumulation (steatosis) to more severe stages involving inflammation, fibrosis, cirrhosis, and hepatocellular carcinoma (HCC). Diagnosis involves excluding significant alcohol use or secondary causes of hepatic steatosis and/or elevated aminotransferases[1-3]. NAFLD has two subtypes: the nonprogressive form-nonalcoholic fatty liver (NAFL)-and the progressive form non-alcoholic steatohepatitis (NASH). NAFL or simple steatosis is defined histologically as hepatic triglyceride accumulation in > 5% of hepatocytes, mild or no inflammation, and no evidence of hepatocyte injury. NASH entails progressive liver injury with steatosis, significant lobular inflammation, liver cell swelling and degeneration (ballooning), and hepatocyte necrosis. Early-stage NASH can progress to fibrotic NASH, cirrhosis, and HCC, although the progression is not always linear, and HCC can develop even without fibrosis or cirrhosis. The severity of fibrosis is assessed on a scale from F -O to F -4 based on histologic criteria with stage ≥F2 indicating clinically significant fibrosis.

DM (Endocrinology), Dept of Endocrinology
IMS & SUM Hospital, Bhubaneswar, Odisha.

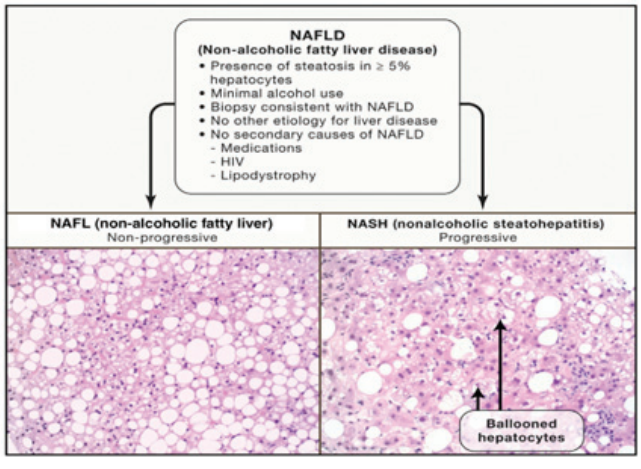

Figure 1. Types of NAFLD

EPIDEMIOLOGY OF NONALCOHOLIC FATTY LIVER DISEASE

Approximately 25% of the world's population is estimated to be affected by NAFLD, with varying prevalence across different regions. The Middle East and South America have the highest rates of NAFLD, while Africa has the lowest. In the United States, the prevalence of NAFLD increased from 20% in 1988-1994 to 32% in 2012-2016, affecting an estimated 80-100 million people. Interestingly, NAFLD is more common in the Hispanic population but less prevalent among African-Americans. Alarmingly, the incidence of NAFLD is also rising in children and adolescents not only in the United States but also globally, including in Europe, China, and India. A recent study examining a large middle-aged US cohort revealed that 38% had NAFL, 14% had non-alcoholic steatohepatitis (NASH), and 6% exhibited significant liver fibrosis.[4,5,6,9,10]

NATURAL HISTORY OF NONALCOHOLIC FATTY LIVER DISEASE

The progression from non-alcoholic fatty liver (NAFL) to non-alcoholic steatohepatitis (NASH) is

complex and highly variable. It is influenced by a combination of factors, including genetics, epigenetics, environment, lifestyle, microbiota, and cardiometabolic risk elements like type 2 diabetes (T2D), hypertension, and dyslipidemia. Individuals with NAFL tend to experience slow progression, typically advancing one fibrosis stage every 14 years. In contrast, those diagnosed with NASH often have a faster progression, advancing one fibrosis stage in 7 years. However, around one in five individuals with NASH rapidly progress to cirrhosis within a decade. Predictors of this rapid progression are not entirely clear, but factors like higher levels of alanine aminotransferase (ALT), presence of poorly controlled T2D, a family history of cirrhosis, and genetic predisposition are considered. Approximately 20%-30% of people with NAFLD have NASH, and among them, about 20%-30% will develop cirrhosis over the next 30-40 years. Rates of hepatocellular carcinoma (HCC) related to NASH have been increasing over the past decade. Individuals with advanced fibrosis or cirrhosis face a 1.5%-2% annual risk of developing HCC. Therefore, patients with advanced fibrosis or NASH cirrhosis should be screened for HCC every 6 months by ultrasound (US) with or without alpha-fetoprotein measurement.

The risk of developing HCC is higher in individuals with non-cirrhotic NAFLD compared to other chronic liver diseases. Atherosclerotic cardiovascular disease (ASCVD) is the primary cause of death in individuals with NAFLD, followed by cancer and liver disease. All-cause, liver-related, and cardiovascular mortality risks increase across all NAFLD stages, peaking with advanced fibrosis. ASCVD risk can be up to 10 times higher in individuals with NAFLD, regardless of fibrosis stage, when compared to those without NAFLD. Stage 2 fibrosis marks a critical point where liver-related mortality starts to exponentially rise with increasing fibrosis. Once cirrhosis develops, liver disease becomes the most common cause of mortality. Notably, NASH is currently the second most common reason for liver transplants and is expected to surpass viral hepatitis as the leading indication within the next decade.[4,7,8]

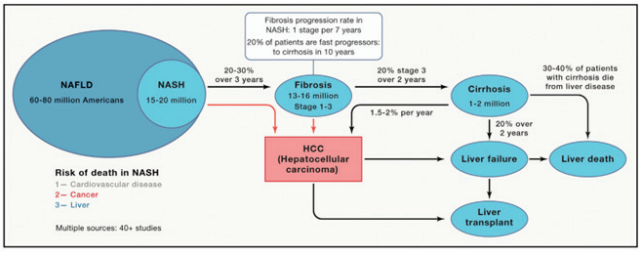

Figure 2. Natural history of NAFLD

PATHOPHYSIOLOGY OF NONALCOHOLIC FATTY LIVER DISEASE

The complex and disparate pathogenesis of NAFLD is influenced by an interaction of multiple factors. The result is insufficient adipocyte storage capacity, offloading of free fatty acids into the circulation, and ectopic accumulation of fat (Fig. 3).[4,11]

Calorie Excess

Excess calories from any source are the building blocks for NAFLD. High-calorie diets particularly overconsumption of fructose, fuel hepatic steatosis. Fructose is especially pathogenic because it induces hepatic insulin resistance and de novo lipogenesis. Major sources of fructose include high fructose corn syrup and table sugar (sucrose is 50% fructose and 50% glucose). Insufficient physical activity affects energy balance and increases risk for NAFLD independent of BMI.

Insulin Resistance

The insulin resistance phenotype with central obesity (increased visceral fat and less gluteofemoral fat) and decreased muscle mass, contributes to the development of NAFLD and the risk for fibrosis. Insulin resistance induces lipotoxicity, disrupts lipid metabolism, and causes systemic inflammation, increased proinflammatory cytokines, increased hepatokines, decreased adiponectin levels, oxidative stress, mitochondrial dysfunction, and endothelial dysfunction. Hyperglycemia increases de novo lipogenesis. The common pathophysiology of insulin resistance leading to T2DM and NAFLD is reciprocally harmful, leading to more severe disease and comorbidities.

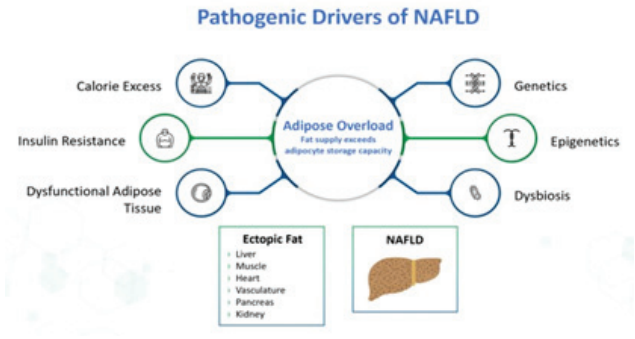

Figure 3. Pathogenic Drivers of NAFLD

Dysfunctional Adipose Tissue

Adipose tissue biology is crucial in NAFLD development, influencing adipocyte storage capacity. Various degrees of lipodystrophy exist, with adipose tissue dysfunction being a key factor in lean NAFLD, particularly in Asian populations. The gene variant TM6SF2 is linked to lean NAFLD, and patients with lipodystrophy exhibit severe ectopic fat accumulation due to insufficient adipocyte storage.

Genetics

Genetics impact NAFLD across its spectrum, affecting body weight, appetite, insulin resistance, and liver-related complications. Several genetic risk variants related to hepatic lipid metabolism are associated with NAFLD. Key genetic variants include PNPLA3 (linked to lipid droplet remodelling). The PNPLA3 rs738409 (C>G) gene polymorphism increases the risk for progression cirrhosis and HCC and is more prevalent in Hispanic populations. Other genes associated with NAFLD include TM6SF2, MBOAT7, and GCKR. The HSD17B13 gene variant is thought to be protective.

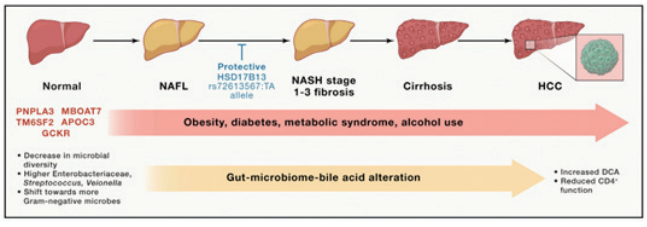

Figure 4. A gene-environment nexus drives the risk of cirrhosis and HCC in NASH

Epigenetics

Epigenetic factors associated with the development of NAFLD include intrauterine exposure to a high-fat diet, intrauterine growth retardation, and accelerated fetal growth.

Dysbiosis

Alterations in gut-microbiome-bile acids lead to a decrease in microbial diversity with a shift toward more Gram-negative microbes. NAFLD has been associated with higher Enterobacteriaceae, Streptococcus, and Velonella and lower Faecalibacterium, Ruminoccus, and Lactobacillus.

DIAGNOSIS of NAFLD

Most persons with NAFLD are asymptomatic or have nonspecific complaints, such as fatigue or vague right upper quadrant pain. An imaging study is not necessary for routine clinical diagnosis, although many cases are discovered incidentally with US, computed tomography (CT), or MRI. A firm or nodular liver and/or splenomegaly may be detected on physical examination, which can indicate advanced liver disease. There may be elevations in serum aminotransferases where ALT is usually higher than serum aspartate aminotransferase (AST). However, aminotransferases are normal in 70% of persons with NAFLD and should not be used alone for diagnosis. In advanced fibrosis, the ratio of AST to ALT may reverse with higher AST levels. A decreased platelet count may occur because of splenic sequestration and decreased hepatic production of thrombopoietin. As liver disease progresses, there may be evidence of hepatic synthetic dysfunction with decreased serum albumin and increased prothrombin time.[1,4]

Imaging to detect hepatic steatosis includes US, CT, MRI, and CAP. The two most sensitive methods to detect steatosis are proton magnetic resonance spectroscopy (H-MRS) and LiverMultiScan, MRI-proton density fat fraction (PDFF) (MRI-PDFF) mainly used in research settings. Because NAFLD extremely common, the diagnostic challenge is not assessing liver fat, but rather the risk for significant fibrosis, which represents the burden of clinical disease. High-risk groups that should be screened for NAFLD include those who have overweight or obesity, T2D, or components of the metabolic syndrome. Patients with persistently elevated AST or ALT> 30 IU/L for more

than 6 months or those with hepatic steatosis on any imaging modality should also be considered high risk. Patients have a higher risk for cirrhosis with T2D or prediabetes, age> 50, BMI >40 kg/m², increasing number of metabolic risk factors, or a family history of NASH. [1,12]

The best initial screening test is FIB-4, which is a simple score calculated using a person's age, AST, ALT, and platelet count. FIB-4 is the most validated test among many others studied to this end. FIB-4 can predict changes over time in hepatic fibrosis and allows risk stratification for future liver-related morbidity and mortality. Patients with a FIB-4 < 1.3 are considered low risk and those with FIB-4 2.67 are at high risk for clinically significant fibrosis. A FIB-4 between 1.3 and 2.67 is the indeterminate risk where additional noninvasive testing can be done to further assess risk. Those at low risk should have the FIB-4 repeated every year and focus on traditional cardiometabolic risk reduction. Those at high risk should be referred to a liver specialist for management of liver disease, and continuing cardiometabolic disease management by the primary care or endocrinology team**.** [1,2,5,8]

NONINVASIVE TESTS

For those with an indeterminate FIB-4, a second non-invasive test should be performed to increase predictive value. NITs to assess risk for fibrosis include serologic markers and imaging modalities.[1,5,8]

Imaging

Fibrosis Biomarkers

Ø VCTE (Fibroscan)

Ø SWE (Sheer Wave Elastography)

Ø MR Elastography (MRE)

Ø CT1 (LiverMultiscan)

Simple

Ø FIB – 4 Index

Ø NAFLD Fibrosis Score (NFS)

Ø AST/ALT Ratio

Ø AST to Platelet Ratio Index (APRI)

Complex

Ø Enhanced Liver Fibrosis (ELF)

Ø Fibrosure

Ø NIS4 (NASHnext)

Ø Pro – C3

Fibrosis Biomarkers

Simple Fibrosis markers include FIB-4, NFS, AST/ALT ratio and APRI. Complex Fibrosis markers include ELF, Fibrosure, NIS4 and Pro C3. Among them ELF test is FDA approved for prognostic risk assessment. It combines three biomarkers involved in fibrosis and extracellular matrix turnover (hyaluronic acid, tissue inhibitors of metalloproteinase 1 and procollagen III N-terminal peptide). An ELF score < 7.7 indicates low risk of fibrosis, a score of 7.7 – 9.8 indicates moderate risk and a score of >9.8 is high risk.

