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Clinical profile and etiological spectrum of patients present with Fever and altered sensorium

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Abstract: ***Background:*** *Fever with altered mentation is a common problem in clinical practice and often poses a diagnostic challenge to the clinician. On that ground, the study was planned to assess theclinico-aetiological spectrum of patients present with fever and altered sensorium.*

Methods: *A total 50 patients admitted to the department of Medicine, Mymensingh Medical College Hospital through the emergency department with complaints of fever along with altered sensorium were included in this study. The socio-demographic variables, clinical features and disease descriptions were recorded in detail. To evaluate aetiological spectrum detailed biochemical, microbiological and radiological investigations were done. Separate case record form was used during interview of the patients. Consenting was collected from the legal guardian of the patients. The study protocol was conformed with Declaration of Helsinki and was ethically permitted from the ERC of MMC.The results were analysed using SPSS 20 statistical software.*

Results: *Mean age the patients were27.14 ±9.36 SD (years). Altered sensorium was more commonly found among the male (66%). Among 30 patients,32% (n=16) of the patients had pyogenic meningitis (meningo-encephalitis), 24% (n=12) had encephalitis, 20% (n=10) had cerebral malaria, 14% (n=7) were suffering from coma vigil and 10% (n=5) had tubercular meningitis. Fever pattern was persistent 76% (n=38) and was irregular in 24% (n=12) patients. Altered sensorium was sudden in 64% (n=32) patients and was gradual in 36% (n=18) patients.*

Conclusion: *Pyogenic meningo-encephalitis and encephalitis was the two most common cause found in our setting present with variables clinical features.*

Keywords*: Fever, Altered sensorium, Non traumatic comma, consciousness.*

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I. Background

Fever with altered sensorium is a problem commonly encountered by the physician in the emergency.Clinicians face challenges in the emergency to identify the clinical syndrome, establishing the etiology and its prompt treatment. Around 5% of the patients with an altered mental state present to the emergency department and 1% of the admissions is due to coma[1]. Fever, headache, altered mental status, and behavior changes encompass a broad differential diagnosis. Infections of CNS (may be a virus, bacteria or parasite) are the most common cause of nontraumatic coma. This includes meningitis, encephalitis, cerebral malaria, brain abscess, coma vigil or in combinations[1]. In some cases, sepsis may lead to altered mental state secondary to systemic complications like hypoglycemia, hypovolemia, hyperpyrexia, hepatic or renal failure. Focal neurological signs and seizures on clinical grounds are not enough, other investigations like CSF analysis and imaging are required to find out the etiology[2].

In Bhalla et al. revealed that patients presenting with fever and alteration in mentation common etiologies are meningitis, meningoencephalitis, sepsis-associated encephalopathy followed by cerebral malaria, leptospirosis, and brain abscess[3]. Similarly in Ruhi Khan reported that acute pyogenic meningitis followed by cerebral malaria, sepsis associated encephalopathy, acute meningoencephalitis, tubercular meningitis, enteric encephalopathy and fungal meningitis are the common cause of fever with alter sensorium [4].

Tubercular meningitis is more common among rural area and age group 20 to 39 years. Cerebrospinal fluid (CSF) findings include a lymphocytic-predominant pleiocytosis, elevated protein, and low glucose[5,6]. In case of pyogenic meningitis fever and an altered mental status were the most frequent findings followed by back rigidity, headache and convulsion. CSF parameters show WBC <500 cells/µL, high protein levels, glucose

levels<1 mmol/L, low CSF/blood glucose levels in Christian Østergaard et al study[7]. Encephalitis is produced by a number of neurotropic viruses and non-viral etiologies.Most commonly caused by virus. Eenterovirus, flavivirus, varicella zoster, herpesvirus; and mixed etiology are commonly found by Rajnish Joshia et al[8].The most common presentation are fever, altered sensorium, seizure, headache, vomiting and signs of meningeal irritation[9]. Most of the cases cerebral malaria is caused by Plasmodium falciparum and patients with cerebral malaria present with seizure, anemia, icterus, bleeding, hepatomegaly, and splenomegaly[10]. The aim of this study is to identify clinical profile and etiologies of patients presenting with fever and altered sensorium.

I. Materials and Methods:

Total 50 patients who were admitted to medicine unit of Mymensingh Medical College Hospital, Mymensingh with history of fever along with altered consciousness, chose for this cross-sectional study. Patients with trauma, intoxication, metabolic disturbance or focal neurological deficit were excluded from the study. The patients' socio- demographic features, initial symptoms, underlying co-morbidity, clinical findings and laboratory investigations were reviewed and recorded and thoroughly. All of the study population were independent of giving necessary information during study and there were no financial benefits other than usual management. Informed written consent was taken from each patient. Ethical measures were followed in accordance to the Helsinki declaration and ethical clearance was taken from the Ethical Review Committee (ERC) of the study place. Privacy and confidentiality of all patients were maintained strictly throughout the procedure. Following signing consent form, within the time frame, patients were interviewed.