Imaging Modalities

Vibration controlled transient elastography (Fibroscan): measures two parameters to assess liver fat and liver fibrosis. CAP(Controlled Attenuation Parameter) quantifies liver fat and is correlated to steatosis. LSM (Liver stiffness Measurement) is an indirect measurement of liver fibrosis based on elastography and is expressed in kilopascal (kPa). LSM < 8 kPa means liver is soft and fibrosis risk is low. LSM >12 kPa indicates stiff liver with high risk for fibrosis. Advantage of VCTE is it is inexpensive and disadvantage is that it is less accurate in cases of mild fibrosis and in persons BMI>40.

Magnetic resonance elastography(MRE): uses technology that combines MRI with low frequency vibrations to quantitatively assess liver stiffness. It is expensive and has limited availability.

Liver-Multiscan: is a multiparametric MRI to noninvasively quantify liver fat and assess disease activity. Three parameters are assessed. The most useful of these is corrected T1 (cT1) imaging which quantifies liver fibrosis and inflammation. PDFF(Proton Density Fat Fraction) is a highly sensitive quantification of hepatic steatosis and T2 assesses iron content of liver. This test is accurate in high BMI patients and is becoming increasingly available.

Liver Biopsy: remains the gold standard to establish diagnosis of NASH, fibrosis and cirrhosis and to ruleout other causes of liver diseases. Limitations are cost, risk of bleeding, pain and sampling variability.

Management of NAFLD

Currently, there are no FDA approved medications available to treat NAFLD. Therefore, treatment must focus on weight loss which improves NAFLD by reducing hepatic insulin resistance and lipotoxicity.

Nonpharmacological treatment options:

• Lifestyle modification is the cornerstone of treatment.

• Encouraged abstinence from any amount of alcohol

• Recommended drinking > 2cups of caffeinated coffee each day as it reduces risk of liver fibrosis.

• Dietary guidance on low calorie diet with restriction of saturated fats and sugars (Mediterranean diet)

• Adherence to exercise is critical for weight loss maintenance.

• Vaccinations(Hepatitis A,B, Pneumococcal) are recommended for patients with CLD[1,2,4,13]

Pharmacologic treatment options-

Diabetes Medications

In patients with T2DM and NAFLD, GLP1 Receptor agonists, SGLT2 inhibitors and pioglitazone are preferred in view of their beneficial effect on steatosis and optimal glycemic control. Different Oral antidiabetic medications have varied effects on steatosis and fibrosis outcomes summarised in table 1 given below.

Medication	Hepatic Steatosis	Steatohepatitis	Fibrosis
Pioglitazone	Decreased	Decreased	Decreased
GLP1 RA	Decreased	Decreased	Unknown
SGLT2 inhibitors	Decreased	Unknown	Unknown
DPP-IV inhibitors	Unchanged	Unknown	Unknown
Metformin	Unchanged	Neutral	Unknown
Insulin	Decreased	Neutral	Unknown

Table 1: Effect of diabetes medications on NAFLD[1,2,14-16]

Anti-obesity Medications

Weight loss with any of the FDA approved anti-obesity medications can improve NAFLD by reducing overall fat mass. Medications include phentermine/ topiramate ER, naltrexone/bupropion ER, orlistat, liraglutide and semaglutide. Antiobesity medications are approved for individuals with comorbidity of obesity and BMI >27kg/m2. Among them semaglutide has the best efficacy in attaining weight loss.[1]

Statins

Statins are indicated for ASCVD risk reduction and are safe for patients with NAFLD. Some studies have shown that statins improve liver enzymes, but no specific data to support the role of statins for treating NAFLD.[17]

Vitamin E

Vitamin E 800 IU daily improves liver histology in nondiabetic adults with NASH. However, it is not recommended in patients with T2DM,NAFLD without a liver biopsy, NASH Cirrhosis or cryptogenic cirrhosis.[16]

Bariatric Surgery

Bariatric surgery is highly effective forNAFLD because it can achieve the greatest amount of sustained weight loss. It has been shown to improve or resolve steatosis, fibrosis and reduction in risk of HCC. Also, it improves other comorbidities and reduces the risk of cardiovascular disease. In a recent study, bariatric surgery compared with nonsurgical management, was associated with an 88% lower risk of major adverse liver outcomes and 70% reduction in adverse cardiovascular events. [13,18]

SUMMARY

NAFLD is the leading cause of chronic liver disease and is soon to be the most common indication for a liver transplant. Because symptoms are vague

and liver enzyme levels are usually normal, many patients with clinically significant liver fibrosis remain undiagnosed. Patients at highest risk for progressive NAFLD are those having T2D, prediabetes, overweight or obesity, components of the metabolic syndrome, steatosis on any imaging study or persistently elevated AST or ALT > 30 IU/L. One should screen high-risk patients with FIB-4 followed by additional NITS as needed. NAFLD treatments include optimization of weight, glucose, blood pressure, and lipids at present.

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Case Report

ITP AS A PRESENTING MANIFESTATION IN DENGUE FEVER : A CASE REPORT

Tuhin Shuvra Bandyopadhyay[1], Sujata Devi[2], Debananda Sahoo[2], Anupam Dey[3], Arpita Dash[4], Dr Sunita Dalei[1]

INTRODUCTION:

A diagnosis of exclusion, Immune Thrombocytopenic Purpura (ITP), alternatively referred to as Idiopathic Thrombocytopenic Purpura or Werlhof's Disease, is distinguished by its characteristic thrombocytopenia. This phenomenon is believed to be induced by the formation of antibodies and potentially by inhibiting platelet release from megakaryocytes. ITP is commonly categorised according to its duration since diagnosis (recently diagnosed, persistent, chronic, and refractory ITP) or its aetiology (primary versus secondary) [1]. While secondary ITP accounts for 20% of diagnoses, primary ITP in adults has an incidence of 3.3 per 100,000 people annually and a prevalence of 9.5 per 100,000 adults [2]. Clinically, a normal peripheral blood smear and a very low platelet count are observed together with mucocutaneous haemorrhage, purpura, or ecchymoses. ITP can be caused by drugs (aspirin, digoxin, phenytoin, etc.), cancers (lymphoma and adenocarcinoma), common variable immunodeficiency, autoimmune disorders (thyroid disease, autoimmune hepatitis, systemic lupus erythematosus), and infections (human immunodeficiency virus, hepatitis C, varicella-zoster virus, rubella, etc.) [3]. Chronic ITP manifests in adults between the ages of 20 and 50, is typically not preceded by viral infections, and has a female-to-male preponderance of 3:1 [4]. In contrast, it generally is self-limiting in children, emerging most frequently following a viral infection, with recovery occurring within three months. Dengue fever, commonly referred to as break bone fever, 7-day fever, or dandy fever, is one of the most common viral diseases spread by arthropods worldwide. Globally, there are around 100 million new cases of dengue each year, and 2.5 billion people reside in dengue-risk areas [5]. Low white blood cells, low platelets, and an increased haematocrit level in the blood are the hallmarks of dengue fever. Fever, headache, muscle aches, maculopapular rash, pain behind the eyes, and bleeding are among the symptoms [6]. Dengue fever causes thrombocytopenia, which has an incidence of 40.3% [7]. It is thought to be caused by antiplatelet antibodies, DIC, early bone marrow suppression, and peripheral sequestration of platelets. The condition is most common during the critical phase of the illness (3–4 days after the onset of fever), which lasts for 36–48 hours and then gradually improves during the convalescent phase. Very few case reports exist that show both a temporal and a causative relationship between immune thrombocytopenic purpura development and dengue fever, and the majority of these cases have involved children. (8) There isn't a definite agreement or publicly available statistics regarding the prevalence of ITP following dengue virus infection. This case report describes a woman in her 40s who was admitted to a tertiary care facility in eastern India due to dengue fever, which manifested as ITP.

CASE PRESENTATION:

Not taking any medication, a young woman in her 40s was just diagnosed with type 2 diabetes. A couple of weeks prior, she experienced a high temperature, chills, and rigour, along with myalgia and back pain that was resolved with medication. She had been experiencing repeated episodes of melena, gingival bleeding, and haematuria for the previous five to six days when she arrived at the emergency department. She had also experienced clear, non-projectile vomiting, including food particles, for the previous three days. There was no historical medical history of weight loss,

[1]PG Trainee, [2]Associate Professor
[3]Addl. Professor, [4]Assistant Professor
Department of General Medicine,
AIIMS, Bhubaneswar

recurring infections in the past, burning micturition, joint discomfort, oral ulcers, alopecia, heat or cold intolerance, or drug use. The patient had previously been admitted to a nearby hospital, where reports consistently indicated that the patient had eight units of RDP transfusion and had a platelet count of less than 10,000/cumm. On Examination, the patient was alert, afebrile, and cognizant of time, place, and people; BP was recorded in the right arm while supine, measuring 120/80 mmHg; PR was 74 bpm; RR was 18/min; and SpO2 was 98% at room temperature; no organomegaly was found, and other systemic examination results were within normal ranges.

INVESTIGATIONS and OUTCOME:

According to CBC, TPC was less than 5000/cumm on the first day of admission, which corresponds to the 15-16th day after the fever started. The results of the Dengue IgM test were positive, and the TPC was consistently less than 10000/cumm in the serial CBC measurements. Throughout her hospital stay, the patient got three RDP units and one SDP (single donor platelets). Urine R/M and C/S were both negative, MP ICT was negative, INR was 0.93, ANA IFA and ANA profile were negative, and HbA1C and FBS were within normal ranges. Urine C3 and C4 levels were also normal. Due to thrombocytopenia that persisted into the third week of dengue fever, a provisional diagnosis of ITP (post-dengue infection) was made so as to mandate transfusion. A bone marrow test showed no additional abnormalities and a higher number of normal and slightly dyspoietic megakaryocytes. These results are in line with ITP, probably following dengue. Steroid medication was put on hold due to the steadily increasing trend of the total platelet count, which started to rise on the fourth day of admission (or the 19th or 20th day after the fever started). The patient showed progressive recovery under conservative therapy with fluids, PPI, antipyretics, and other supportive measures; at the time of discharge, the platelet count was 129000/cumm.

FOLLOW UP:

Upon assessment two weeks later in the Medicine OPD, the patient's liver and kidney parameters, as well as his platelet count (TPC 255000/cumm), were all normal, and there had been no observable bleeding symptoms. The patient is currently improving and continues to receive routine follow-up.

DISCUSSION and CONCLUSION:

When thrombocytopenia from a dengue infection persists after the second week of infection, it should raise suspicions about other possible reasons and prompt medical attention. ITP should be considered as one of the differential diagnosis once other potential causes for thrombocytopenia, such as drug usage, dietary deficiencies, toxins, and primary bone marrow diseases, have been ruled out. Particularly among adults, the number of case reports demonstrating a connection between dengue and ITP is quite low [8]. It's important to rule out other causes of ITP, such as systemic lupus erythematosus and lymphoproliferative disorders, before connecting dengue infection to ITP. Prompt identification and treatment are also necessary to prevent potentially catastrophic outcomes, such as brain haemorrhage. Clinical assessment and pathological investigation indicated that this was a self-limited case of ITP owing to dengue infection, which did not justify the use of steroids or other specialised treatment modalities for ITP.

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Case Report

AREA POSTREMA SYNDROME: AN UNUSUAL PRESENTATION OF NEUROMYELITIS OPTICA SPECTRUM DISORDER (NMOSD)

Suvam Saswat Rout[1], Susanta kumar Bhuyan[2], Premakanta Mohanty[2], Namita Mohapatra[3]

ABSTRACT

Neuromyelitis optica spectrum disorder (NMOSD) is an immune-mediated inflammatory disorder of the central nervous system (CNS) that commonly targets the optic nerves and the spinal cord [1]. A recent IPND diagnostic criteria has evolved to include the area postrema, the diencephalon, the brainstem and the cerebral hemispheres as other targets for the autoantibodies [2] Area postrema syndrome (APS) is uncommon neurological presentation characterized by unexplained attacks of intractable nausea, vomiting or hiccoughs (INVH) lasting for more than 1 week (at least 48 hr) with supporting radiological evidence[1]. It is mostly misdiagnosed as Gastrointestinal manifestation that delays the diagnosis and causes further serious neurological sequelae. Here we report a case of Area Postrema Syndrome as the first presentation of Neuromyelitis Optica Spectrum Disorder (NMOSD).

INTRODUCTION

The area postrema (AP) is located at the dorsal medulla on the roof of the fourth ventricle, adjacent to the nucleus of the solitary tract (NTS). It is an area, where the blood–brain barrier (BBB) is more permeable (due to lack of tight junctions between the vascular endothelial cells and the presence of fenestrated capillaries) and aids neurochemical communication and fine control of autonomic functions [3]. Pathologically, lesions in the AP are characteristically non-destructive with full remission after resolution of inflammation compared to spinal cord or optic nerve lesions [4]. Thus, it is necessary to recognize APS early and to commence therapy as soon as possible to prevent NMOSD recurrence with more devastating neurologic deficits . Most studies of NMOSD have focused on the classic optico-spinal presentations, while only few outlined other presentations including APS and were mainly case reports [5].

CASE PRESENTATION

A 30-year-old woman from Khordha presented to the outpatient department with complaints of nausea, vomiting and occasional headaches for 3 weeks and difficulty in walking and change in voice quality for 3 days. She had 10-15 episodes of vomiting per day and no other significant medical history. She had taken parenteral proton pump inhibitors and antiemetics multiple times at local hospital but had no relief. A detailed medical evaluation including hematologic, biochemistry, ultrasound abdomen with pelvis and UGI Endoscopy showed normal findings. On neurological examination, she was conscious, well oriented to time, place, and person. She had horizontal nystagmus bilaterally. Her motor and sensory examinations were unremarkable. She had postural instability, truncal gait ataxia and dysarthria. MRI of the brain was performed, which showed T2/fluid attenuated inversion recovery hyperintensity in posterior aspect of midbrain and dorsal medulla involving area postrema(AP) without diffusion restriction. MRI orbit and whole spine screening were performed and were unremarkable. Visual evoked potential was also normal. Lumbar puncture with cerebral spinal fluid analysis was normal, with no oligoclonal bands. The Aquaporin4 Antibody was also negative. With these clinical findings and laboratory

[1]Post Graduate Trainee
[2]Associate Professor
[3]Professor and HOD
PGIMER and Capital Hospital, Bhubaneswar

parameters a diagnosis of Neuromyelitis Optica Sprectrum Disorder(NMOSD) was made according to 2015 IPND criteria. She was started with intravenous methylprednisolone pulse therapy 1,000 mg/d for 5 days which showed a significant improvement. She was then continued with oral Prednisolone tablets with a starting dose of 40mg and gradually tapered over next 21 days. Simultaneously the patient was also given tab Azathioprine 25mg twice daily.

DISCUSSION

APS is caused by lesions in dorsal medullary tegmentum, known as AP. The area postrema, a reflex emetic centre, is a vascular structure consisting of chemosensitive neurons mediating hiccups, fluid balance, and osmoregulation systems. APS is also reported to occur in other neurologic disorders such as anti-glial fibrillary acidic protein encephalomyelitis and Bickerstaff brainstem encephalitis.

While NMOSD must be considered in both sexes, there is a strong female preponderance irrespective of ethnicity, with a female:male ratio of up to 10:1 among AQP4-IgG- seropositive patients, who account for the vast majority of NMOSD, and up to 3:1 in seronegative patients [6].

Although APS is considered highly specific for AQP4-seropositivity APS in AQP4-seronegative patients (including patients with anti-myeline oligodendrocyte glycoprotein "MOG"- IgGs) are being increasingly recognized . The fact that the lack of BBB at the AP allows entry of other pathogenic autoantibodies makes it likely that AP may be involved in AQP4-seronegative NMOSD [7]. Therefore, NMOSD should be considered in context of strong clinical suspicion even with negative serological markers. Careful attention must be paid to ruling out differential diagnoses, especially in patients with seronegative NMOSD. The most important diferential diagnoses include MOG-EM/MOGAD, MS, neurosarcoidosis, paraneoplastic neurological syndromes, and infectious diseases

APS at onset can delay the diagnosis of NMOSD causing further neurologic deficits in the form of optic neuritis, transverse myelitis, or brainstem syndrome. Acute attacks are managed by methylprednisolone pulse therapy for 3–5 days or plasmapheresis. The pathology of AP usually involves inflammatory reaction rather than demyelination and necrosis, so it is highly responsive to immunomodulatory therapy with complete recovery. (8) Long-term immunotherapy must be initiated in NMOSD with APS at onset because it is associated with further frequent relapses and residual disability. Eculizumab, inebilizumab, and satralizumab are approved as maintenance therapy. Azathioprine, mycophenolate mofetil, and rituximab are the other effective agents

Diagnostic Criteria for NMOSD with AQP4-IgG
1. At least 1 core clinical characteristic
2. Positive test for AQP4-IgG using best-available detection method (cell-based assay strongly recommended)
3. Exclusion of alternative diagnoses
Diagnostic Criteria for NMOSD Without AQP4-IgG or NMOSD with Unknown AQP4-IgG Status
1. At least 2 core clinical characteristics occurring as a result of one or more clinical attacks and meeting all of the following requirements:
a. At least 1 core clinical characteristic must be optic neuritis, acute myelitis with LETM, or area postrema syndrome
b. Dissemination in space (2 or more different clinical characteristics)
c. Fulfillment of additional MRI requirements, as applicable
2. Negative test for AQP4-IgG using best-available detection method or testing unavailable
3. Exclusion of alternative diagnoses
Core Clinical Characteristics
1. Optic neuritis
2. Acute myelitis
3. Area postrema syndrome: episode of otherwise unexplained hiccups or nausea or vomiting
4. Acute brainstem syndrome
5. Symptomatic narcolepsy or acute diencephalic clinical syndrome with NMOSD-typical diencephalic MRI lesions
6. Symptomatic cerebral syndrome with NMOSD-typical brain lesions
Additional MRI Requirements for NMOSD Without AQP4-IgG and NMOSD with Unknown AQP4-IgG Status
1. Acute optic neuritis: requires brain MRI showing (a) normal findings or only nonspecific white matter lesions, OR (b) optic nerve MRI with T2-hyperintense lesion of T1-weighted gadolinium-enhancing lesion extending over >1/2 optic nerve length or involving optic chiasm
2. Acute myelitis: requires associated intramedullary MRI lesion extending ≥3 contiguous segments (LETM) OR ≥3 contiguous segments of focal spinal cord atrophy in patients with history compatible with acute myelitis
3. Area postrema syndrome requires associated dorsal medulla/area postrema lesions
4. Acute brainstem syndrome requires periependymal brainstem lesions

(Diagnostic criteria of NMOSD)

studied. The limitation of this case study is that we have described only the initial presentation and management of the case. A follow-up of the patient is required to understand the course of APS-onset in seronegative NMOSD.

CONCLUSION

APS can be the first presentation of NMOSD. So intractable hiccups and vomiting not responding to routine supportive measures must be evaluated for APS. APS at onset can delay the diagnosis of NMOSD causing further neurologic deficits in the form of optic neuritis, transverse myelitis, or brainstem syndrome. The diagnosis of NMOSD should be made according to the 2015 IPND criteria. Careful attention must be paid to ruling out differential diagnoses, especially in patients with seronegative NMOSD.

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Case Report

A CASE OF ADULT-ONSET BARTTER SYNDROME

Sweekruti Mahapatra[1], Bishnuprasad Chinhara[1]
Kalikinkar Chand[2], Sanjay Kumar Jangid[3]

ABSTRACT

Bartter Syndrome is a rare autosomal recessive salt losing disorder characterized by renal potassium wasting with hypokalemia, hypochloremic, metabolic alkalosis, increased renin angiotensin aldosterone system, normal blood pressure, juxtaglomerular cell hyperplasia. Most of the cases have been noted in pediatrics age group and adult onset are very rare.

CASE REPORT

A 21 year old man presented to the Department of General Medicine of Hitech Medical College and Hospital, Bhubaneswar with a history weakness of weakness of B/L lower limbs, joint pain, loss of appetite, increased frequency of micturition, proteinuria and renal impairment detected on laboratory evaluation. Symptoms started five days ago and gradually increased in severity. He had a similar episode three years ago and spontaneously remitted from it following bed rest. No significant family history. He denied ingestion of licorice, diuretics, laxatives or any other medication. No history of nausea, vomiting, diarrhea.

The patient weighted 45 kgs and was 172 cms tall (BMI-15.21).

Systemic examination revealed hypotonia in B/L lower limbs. Laboratory investigations are presented in Table 1 and Table 2.

[1]PG Trainee
[2]Assistant Professor
[3]Professor
Hi-Tech Medical College, Bhubaneswar

TABLE 1

	RESULTS OF BLOOD TEST	NORMAL LEVEL
Sodium	144	135-145 mEq/L
Potassium	1.2	3.5-5 mmol/L
Chloride	92	96-106 mmol/L
Calcium	8.7	9-11.5 mmol/L
Hemoglobin	10.4	13.2-16.6 gm/dl
Packed Cell Volume	30.8 %	38.3-48.6%
Creatinine	1.49	0.72-1.25 mg/dl

Table 1: The results of blood analysis in the patient

TABLE 2

PARAMETERS OF ABG		NORMAL LEVEL
pH	7.56	7.35-7.45
Bicarbonate(HCO3-)	27.8 mEq/l	22-26 mEq/l
Partial pressure of CO2(PaCO2)	31 mm Hg	35-45 mm Hg

Table 2: The result of ABG analysis in the patient

The patient had hypokalemia, metabolic alkalosis and hypochloremia and these features suggested the diagnosis of Bartter Syndrome. Genetic studies were not done due to non availability of specialized laboratories. He was initiated on potassium chloride infusion and potassium chloride syrup and advised to drink plenty of coconut water and consume a diet rich in potassium. Patient improved greatly after volume and potassium repletion.

DISCUSSION

The discovery of a novel salt-wasting tubulopathy by Bartter et al was characterized by Juxtaglomerular apparatus hyperplasia resulting in Hyperreninemia,

adrenal cortical hyperplasia resulting in normotensive-hyperaldosternism, and hypokalemic metabolic alkalosis as a significant event in 1962(1). It occurs mostly in childhood or adolescence and initial presentation in patients over 40 years of age was very rare(2).

Bartter Syndrome is an autosomal recessive disorder that affects one in 1,000,000 people. Loss of function mutations in the ion channels of the thick ascending limb of the loop of Henle cause renal salt wasting, resulting in hypokalemia, hypochloremia and hypercalciuria. It is classified into two types based on the phenotype, Neonatal(antenatal) and Classical Bartter Syndrome and five based on genotype.

Except for type 3 and type 5, all other types of Bartter Syndrome are usually present in the pediatrics age group(3).

It is associated with a mutation in the Potassium-Sodium-Chloride Cotransporter (NKCC2) or the Potassium channel (RONK) in the thick ascending loop of henle(TAL). The TAL's capacity to absorb sodium is reduced, which increases the distal delivery of sodium, followed by increased sodium absorption from the distal tubular segments in exchange with potassium and hydrogen ions. Volume depletion brought or by excessive salt and water loss stimulates the RAAS, resulting in secondary hyperaldosteronism, and hyperplasia of the JG apparatus. The absorption of the bicarbonate ion also increases secondary to hydrogen loss, which leads to metabolic alkalosis. A positive lumen change is eliminated by defective chloride absorption, resulting in hypercalciuria and hypermagnesuria(4).