Study instrument: A preformed questionnaire was used to assess the patients and relevant data were also collected by clinical history taking, clinical examination and relevant investigations. The first part of the questionnaire contained the informed written consent form and the second part contained few questionnaires to collect socio-demographic data and rest of the questions focused on clinical history.

Procedure of data collection: After ethical approval for this study, the study was conducted at inpatient Medicine Department of MMCH. After recruitment of the patient, firstly the aims and objectives of the study were discussed separately with each physician working as attending doctor and the subjects were thoroughly informed about the aims, objectives and detail procedure of the study before examination. Detailed clinical history and physical examination were done according to standard protocol. Relevant data were collected in a semi structured pretested case record form (CRF). Base investigations like TC, DC, Hb%, ESR, Urine R/M/E, Chest X-ray P/A view, MP were done for all study subjects and MT, RBS, Blood urea, S. creatinine, S. electrolyte, s, bilirubin, triple antigen, SGPT, HbsAg, CSG study, Blood for C/S, CT scan, bone marrow examination were done according to relevancy with clinical presentation.

Statistical analyses:

Before final analysis, all collected data were checked & verified to remove inconsistencies and then data were input into the statistical software. For data analysis, Statistical Package for Social Science (SPSS) 23 version was used. Descriptive statistics of mean±SD, median, frequencies, and percentage were used to present the continuous and categorical variables.

II. Results:

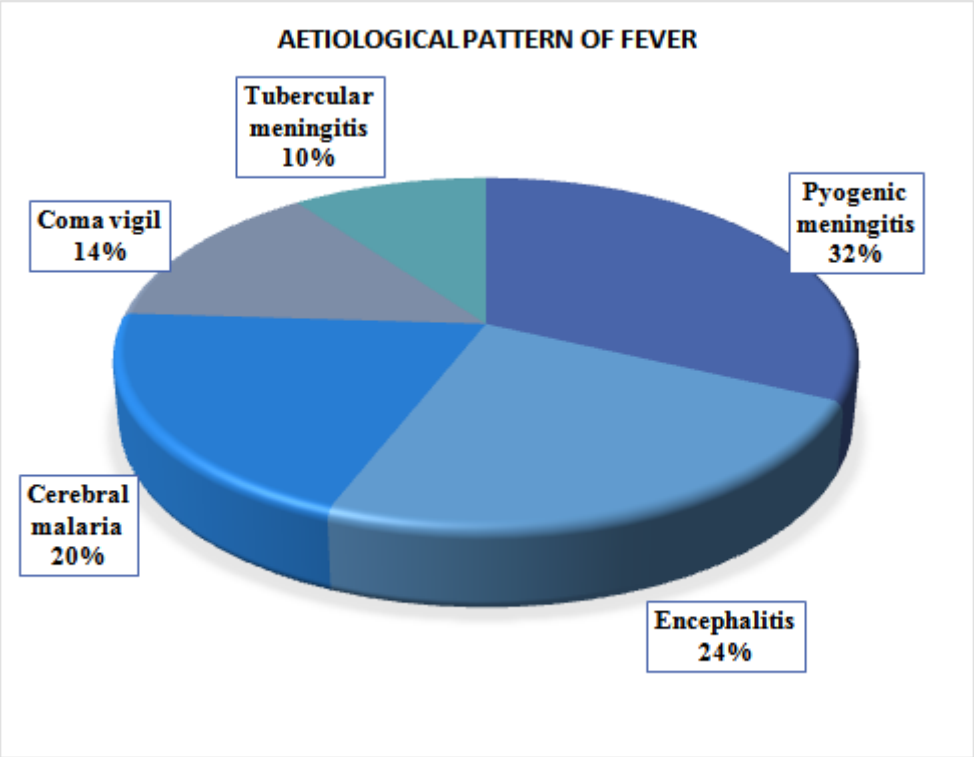
Total 50 patients with fever and altered sensorium were included in the study. Mean age of study population was 27.14 ±9.36 years with a range of 16 years to 65 years. Most of the patients were in age group 20-29 years and 16-19 years with a percentage of 40 and 22. About 66% (n=33) patients were male, female being only 34% (n=17)**(table 1)**

Variable	Frequency (%)
Age Group	
16-19 years	11 (22)
20-29 years	20 (40)
30-39 years	9 (18)
40-49 years	3 (6)
50-59 years	4 (8)
60-65 years	3 (6)
Gender	
Male	33 (66)
Female	17 (34)

Table 1: Distribution of patients by sociodemographic features (N=50)

Variable etiological spectrum was observed in this study. Among 30 patients, 32% (n=16) of the patients had pyogenic meningitis (meningo-encephalitis), 24% (n=12) had encephalitis, 20% (n=10) had cerebral malaria, 14% (n=7) were suffering from coma vigil and 10% (n=5) had tubercular meningitis. More illustrated **in figure 1.**