Fever, polyuria, polydipsia, vomiting, cramps, dehydration, constipation, growth delays and failure to thrive are common clinical presentation seen in neonates. Neonates also exhibit signs like SNHL, big eyes, protruding ears, strabismus and a drooping mouth(5). On the other hand, adults frequently present with weakness, fatigue, polyuria, polydipsia and a salt craving(6).

Bartter Syndrome is characterized by specific electrolyte and acid base abnormalities. Hence, laboratory investigations to assess serum electrolyte level like Potassium, Sodium, Chloride, Calcium, Bicarbonate and Magnesium are crucial for the diagnosis. Hypokalemia and Hypochloremia are present in nearly all cases of Bartter Syndrome. Assessment of urine electrolytes is also key in evaluating these patients. Urine analysis shows elevated potassium, sodium, chloride, calcium and prostaglandin E2 excretion. Elevated levels of 24 hours urinary calcium can be used to rule out Gitelman Syndrome (low calcium excretion). In Bartter Syndrome, serum/ blood levels of renin and aldosterone are also elevated. An ABG will show metabolic alkalosis. Confirmation of the diagnosis of Bartter Syndrome can be made genetic testing such as next generation sequencing which includes testing for the following genes- SLC12AI, KCNJ1, CLCNKB, CLCNKA, BSND, MAGED2(7).

Based on the age of onset and severity,Bartter Syndrome can be divided into two types: The classical variant, which manifest in early childhood and is less severe and the antenatal variant which occurs before birth and is frequently life threatening. Bartter Syndrome can also be divided into five types based on the genes involved with type I BS involving a mutation in the Sodium Chloride/ Potassium Chloride co-transporter genes. Type II BS and Type III BS are caused by mutation in the renal outer medullary potassium channel and chloride channel-KB genes respectively. Type IV BS is caused by a loss of function mutation in the Bartter Syndrome, infantile with sensorineural deafness genes. Mutation in the genes encoding chloride channel subunits and the extracellular calcium ions sensing receptor can cause Type V BS(8).

The therapeutic approach for this rare syndrome varies, rely on clinical presentation, personal experience and on understanding of pathophysiology. There are few standard guidelines for treating, but they include potassium chloride replacement, a prostaglandin inhibitor(Indomethacin), and a potassium sparing diuretic(Spironolactone, Eplerenone or Amiloride). As potassium supplementation at higher doses is tolerable, a potassium sparing diuretic is advised to keep the serum potassium in the range.

Among these, Amiloride which is a direct epithelial sodium channel inhibitor is preferred over Spironolactone which work by blocking the Aldosterone Receptor.

Aldosterone levels are usually low in these patients because they hypokalemia. Angiotension

converting enzyme inhibitors can also treat hypokalemia in these patients, especially with coexisting proteinuria. However, caution should be taken to prevent possible hypotension and prerenal acute kidney injury(9).

Some patients with Bartter Syndrome will develop CKD due to Chronic hypokalemia, multiple episodes of dehydration and nephrocalcinosis. However, the prognosis is usually good with strict adherence to the treatment and follow up(10).

CONCLUSION

Treatment is generally focused on the repair of hypokalemia by inhibition of the renin angiotensin aldosterone or the prostaglandin kinin system. Potassium supplementation, magnesium repletion, propanolol, amiloride, prostaglandin inhibitors and angiotensin converting enzyme inhibitors all have been advocated but each has met with limited success.

Bartter Syndrome usually seen in neonates but in this case the patient was diagnosed to be adult onset Bartter Syndrome due to hypokalemia, increased renin activity. In appropriate medical therapy, a positive Potassium balance and an increase in serum potassium concentration, the patients muscle strength was rapidly recovered and the patient did well.

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Case Report

A CASE OF HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS (HLH) SECONDARY TO TUBERCULOSIS

Naluri Mahesh, Meghanad Meher, Chandan Dash, Siba Prasad Dalai, Brijesh Raj Swain, M. Srinivas

INTRODUCTION

Hemophagocytic lymphohistiocytosis (HLH) is an uncommon hematologic disorder characterized by an uncontrolled immune response with organ infiltration of lymphocytes and histiocytes, and organ damage caused by excessive production of pro-inflammatory cytokines [1]. HLH is categorized either as primary due to a genetic disorder, or as secondary due to an acquired condition. Secondary HLH can be triggered by neoplastic and non-neoplastic diseases [2]. Malignancies associated with secondary HLH are mainly various hematological malignancies such as leukemia or lymphoma, whereas autoimmune disorders and infectious diseases are the most common nonmalignant diseases associated with HLH [3]. While active tuberculosis (TB) is rare in the Nordic countries, the World Health Organization estimates 10 million new TB cases globally causing 1.5 million deaths every year, thus making *Mycobacterium tuberculosis* the single most lethal infectious agent in the world [4]. HLH due to TB is very uncommon, with only a few cases reported, mostly in immunocompromised patients [5].

Here we report a case of HLH associated with Pulmonary TB in an apparently immunocompetent healthy woman. The case illustrates that the combination of an aggressive diagnostic approach, searching for a broad variety of disorders, combined with an early therapeutic intervention are crucial to securing a successful outcome.

Department of General Medicine,
IMS and SUM Hospital, Bhubaneswar

CASE PRESENTATION

A previously healthy 23year-old married female with no prior co-morbidities presented at the emergency department with Fever from last 2 months, pain abdomen since 7 days and nausea and vomiting since 3 days. Fever was low grade and intermittent. She also reported undocumented weight loss. She denied a history of loose stools, dysuria, oliguria, haemoptysis, melena, cough, headache, jaundice. There were no complaints of chest pain, breathlessness or palpitations. On examination patient was conscious and oriented, normotensive with a blood pressure of 100/60 mmHg, pulse rate of 107/min and spo2 of 97% with room air. She was febrile to touch with an oral temperature of 100^0F. General physical examination revealed mild pallor. Abdomen examination revealed tense abdomen, guarding noted over the epigastric and right hypochondrium with tender hepatosplenomegaly and rest systemic examination was unremarkable. A clinical diagnosis of pyrexia of unknown origin with hepatosplenomegaly, polyserositis and anaemia was made. Possible differentials were Disseminated Tuberculosis, Dengue fever, Enteric fever, subacute intestinal obstruction, Lymphoreticular malignancy, Acquired immunodeficiency syndrome related illness, autoimmune disorder and HLH.

Routine laboratory investigation on day-1 showed anaemia with thrombocytopenia withderanged liver function test [Table 1]. Considering relevant possible differential diagnosis, other investigations were sent which was dengue serology, chest X-ray erect abdomen, HIV,HBs antigen, Anti Hepatitis C virus antibody, serum ferritin, D-Dimer and triglyceride levels. RTPCR for COVID-19 was negative for the patient. Among all serum ferritin, triglycerides, D-Dimer values were high.

She was managed with broad- spectrum antibiotics, antipyretic and adequate hydration. Simultaneously, chest imaging was done which showed right sided minimal plural effusion and abdominal X-ray was normal. Sonography of the abdomen confirms the presence of Hepatosplenomegaly.patient was not improved and further developed hypoxia and hypotension, so, she was shifted to ICU and managed with non-invasive ventilation BiPAP and vasopressor. In view of bicytopenia and raised ferritin level, a bone marrow aspiration biopsy was done which revealed the presence of phagocytic macrophages in the bone marrow with few macrophages engulfing platelets and neutrophils are seen suggestive of hemophagocytic lymphohistiocytic syndrome [FIG 1].

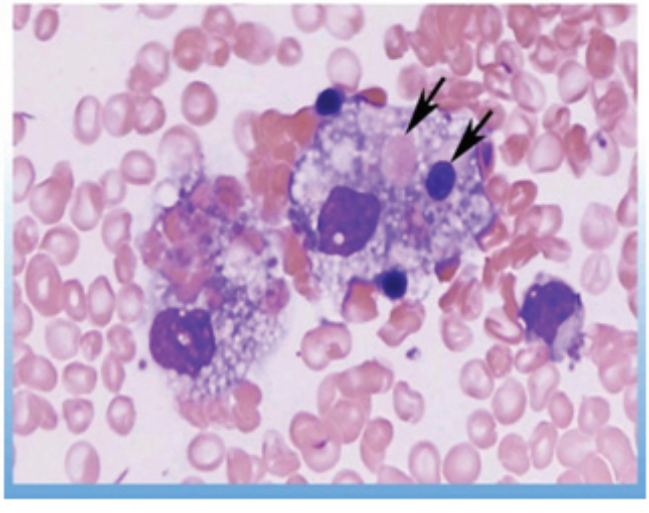

FIG 1:Showing Phagocytic macrophage in the Bone marrow with few macrophages engulfing platelets and neutrophils

A thorough investigation of the patient suggested a diagnosis of HLH. According to HLH-2004 protocol, our patient fulfilled 6 features out of the 8 diagnostic criteria for HLH including persistent fever, bicytopenia,

Hepatosplenomegaly, raised ferritin level, elevated triglyceride and histocytic activity on a bone marrow aspirate. So patient was started with intravenous steroids, followed by she showed signs ofimprovement, requirement of inotropes decreased and hypoxia improved. By the 3rd day inotropes, BiPAP ventilation was weaned off and patient had a spontaneous resolution in fever spikes. Further workup to identify secondary causes of HLH was done. These investigations included blood cultures, urine cultures, sputum for AFB, widal test, covid-19 RTPCR, TORCH serology and pleural fluid analysis. Pleural fluid analysis showed towards tubercular aetiology. A diagnosis of right sided tubercular pleural effusion with secondary HLH was made.

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Case Report

UNRAVELING CHBG SYNDROME: INSIGHTS INTO DIABETES RELATED NEUROLOGICAL MANIFESTATION - A CASE SERIES

Khemeswar Agasti[1], Niranjan Mohapatra[2], Jayanta Kumar Panda[3]

ABSTRACT

Chorea-Hyperglycemia Basal Ganglia Syndrome (CHBG) is a rare and potentially reversible neurological disorder associated with poorly controlled diabetes mellitus. The syndrome manifests as sudden-onset chorea, a hyperkinetic movement disorder, and is characterized by high blood glucose levels. The pathophysiology of CHBG involves metabolic derangements leading to dysfunction in the basal ganglia, which plays a crucial role in motor control. Early recognition and prompt management of hyperglycemia are essential to achieve a favorable outcome.

We hereby describe 4 cases with CHBG syndrome who presented to our hospital with different duration of diabetes and different values of blood sugar and HbA1c, treated and got completely cured of the hyperkinetic movement disorder.

Purposes-This study aims to provide a concise overview of CHBG, including its clinical features, pathogenesis, and therapeutic approaches. Further research is needed to better understand the underlying mechanisms and establish effective interventions for this intriguing neurological complication of diabetes.

INTRODUCTION

Chorea is excessive, involuntary, irregular, and non-rhythmic semi purposeful movements. Can be caused by vascular, degenerative, genetic, autoimmune, neoplastic, infectious or metabolic pathologies. Diabetes mellitus can have different neurological manifestations, commonest being stroke and peripheral neuropathy. However, in some settings, it can also manifest as chorea hyperglycemic basal ganglia (CHBG) syndrome CHBG syndrome, also known as diabetic hemichorea or diabetic striatopathy, is a rare metabolic cause of chorea seen in the setting of uncontrolled non-ketotic diabetes mellitus. Awareness and prompt recognition of CHBG syndrome is crucial since correction of hyperglycemia can lead to clinical and radiological improvement.

We present a case series of CHBG syndrome which remitted following adequate blood glucose control and with other medications

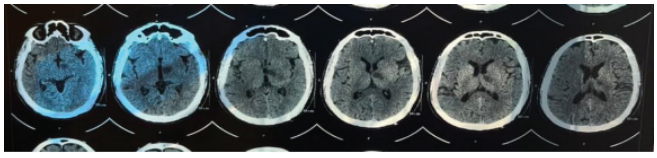
CASES

Case 1- A 52-year-old female known diabetic, diagnosed newly 1 month back presented to the emergency with c/o sudden onset of jerky movements in right Upper Limb and Lower Limb for 12 day, on examination power and reflex were normal her GRBS was found to be 452 mg/dl, FPG-242 mg/dl ,2hr PPPG-340 mg/dl, HbA1c was 13.4 gm%, serum electrolytes and hemogram was within normal limits, LFT, RFT also within normal limits, then NCCT was advised, which showed hyper density in left Basal ganglia (suggesting of CHBG syndrome)

Patient was started with insulin for glycemic control and for hyperkinetic movement she was given tetrabenazine 12.5 mg first OD then increased to BD, then we added clonazepam 0.5mg, movements started decreasing and subsided completely after 18 days, then we did a repeat NCCT brain, and it showed radiological improvement also.

[1]PG Trainee, [2]Asst. Professor, [3]Professor
PG Dept. of Medicine
SCB Medical College, Cuttack

Case 2 -A 68-year-old male known diabetic not compliant to treatment presented with right sided abnormal jerky movements for 3 days, identified as hemichorea, on examination power and reflexes were normal but his GRBS was 328.Investigation showed high FPG and 2hrPPPG, HbA1c was 10.2gm%



NCCT showed bilateral hyperdense lesions in basal ganglia, symptoms persisted for 9 days.

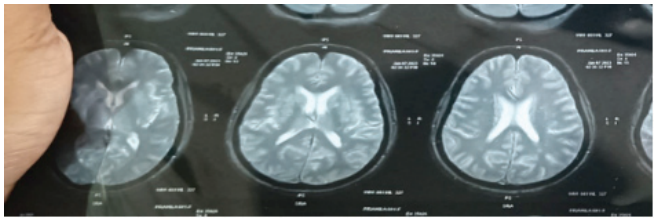
Case 3- 50-year-old female patient presented with similar hyperkinetic movement for 4 days as in case-2 but on in right upper limb, history and clinical examination was done, she has not undergone any investigation for diabetes previously, but her GRBS was found to be 532, on further investigation, FPG and PPPG was 230 and 346 respectively and HbA1c was 14.6gm%.

NCCT showed –CHBG syndrome, glycaemic control achieved and patient improved after 4 weeks.

Case 4- A 52-year-old female diabetic patient presented with altered sensorium and dehydration to casualty, on testing GRBS was high, patient was diagnosed as HHS, IVF and saline infusion was started, patient's sensorium also improved but very next day he developed sudden jerky movements in his right upper and lower limb,

Her FPG and 2hr PPPG was 210 & 343mg/dl respectively. HbA1c was 11.4gm% and other serum electrolytes were normal.

MRI showed BG hyperintensity in T1W.



Patient was treated with tetrabenazine along with Insulin and symptoms improved after 4 days.

TREATMENT

• The main goal of treatment was achieving glycemic control with insulin.

• Other additive therapies were anti-chorea medications like Tetrabenazine, Clonazepam, Haloperidol, Quetiapine

RESULTS

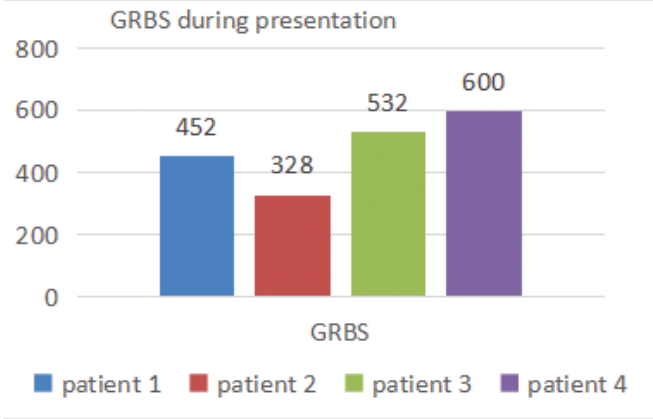
We had 4 patients with diabetic CHBG syndrome, whose median age was found to be 55.5 years, female to male ratio was 3:1, all were right-handed person and had chorea on right side of body with normal cognition and power of body.

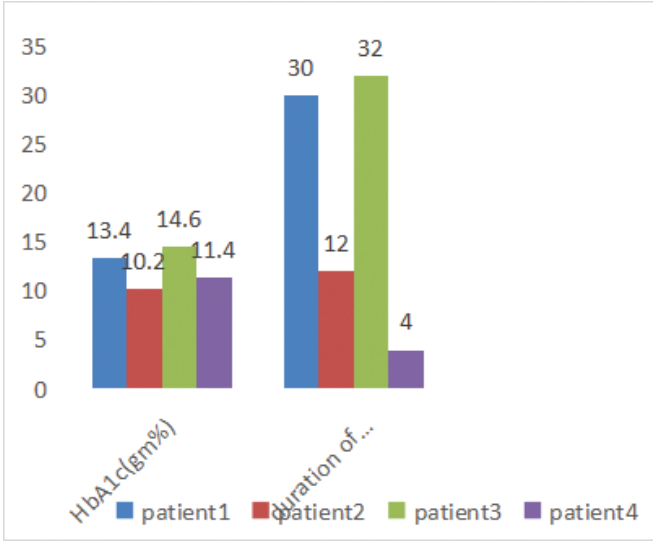
• All had high blood sugar with mean GRBS during presentation 471.5 mg/dl.

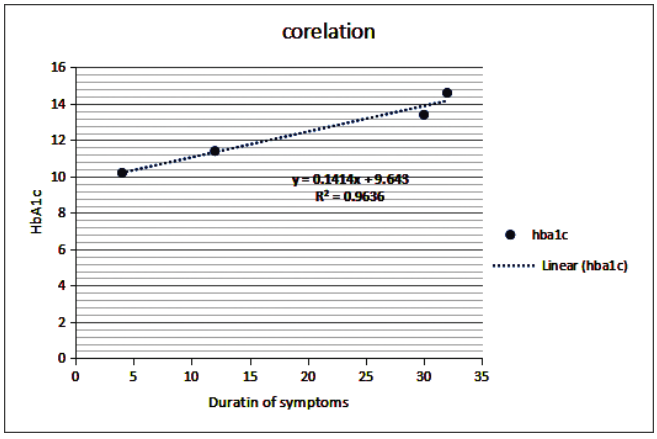
• Mean duration of symptom was 19.5 days.

• Mean HbA1c of 12.4gm%.

• None had ketone bodies in urine.







• Serum electrolytes and LFT, RFT were normal

• Neuroimaging of these patients with NCCT / MRI showed hyper density/ T1 hyperintensity in basal ganglia

• Chorea subsided after few days of glycemic control. so, it is potentially reversible

DISCUSSION

CHBG is a rare condition that occurs in uncontrolled type 2 diabetes mellitus and characterised by hemichorea/hemiballismus with nonketotic hyperglycemia.

CHBG is predominantly seen in women especially in Asian woman indicating genetic predisposition.Only few cases have been reported with type 1 CHBG syndrome is rare but it's seen in uncontrolled diabetes. It can also be seen as the first neurological symptoms in some patients.

The exact pathophysiology is not fully understood, but several theories suggested.

Hyperglycemia impairs cerebral autoregulation, hypo perfusion & activation of anaerobic metabolism and depletion of gammaaminobutyric acid (GABA) in basal ganglia neuron. (GABA is the main inhibitory neuro transmitter in basal ganglia).

The hyper viscosity induced by hyperglycemia causes disruption in blood brain barrier and transient ischemia of vulnerable striatal neurons.

• The synergistic effect of uncontrolled hyperglycemia and vascular insufficiency cause an incomplete transient dysfunction of the striatum, which eventually leads to hemi chorea/hemiballismus in these patients.

• Histological findings may suggest neuronal loss/ atrophy with corpus striatum.

CONCLUSION

CHBG syndrome is an uncommon complication of uncontrolled hyperglycemia. Glycemic control is important even in young and type 1 diabetes mellitus.

If patients with diabetes mellitus present with hyperkinetic movements, suspicion and early detection of CHBG syndrome would be important for the accurate diagnosis and treatment.

CHBG is a rare disease but deserves attention because it is completely reversible with correction of hyperglycemia and makes patients quality of life better. It is a rare uncommon complication but ls potentially reversible, so needed to be identified early and treated early for better outcome.

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Case Report

CLINICO-RADIOLOGICAL PROFILE IN WALLENBERG'S SYNDROME : A CASE REPORT

Shishir Kumar Panda[1], Jayanta Kumar Panda[2], Sanjay Kumar Majhi[3]

INTRODUCTION

Lateral medullary syndrome or Wallenberg's syndrome is an uncommon and often underdiagnosed cause of posterior circulation stroke mostly caused by thrombo-embolization in vertebral(V4 segment) or posteriorinferior cerebellar artery (PICA).

Mostly it involves structures such as spinal nucleus of trigeminal, nucleus of tractus solitarius, vestibulocerebellar fibres, 9th & 10th cranial nerves along with nucleus ambiguus, sympathetic fibres, spinothalamic tract and inferior cerebellar peduncle causing loss of pain & temperature sensation in ipsilateral face, I/L loss of taste in anterior 2/3rd of tongue, vertigo & tinnitus, dysphagia, I/L palatal weakness, I/L horner's syndrome, pain &temperature loss in opposite side body, nystagmus & giddiness respectively.

MATERIAL AND METHODS

A 43 years old hindu male, hypertensive and diabetic, presented with complaints of sudden onset difficulty in swallowing to both solids & liquids,drooping of left eyelid and severe headache since the previous night.

On examination patient was conscious & oriented, there was left side ptosis with constricted pupil, numbness and decreased sweating over left side face, uvula deviated to right side, ataxia, decreased pain & temperature sensation over right side of body .Rest all neurological examinations were within normal limits.

Ice pack test, RNST were negative. NCS were normal bilaterally.

MRI brain was showing focal infarction involving the left medullary region.

MR angiography showing non-visualisation of the left distal vertebral artery suggestive of arterial occlusion.

RESULTS

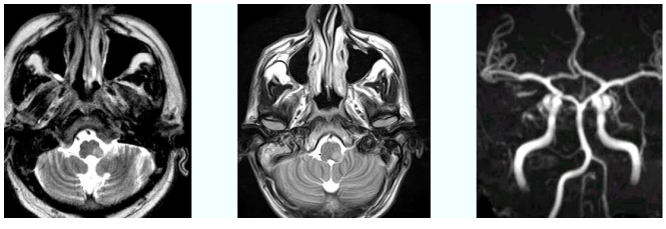
The patient was diagnosed with wallenberg's syndrome involving the left side medulla, prescribed dual antiplatelets, high-intensity statins, insulin and some neurovitamins.

Over the next 6 months he achieved gradual improvements in his symptoms and presently being able to swallow both solids & liquids without any difficulty.

CONCLUSION

The important risk factors are vertebral artery dissection in younger patients and large atherosclerosis-embolisation in older patients.

Patients with high risk factors should be aware of the manifestations of the disease and clinicians should be vigilant about the risk factors, presentations & management so that a better outcome can be expected.



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Harrisons principles of internal medicine 21st edition

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[1]PG Trainee, [2]Professor, [3]Asst. Professor
Department of General Medicine
SCB Medical College,Cuttack

Case Report

AN INTERESTING CASE OF YOUNG ICH WITH UNIQUE FACIAL FEATURES : SEEING THE UNSEEN

Saswat Kumar Bahinipati[1], Bibhujit Padhy[2], Binod Manthan[2]

ABSTRACT

A 40 year old male presented with headache ,slurred speech and weakness of right side of body for 3 days.Patient had some facial features and body habitus which on further investigations revealed Acromegaly. Simultanous management of ICH and acromegaly is needed in this case to avoid future complications for this patient.

INTRODUCTION

Acromegaly is an endocrine disorder caused by excessive growth hormone production from anterior pituitary resulting in excessive growth of bone, soft tissues of body and multiple metabolic disturbances. These metabolic disturbances can affect multiple organ systems especially heart and brain,which can be fatal for the patient. Pituitary adenomas are the commom cause of acromegaly in clinical practice.Acromegaly generally occurs after fusion of growth plates, differentiating it from Gigantism.Here we report a case of Young onset Hypertensive intracerebral hemorrhage, who on clinical examination was found to have unique facial features and body habitus and discuss the case.

CASE REPORT

A 40 year male patient ,farmer by occupation presented to MKCG casualty with severe headache for 3 days,slurred speech with weakness of right upper and lower limb and deviation of angle of mouth to left side for 2 days.His symptoms started suddenly, deficits were maximum at the time of onset.Patient also complained of intermittent headacheand weight gain in past 1 year.His past history revealed that he had pain and clicking sounds of jaw joints and enlarging lower jaw since last 1.5 years.He also gave history of some soft tissue overgrowth in nasopharynx which caused him to snore and having symtoms of Obstructive sleep apnea.

Personal history-Patient is a occasional drinker and smoker.Patient is a known hypertensive since last 1 month but incompliant to medications. No history of diabetes or any thyroid disease was present.

Family history-No family history of HTN, cardiovascular or cerebrovascular disease. No similar morphological features seen in other family members. Patient's 12 yr old son is also normal by appearance.

CLINICAL EXAMINATION

General examination of the patient revealed no pallor, icterus, cyanosis, clubbing, edema, lymphadenopathy.

Head to toe examination revealed-

1) Height-174cm,weight-92 kg,muscular built.
2) Facial features are coarse,enlargedface,nose is large, earsnormal, glabella and supraorbital ridge, frontal eminences, forehead creases are prominent.
3) Deep depression present at nasion, jaw is enlarged and elongated.
4) Tongue is enlarged but within oral cavity, widely spaced dentition present.
5) Skull is asymmetrically enlarged.
6) Skin is thick and rough, increased body hairs present especially over chest, nails are thick and hard.
7) Fingers and toes are broad and large ,increased thickness of palms and heel observed.
8) Voice of the patient is deep, hoarse and slurred.

[1]PG Trainee, [2]Assistant Professor
MKCG Medical College, Berhampur

VITALS

PR-88bpm, BP-160/100 mmHg, RR-16/min.

Nervous system examination revealed right plantar extensor, all DTR of right side of body exaggerated. No sensory symptoms, no visual symptoms. Cardiovasular system was normal only loud A2 was heard at aortic area.Genitourinary system examination revealed enlarged bilateral testes(volume-42cc). Respiratory and abdominal examination are normal.

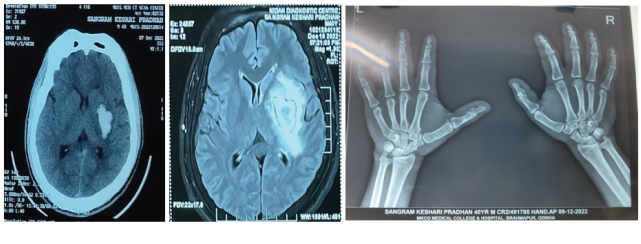
LABORATORY FINDINGS

FBS-123mg/dl,PPBS-210mg/dl,HBA1C-7.2%,CRP-5.2mg/dl,LDL-132mg/dl,Total cholesterol-268mg/dl, S.urea-52, S.creatinine-1.2mg/dl. Thyroid function test was normal, ECG showed increased amplitude of r waves in lateral precordial leads and s waves in V1 lead.2D ECHO showed concentric LVH (wall thickness-15mm) with EF 62%.Fundoscopy showed grade 1 hypertensive retinopathy. Serum IGF-1 came out to be 583ng/ml,which was high.Serum LH-0.8 IU/L,FSH-1.2IU/L which were suppressed, S.cortisol-22.5mcg/dl.Calcium was 11.5mg/dl,sodium and potassium were normal.No suppression of GH levels was observed after OGTT (GH after OGTT-8.8 ng/ml). Serum prolactin was 11.8 ng/ml,which was normal. MRI brain showed a rounded nodule in right anterior pituitary which is isointense on T1W,iso-hypointense on T2W with mild gradual post contrast enhancement on dynamic phase.

IMAGES

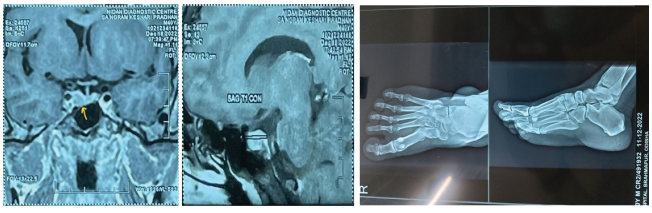
1) NCCT brain showing hyperdense acute hemorrhage in left putamen region.

2) Xray hand showing spade phalanx, ulnar styloid impaction syndrome, small midline shift to right and respective MRI findings. Osteoarthritic changes in interphalangeal joints and increased soft tissue density in the palm.



3) MRI Brain showing a rounded nodule in right anterior pituitary.

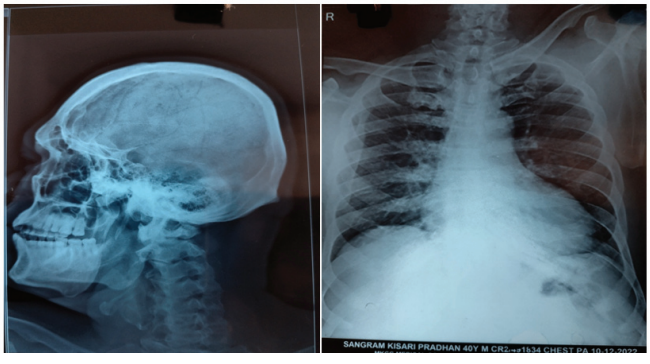
4)Xray foot showing spade terminal phalanx, increased heel pad isointense on T1W. thickness (37mm).



5) Xray skull showing calvarial thickening, frontal bossing, enlarged paranasal sinuses, enlarged sella tursica, prognathism and increased teeth gap.

6) Xray chest showing LV enlargement features,

rounding of cardiac apex, shifted left heart border, shmoo sign



7) Xray LS spine showing posterior scalloping of L3,4,5 And marginal osteophytes.

8) Face and hands of the patient.

Patient was diagnosed with Acute intracranial hemorrhage in putamen region ,pituitary microadenoma with features of acromegaly complicated by Type 2 Diabetes, hypertension, obstructive sleep apnea. Patient was managed as acute ICH and after patient had been stabilized he was started on once monthly inj Octerotide and referred for trans sphenoidal tumor resection. After resection of tumor, Somatostatin analogs were continued for some months. On follow up of the patient after 3

months, patient's hypertension and glucose intolerance were resolved and patient regained his motor power to certain extent.IGF 1 repeat assay after 3months showed normal values (128ng/ml).

DISCUSSION

Acromegaly is a rare disease generally occurring in adults between 30-60 years.Its Prevalence varies according to various population studies.Most of the cases of acromegaly are due to pituitary adenomas.Patient has a wide variety of clinical manifestations including acral and soft tissue growth. Jointpain, headache, Diabetes mellitus, Hypertension, OSA, Carpal tunnel syndrome are some common complications.More serious complications include coronary artery disease, heartfailure,visual disturbances ,cerebrovascular disease etc. Skeletal and facial features include frontal skull bossing,prominent supraorbital ridges, mandibular prognathism, dental malocclusion, large and thick nose, coarse lower lips and prominent facial lines which can be a aid to clinical suspicion of acromegaly.

The definitive diagnosis of acromegaly is done after thorough physical examination,radiographic analysis and biochemical evaluation.Measurement of GH response to glucose load is the standard diagnostic test.Serum IGF 1 levels have also diagnostic values and also these levels can be used to watch for disease resolution post pituitary surgery.

Acromegaly can be associated with pituitary micro or macro adenoma.Microadenomas are less symptomatic or asymptomatic and can present for many years before they are diagnosed.Macroadenomas generally present with headache, visualdisturbances. So, diagnosing a microadenoma before the onset of metabolic disturbances and end organ damage is a challenge.Currently,MRI has emerged as imaging modality of choice for evaluation of pituitary gland abnormalities,which has the sensitivity to detect microadenomas.

ICH in acromegaly can be a devastating complication,though more common is ischemic stroke.Many studies have shown that ischemic stroke incidences in acromegaly are no different than general population, but hemorrhagic strokes are not common as in our case.Treatment aspects of acromegaly include Surgical, medical and radio-therapeutic management. First line for microadenomas are early Trans sphenoidal pituitary surgery.In some cases somatostatin analogs to be continued for some months after surgery as in our case.In case of acromegaly patient presenting with acute end organ complications, surgery should be deferred till patient is stabilized and recovered from acute illness.

CONCLUSION

Acromegaly in most cases are due to pituitary adenomas.It has a wide spectrum of clinical manifestations,sometimes detected late even presenting with end organ complications at the time of diagnosis. Early treatment reduces morbidity and mortality associated with acromegaly. So, primary care physicians should be vigilant enough to see the unseen, diagnose the condition early and save the patient from future complications due to the advancement of disease process.

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Case Report

ACUTE METHEMOGLOBINEMIA AND HEMOLYSIS FOLLOWING INSECTICIDE POISONING: A RARE CASE REPORT

Biswajita Pradhan[1], Sanjay Kumar Jangid[2]

ABSTRACT

A young male patient presented to our hospital with alleged history of ingestion of insecticide with suicidal intent. After few hours of admission, the patient became drowsy with low GCS, desaturated and hence, was intubated. On examination B/L pupils dilated, sluggishly-reactive, peripheral cyanosis present. Cardiopulmonary causes were ruled out. Arterial blood gas analysis showed an unsual increase in the methemoglobin levels. In suspicion of methemoglobinemia, methylene blue and ascorbic acid was administered intravenously. The patient condition improved gradually and was extubated. Evidence of hemolysis developed approximately 72 hours after admission. It was corrected with blood transfusion and supportive treatment. The patient was discharged without any delayed neurological complications.

KEYWORDS- Insecticide, Methemoglobinemia, Methylene blue, Hemolyticanemia, G6PD Deficiency

INTRODUCTION

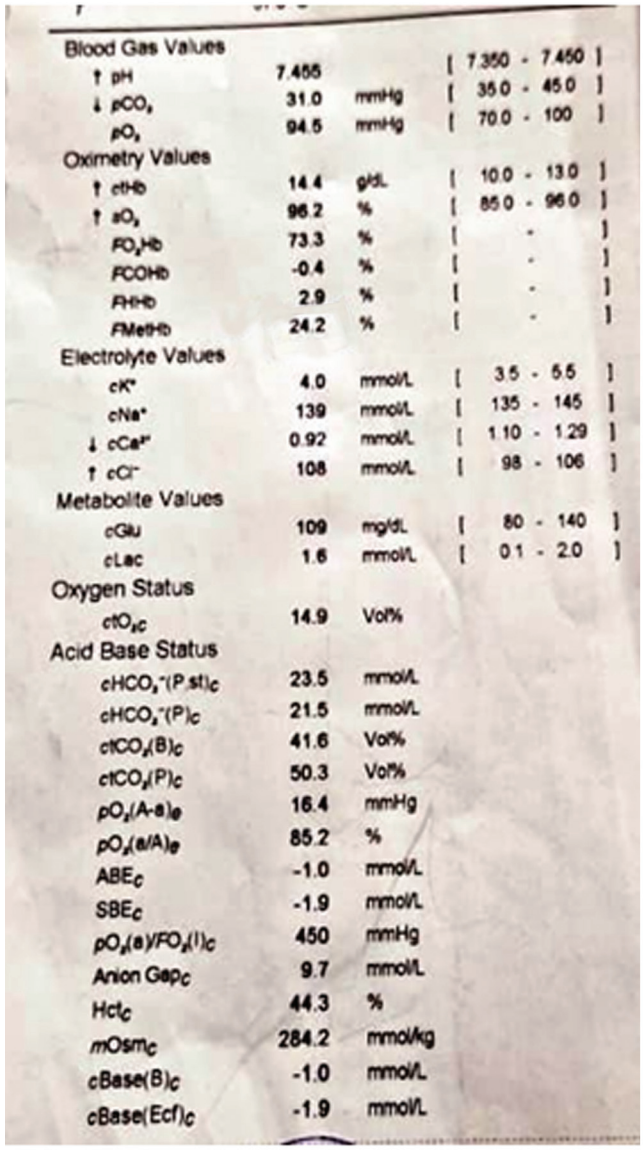
Methemoglobinemia is an uncommon cause of cyanosis in clinical practice. Acquired methemoglobinemia can occur due to the effect of certain chemicals and drugs. Herein we present a case of insecticide poisoning with unexplained, sudden onset of cyanosis and hemolysis, which based on physical findings and arterial blood gas analysis was diagnosed as methemoglobinemia.

CASE REPORT

A 30 years old male presented with alleged history of ingestion of insecticide "Viraat" (cypermethrin+ quinalphos) with suicidal intention. He was primarily treated at the local hospital with gastric lavage and then referred to our hospital. On admission, his vitals were stable, GCS 15/15, pupils B/L 3mm,reactive to light. Blood investigations revealed leucocytosis , serum cholinesterase levels 5518.4 U/L, serum procalcitonin 1.0 ng/dl. Liver function tests, kidney function tests were near normal. He was administered with Inj. Ceftriaxone(1gm IV BD), Inj.Atropine infusion, Inj.Pralidoxime and other supportive treatment.

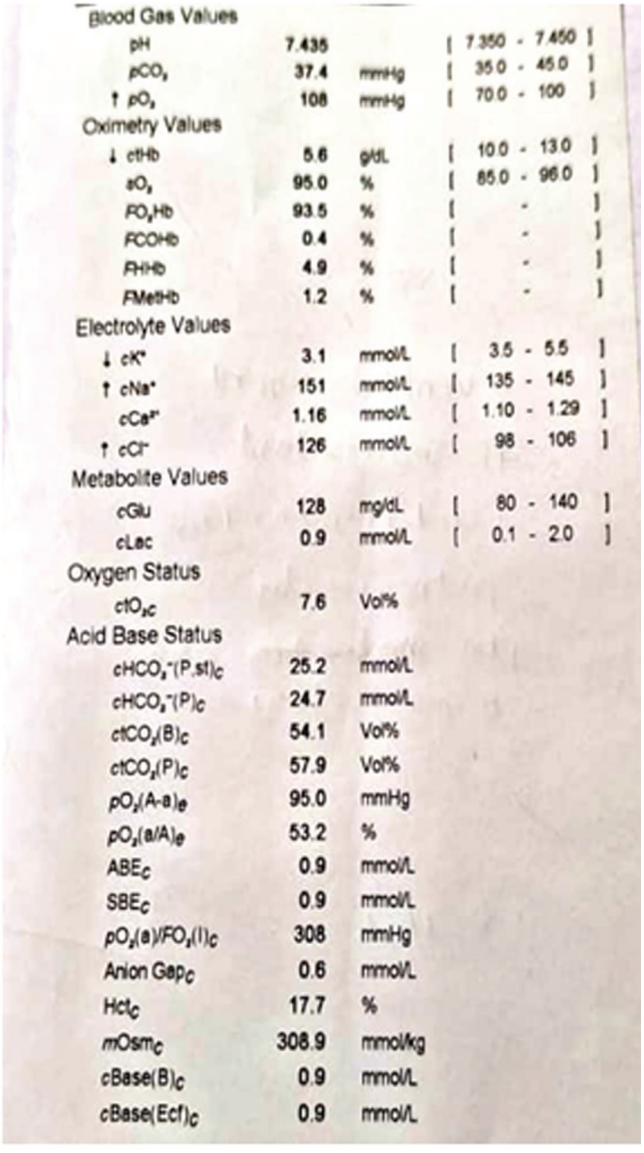
After few hours of admission, the patient became drowsy, B/L pupils dilated and sluggishly-reactive, peripheral cyanosis was present. He was intubated in view of low GCS and desaturation. Antibiotics were upgraded to Inj.Piperacillin+Tazobactam(4.5g) and Inj. Clindamycin(600mg). Arterial blood gas analysis showed mild respiratory alkalosis with methemoglobin levels 24.2%. In suspicion of methemoglobinemia, Inj.Methylene blue was added in a 50mg IV stat dosethen followed by 5mg IV QID, Inj. VitaminC(1.5g) IV TDS was started. Subsequent ABGs showed a decrease in the methemoglobin levels. Antibiotics were upgraded as per the blood culture reports. On improvement in the oxygen saturation levels and gradual improving GCS, the patient was extubated.

[1]PG Trainee
[2]Professor
PG Department of General Medicine
Hi-Tech Medical College and Hospital,
Bhubaneswar, Odisha



Blood Gas Values			
↑ pH	7.455		[7.350 - 7.450]
↓ pCO_2	31.0	mmHg	[35.0 - 45.0]
pO_2	94.5	mmHg	[70.0 - 100]
Oximetry Values			
↑ ctHb	14.4	g/dL	[10.0 - 13.0]
↑ sO_2	96.2	%	[85.0 - 96.0]
FO_2Hb	73.3	%	[-]
$FCOHb$	-0.4	%	[-]
$FHHb$	2.9	%	[-]
$FMetHb$	24.2	%	[-]
Electrolyte Values			
cK^+	4.0	mmol/L	[3.5 - 5.5]
cNa^+	139	mmol/L	[135 - 145]
↓ cCa^{2+}	0.92	mmol/L	[1.10 - 1.29]
↑ cCl^-	108	mmol/L	[98 - 106]
Metabolite Values			
cGlu	109	mg/dL	[80 - 140]
cLac	1.6	mmol/L	[0.1 - 2.0]
Oxygen Status			
ctO_2c	14.9	Vol%	
Acid Base Status			
$cHCO_3^-(P,st)c$	23.5	mmol/L	
$cHCO_3^-(P)c$	21.5	mmol/L	
$ctCO_2(B)c$	41.6	Vol%	
$ctCO_2(P)c$	50.3	Vol%	
$pO_2(A-a)e$	16.4	mmHg	
$pO_2(a/A)e$	85.2	%	
ABE_c	-1.0	mmol/L	
SBE_c	-1.9	mmol/L	
$pO_2(a)/FO_2(I)c$	450	mmHg	
Anion Gap_c	9.7	mmol/L	
Hct_c	44.3	%	
$mOsm_c$	284.2	mmol/kg	
cBase(B)c	-1.0	mmol/L	
cBase(Ecf)c	-1.9	mmol/L	

[ABG Day 1]- Showing Methemoglobinemia



Blood Gas Values			
pH	7.435		[7.350 - 7.450]
pCO_2	37.4	mmHg	[35.0 - 45.0]
↑ pO_2	108	mmHg	[70.0 - 100]
Oximetry Values			
↓ ctHb	5.6	g/dL	[10.0 - 13.0]
sO_2	95.0	%	[85.0 - 96.0]
FO_2Hb	93.5	%	[-]
$FCOHb$	0.4	%	[-]
$FHHb$	4.9	%	[-]
$FMetHb$	1.2	%	[-]
Electrolyte Values			
↓ cK^+	3.1	mmol/L	[3.5 - 5.5]
↑ cNa^+	151	mmol/L	[135 - 145]
cCa^{2+}	1.16	mmol/L	[1.10 - 1.29]
↑ cCl^-	126	mmol/L	[98 - 106]
Metabolite Values			
cGlu	128	mg/dL	[80 - 140]
cLac	0.9	mmol/L	[0.1 - 2.0]
Oxygen Status			
ctO_2c	7.6	Vol%	
Acid Base Status			
$cHCO_3^-(P,st)c$	25.2	mmol/L	
$cHCO_3^-(P)c$	24.7	mmol/L	
$ctCO_2(B)c$	54.1	Vol%	
$ctCO_2(P)c$	57.9	Vol%	
$pO_2(A-a)e$	95.0	mmHg	
$pO_2(a/A)e$	53.2	%	
ABE_c	0.9	mmol/L	
SBE_c	0.9	mmol/L	
$pO_2(a)/FO_2(I)c$	308	mmHg	
Anion Gap_c	0.6	mmol/L	
Hct_c	17.7	%	
$mOsm_c$	308.9	mmol/kg	
cBase(B)c	0.9	mmol/L	
cBase(Ecf)c	0.9	mmol/L	

[ABGDay7] – Showing resolved Methemoglobinemia and Low Hemoglobin

Two days later, there was an acute drop in the hemoglobinlevel(from 11.3 g/dl to 7.0 g/dl), total bilirubin level 6.4 mg/dl, lactate dehydrogenase level 835 U/L, reticulocyte count 2.4%. Peripheral blood smear was suggestive of dimorphic anemia(?hemolytic) with neutrophilic leucocytosis.Coombs test(direct and indirect)was negative, Glucose-6-phosphate dehydrogenase (G6PD) level was normal. The hemoglobin level further dropped to 5.5g/dl over the next 4 days. The patient received 5 units packed cell (P-RBC) and 6 units fresh frozen plasma(FFP) transfusion over a period of 7 days. With stable vitals, hemoglobin level 10.1g/dl, total bilirubin level 0.7mg/dl, the patient was discharged with oral medications(Tab.Cefuroxime 500mg, Cap.Pantoprazole-Domperidone, Tab.Vitamin C 500mg, Multivitamin tablet) and follow up advice.

DISCUSSION

Methemoglobinemia is a state of altered form of hemoglobin in which the iron is in oxidized ferric form and unable to combine with oxygen. The causes can

be hereditary or acquired. Hereditary causes include Methemoglobin reductase deficiency, Cytochrome b5 reductase deficiency. Acquired methemoglobinemia can be due to chemicals and drugs such as organic nitrites, nitrates, benzocaine,dapsone,copper sulphate,aniline dyes,chlorobenzene, naphthalene,etc. which acts as oxidizing agents. As a consequence, hemoglobin-oxygen dissociation curve is shifted to the left and oxygen delivery to tissues is reduced[2].Clinically, when methemoglobin level> 1.5g/dl, there is cyanosis. Initially, the patient may develop dizziness, nausea, headache and dyspnea progressing to respiratory depression,altered sensorium,seizures,shock,coma and death in severe cases. Hemolysis may occur,especially in patients susceptible to oxidant stress i.e, those with G6PDdeficiency[3].

Clinical suspicion for methemoglobinemia may arise when a "saturation gap" is noted i.e, low oxygen saturation on pulse oximeter with high oxygen saturation on ABG. Other diagnostic clues include i) dark chocolate colour of arterial blood which fails to change colour on exposure to air, ii) cyanosis unresponsive to 100% oxygen[4].Intravenous Methylene blue(Methylthionium chloride) is the preferred treatment in symptomatic patients with acquired methemoglobinemia.The usual dose is 1-2mg/kg[1]. It enhances the conversion of methemoglobin to hemoglobin by increasing the activity ofMethemoglobin reductase enzyme. It promotes non-enzymatic redox conversion of methemoglobin to leucomethyleneblue (LMB) via NADPH reductase which further reduces the ferric iron of methemoglobin to the ferrous state of hemoglobin[5].But it may be ineffective in individuals with Glucose-6-phospate dehydrogenase(G6PD) deficiency[6]. Alternate treatment with Inj.Vitamin C(ascorbic acid) can be preferred in G6PD deficient patients. Successful treatment with hyperbaric oxygen therapy and plasma exchange therapy have also been reported, but should be considered in cases unresponsive to methylene blue as a second line treatment.[4]

Toxic chemicals containing organic nitrites and nitrates are known to cause methemoglobinemia. The composition of the alleged insecticide ingested by our patient was quinalphos and cypermethrin which belongs to diethyl organophosphorus and pyrethroid groups respectively. Hemolysis may occur following administration of Methylene blue,especially in G6PD deficient patients. However, this seemed to be unlikely in our patient as G6PD level was normal. Autoimmune cause of hemolysis was ruled out with negative Coombs test(direct, indirect). These groups of insecticides causing methemoglobinemia followed by hemolysis is a rare case finding.

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Case Report

UNVEILING THE UNCOMMON: A CASE REPORT ON SCRUB TYPHUS WITH RARE MYOSITIS AND HERPES CO-INFECTION

Khemeswar Agasti[1], Jayanta Ku. Panda[2]

ABSTRACT

Scrub typhus, caused by the bacterium *Oriential tsutsugamushi*, is a vector-borne disease that presents with a myriad of clinical manifestations. It is an acute febrile illness endemic in certain regions of Odisha and India as well. It is endemic in tsutsugamushi triangle. It commonly presents with fever, rash, and constitutional symptoms. We report a rare case of scrub typhus with myositis and herpes co infection, adding to the growing spectrum of atypical presentations.

A 45-year-old patient presented with fever, rash and generalised weakness. However, the persistence of symptoms and positive serology for scrub typhus prompted further investigation.

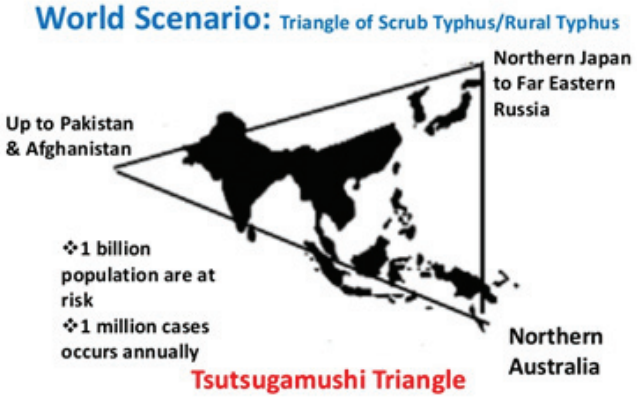
This case highlights the importance of considering scrub typhus in patients with unexplained myositis and underscores the need for vigilance in regions where both scrub typhus and herpes infections are endemic.

Timely diagnosis and treatment of co-infections like this are crucial for improving patient outcomes. Myopathy as a complication of scrub typhus is rare and co-infections with herpes viruses have been reported but remain unusual.

Keywords: *Oriential tsutsugamushi,* myositis, tsutsugamushi triangle

INTRODUCTION-

Scrub typhus, caused by the intracellular bacterium *Oriential tsutsugamushi*, is an underdiagnosed and often misdiagnosed febrile illness prevalent in endemic regions across Asia, including the Indian subcontinent. It is mainly endemic to area coming under tsutsugamushi triangle, which extends between Japan in north-east to Pakistan and Afghanistan in west and Australia in south.



This zoonotic disease is transmitted to humans through the bite of infected chiggers, and its clinical manifestations can range from mild febrile episodes to severe multi-organ involvement. While scrub typhus typically presents with fever, eschars, and rash, it is increasingly recognized as a great masquerade, capable of mimicking a multitude of other diseases. This diagnostic challenge is further compounded when it occurs in conjunction with co-infections, making accurate diagnosis and management a formidable task.

Myositis, characterized by inflammation of skeletal muscles, is an uncommon but recognized complication of scrub typhus. However, when myositis occurs in conjunction with another viral pathogen, such as herpes simplex virus (HSV), the clinical picture becomes even more complex. Co-infections with scrub typhus and HSV present unique diagnostic and

[1]PG Trainee, [2]Professor
PG Dept. of Medicine
SCB Medical College, Cuttack

therapeutic challenges, as the clinical symptoms can overlap, potentially leading to misdiagnosis and delayed treatment.

In this article, we present a compelling case of scrub typhus with myositis co-infected with herpes, shedding light on the intricate interplay of these pathogens. Our case serves as a testament to the multifaceted nature of scrub typhus, where the clinical presentation extends beyond the commonly recognized symptoms. Furthermore, it underscores the importance of considering the possibility of co-infections in patients presenting with atypical clinical features, as timely diagnosis and appropriate management are pivotal in achieving positive patient outcomes.

Through the analysis of this case report and a review of the existing literature, we aim to enhance the understanding of scrub typhus and its co-infections, emphasizing the need for vigilance among healthcare practitioners in endemic regions. By unrevealing the complexities of this clinical scenario, we hope to contribute to the knowledge base necessary for improved diagnosis and treatment strategies for scrub typhus and its co-infections.

CASE PRESENTATION:

We present a case of a 45-year-old individual from puri, who developed high fever, myalgia, and weakness. The patient was hospitalized for fever,and during the second day of hospitalisation, weakness progressed so that the patient was unable to get up from the sitting position, generalized muscle tenderness was present and a maculopapular rash. Scrub typhus Ig M confirmed the diagnosis. Laboratory tests indicated elevated AST, ALT,elevated CPK and thrombocytopenia

EMG confirmed myopathy.Surprisingly, the patient also developed a typical vesicular rash on the trunk on day 4 and it was a herpes infection

- Scrub typhus IgM was positive
- AST ALT was raised
- CPK was raised

	DAY1	DAY3	DAY5	DAY7
TLC	18600	16400	14200	12120
TPC	56000	80000	12000	160000
AST	228	218	184	110
ALT	168	124	98	76
CPK	3426 IU/L	–	–	–

- Then we went for EMG – it showed **myogenic** pattern

Pt was diagnosed as scrub typhus with myositis with herpes co infection.

Patient was treated with doxycycline, with low dose steroid and valacyclovir.

Pt showed significant improvement and was able to walk and myalgia also improved and patient was discharged.

Unique Feature of the Case:

This case is noteworthy due to the concurrent occurrence of scrub typhus-induced myopathy and herpes co-infection. While scrub typhus-related myopathy is a rare complication, the presence of a herpes co-infection adds complexity to the clinical picture and poses diagnostic challenges.

DISCUSSION

Scrub typhus is a potentially life-threatening infectious disease. In recent years, there has been a growing body of evidence linking scrub typhus to various complications, including myositis and coinfections with other pathogens like herpes viruses. This discussion section will explore the implications of such cases and their clinical significance.

1. Myositis in Scrub Typhus: Myositis is a condition characterized by inflammation of the skeletal muscles. Scrub typhus-induced myositis has been documented in several cases, and it often presents as severe muscle pain, weakness, and elevated creatine kinase levels. Myositis in the context of scrub typhus can complicate the clinical picture, making diagnosis and management more challenging. Early recognition and appropriate treatment are essential to prevent severe muscle damage and improve patient outcomes.

2. Coinfection with Herpes Viruses: Scrub typhus patients, especially those with myositis, may be at an increased risk of coinfections with herpes viruses, such as herpes simplex virus (HSV) or varicella-zoster virus (VZV). These coinfections can further exacerbate the clinical symptoms and lead to more severe and prolonged illnesses. The immunosuppressive effects of scrub typhus and the systemic inflammatory response may provide an environment conducive to herpes reactivation.

3. Diagnostic Challenges: The clinical presentation of scrub typhus, myositis, and herpes coinfection can overlap with other conditions, making accurate diagnosis challenging. The use of molecular diagnostic tests, serological assays, and imaging techniques, in combination with a high index of suspicion, is crucial to differentiate these conditions accurately. Prompt and accurate diagnosis is essential for guiding appropriate treatment.

4. Treatment and Prognosis: The timely initiation of appropriate antibiotic therapy for scrub typhus is essential. Myositis associated with scrub typhus may require additional management strategies, such as pain control, physiotherapy, and, in some cases, immunosuppressive therapy. For herpes coinfections, antiviral medications may be necessary. The prognosis of patients with scrub typhus, myositis, and herpes coinfection varies depending on the severity of the disease, the timeliness of treatment, and the presence of other comorbidities.

CONCLUSION

Scrub typhus with myositis and herpes coinfection represents a complex and challenging clinical scenario. The interplay of these conditions can result in severe illness, increased morbidity, and prolonged hospitalization. Healthcare providers should remain vigilant and consider the possibility of these complications when managing patients with scrub typhus, especially those with severe myositis symptoms. Early diagnosis, appropriate treatment, and supportive care are paramount in ensuring the best outcomes for these patients.Further research is needed to better understand the pathophysiology, epidemiology, and optimal management strategies for patients with scrub typhus, myositis, and herpes coinfection. By increasing awareness of these potential complications and improving diagnostic methods, we can enhance our ability to provide effective care for individuals affected by these complex medical conditions.

Clinicians should be vigilant about the possibility of atypical presentations and co-infections in patients with scrub typhus. This case highlights the importance of comprehensive diagnostic investigations and the need for a multidisciplinary approach to manage complex cases. Furthermore, it underscores the necessity of considering co-infections in regions where multiple pathogens are endemic, thus enabling timely and appropriate management strategies.

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Case Report

AORTOARTERITIS ASSOCIATED WITH TUBERCULOSIS IN A YOUNG MALE: AN UNCOMMON CASE REPORT

Anjani Arihant, Anupam Dey, Debananda Sahoo, Sujata Devi, Arpita Dash, Ranjan K. Patel, Karthikeya

OVERVIEW:

Aortoarteritis is an inflammatory vascular disease usually affecting the major branches of the aorta in young individuals, with an incidence rate of 0.01 cases per 100,000 per year [1]. It results in occlusive or ecstatic changes to the major elastic arteries. The American College of Rheumatology (1990) developed six criteria for the diagnosis of Aortoarteritis. They include the following: onset of disease <40 years of age, claudication of the limbs, a brachial artery pulse that is lower than normal, a blood pressure differential between the arms that is greater than 10 mmHg, bruit over the subclavian arteries or aorta, and abnormalities on arteriograms. The presence of at least "three" of these "six" criteria suggests the diagnosis of Aortoarteritis, with a sensitivity of 90.5% and a specificity of 97.8%. Tuberculosis (TB)-related Aortoarteritis occurs in less than 1% of cases of aortitis [2]. We are reporting on a young male patient who had Aortoarteritis as a result of TB.

CASE STUDY:

A 20-year-old male defaulter with a history of tuberculosis (TB) who had taken ATT for two months, two years back for Cervical spine TB and experienced fever, loss of appetite, and vomiting for the previous two months, along with altered sensorium and three GTCS episodes in one day, presented to our hospital casualty and was admitted to the ward. His vitals during the presentation were BP-200/100 mmHg, RR-20/min, PR-120/min, and SPO2-97% on room air. On examination, GCS was E3V4M5; pupils were 3 mm dilated and responsive to light. There was a visible pulsation in the epigastric area. A palpable pulse was felt by the pulp of the finger over the same area. Upon auscultation, bruit was detected in the epigastric and left renal area. Neck stiffness was present with B/L plantar response being mute.

INVESTIGATIONS and OUTCOME:

Routine blood investigations like CBC, LFT, RFT, RBS all were within normal limits. Both CRP and ESR were high. VDRL test and Widal test were negative. Blood culture revealed no growth after 72 hrs of incubation. Upon additional examination, his CSF analysis, CSF viral profile, ANA profile, and ANCA were all negative. An assessment revealed CBNAAT-positive BAL and B/L renal artery stenosis on the USG Doppler. The abdominal aorta, the origin of SMA (Superior Mesenteric Artery)(Fig. 1, Red and Yellow arrows, respectively), and the b/l renal arteries (left>right) (Fig. 2, Blue arrow), all exhibit circumferential soft tissue thickening on CECT (Thorax+Abdomen), with left kidney exhibiting hypo enhancing, all of which are most likely TB-induced Aortoarteritis.

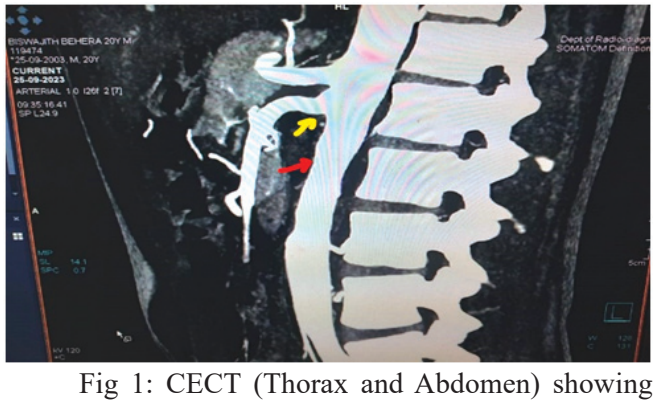

Fig 1: CECT (Thorax and Abdomen) showing circumferential soft tissue thickening in the abdominal aorta (red arrow) and at origin of SMA (yellow arrow)

Department of General Medicine
AIIMS, Bhubaneswar

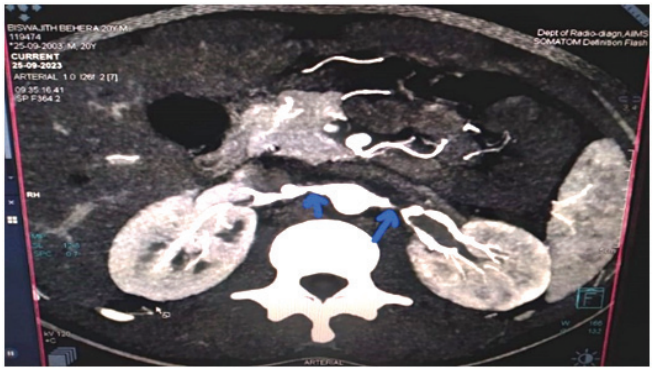

Fig 2: CECT (Thorax and Abdomen) showing circumferential soft tissue thickening of b/l renal arteries (left>right) (blue arrow)

Furthermore, numerous centrilobular nodules in the superior and postero-basal segments of the right middle lobe and right lower lobe exhibit a tree-in-bud appearance. The left parieto-occipital and right temporal regions in CEMRI BRAIN displayed T2W/FLAIR hyperintensities without diffusion restriction or post-contrast enhancement, most likely due to Posterior reversible encephalopathy syndrome (PRES).

Prednisolone 1 mg/kg, the ATT medication, and hypertension medication were started for the patient along with other supportive measures. The patient is improving clinically and is hemodynamically stable at present and planned for discharge.

DISCUSSION and CONCLUSION:

Pan-arteritis is the hallmark of Aortoarteritis. It is brought on by either infectious cases, including syphilis, salmonella, or tuberculosis [3], or non-infectious Takayasu arteritis. Because tuberculous Aortoarteritis is rare and mimics Takayasu's arteritis, diagnosing it can be difficult. It is, therefore, usually a diagnosis of exclusion. In the present case, with a background of TB defaulter and present CBNAAT positive BAL, the manifestation of Aortoarteritis most likely has been attributed to TB. Therefore, in the developing countries like ours, Aortoarteritis may have TB as a contributing factor and treatment should begin with high-dose steroids and ATT as soon as feasible[4].

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