Figure 1: Etiological pattern of fever among patients (N=50)



Variable patterns of fever were observed among study population. Fever was persistent among 76% (n=38) patients and irregular among 24% (n=12) patients. Onset of altered sensorium was sudden in 64% (n=32) patients and gradual in 36% (n=18)patients.Duration of fever was observed less than 7 days in 64% (n=32) patients, 7-21 days in 24% (n=12) patients and more than 21 days in 12% (n=6) patients. Temperature of the study subjects ranges from 100 to 106 degree F. About 68% patients presented with high grade fever and 32% with low grade fever. Regarding other chief complaints, 84% (n=42) of the patients complaints about headache, 76% (n=38) photophobia, 66% (n=33) vomiting, and 22% (n=11) convulsion. Features of meningeal irritation was observed in 76% (n=38) patients. Eye congestion, skin rash and purpura was present in 28% (n=14), 4% (n=2) and 2% (n=1) patients. At presentation, 60% (n=30) had a GCS of <8 at presentation and 40% (n=20) had a GCS of >8. More description is provided in **table 2.**

Table 2: Distribution of Clinical Presentation of the Patients(N=50)

Signs & Symptoms	**Frequency (%)**
Fever	
Persistent	38 (76)
Irregular	12 (24)
High grade	34 (68)
Low grade	16 (32)
Duration of fever	
< 7 days	32 (64)
7-21 days	12 (24)
>21 days	6 (12)
Altered consciousness	
Sudden	32 (64)

Gradual	18 (36)
Headache	
Present	42 (84)
Absent	8 (16)
Vomiting	
Present	33 (66)
Absent	17 (34)
Photophobia	
Present	38 (76)
Absent	12 (24)
Convulsion	
Present	11 (22)
Absent	39 (78)
Temperature	
100-103	34 (68)
>103	16 (32)
GCS	
>8	30 (60)
<8	20 (40)
Mean GCS score: 9±2.31	
Meningeal irritation	
Present	38 (76)
Absent	12 (24)

Table 3 enlists laboratory findings of study population. About 68% (n=34) respondents presented with leukocytosis and 58% (n=29) presented with neutrophilic leukocytosis. In CSF study, Neutrophil was found 200-2000 in 38% (n=16) patients and present but less than 200 in 30% (n=15) patients. Lymphocyte count in CSF was 50-300 in 26% (n=13) patients and 6-50 in 36% (n=18) patients. Sugar and protein both was present in abnormal level in 52% (n=26) patients. Hyponatremia was found in 46% (n=23) patients. Hyponatremia was present among 30% (n=15) patients.

Investigation	**Findings**	**Frequency (%)**
TC of WBC	Normal	16 (32)
	Raised	34 (68)
Neutrophil in blood	Normal	21 (42)
	Raised	29 (58)
ESR	Normal	16 (32)
	Raised	34 (68)
CXR P/A view	Normal	47 (94)
	Abnormal	03 (06)
MP in blood	Present	5 (10)
	Absent	45 (90)
WIDAL test	Significant	7 (14)
	Insignificant	43 (86)

CSF		
Neutrophil	Nil	16 (34)
	<200	15 (30)
	>200-2000	19 (38)
Lymphocyte	0-5	19 (38)
	6-50	18 (36)
	>50-300	13 (26)
Sugar	Normal	26 (52)
	Abnormal	23 (46)
Protein	Normal	28 (56)
	Abnormal	22 (44)
Hyponatremia	<135 mmol/I	11 (22)
	<110 mmol/I	04 (08)

Table 3: Distribution of Laboratory Findings of patients (N=50)

Fever pattern was observed as persistent in most of the encephalitis and meningitis patients (71.42%, n= 15 and 83.33%, n=10 accordingly) and in almost all coma vigil patients (100%, n=7). Among the patients diagnosed as cerebral malaria, 40% (n=4) had persistent fever and 60% (n=6) had irregular fever. All the patients with encephalitis and cerebral malaria presented with fever of less than seven days duration. Patients with Tubercular meningitis had a history of fever of more than twenty-one days. Patients of coma vigil had fever from seven to twenty-one days. Headache was present in 95.23% (n=20), 100% (n=12), 20% (n=2) and 28.57% (n=2) in patients with meningitis, encephalitis, cerebral malaria and coma vigil accordingly. Convulsion was present in 83.33% (n=10) of encephalitis and 80% (n=8) of cerebral malaria patients. Signs of meningeal irritation was present in 80% (n=8) of patients with cerebral malaria and 42% (n=3) of patients with coma vigil.

III. Discussion

Fever with altered mentation, is a common symptom complex leading to hospital admissions in which clinicians need to accurately diagnose. Early recognition, efficient decision making and rapid institution of therapy can be life-saving. In patients with non traumatic coma, CNS infections are the most common causes of altered mental status. This can be caused by virus, bacterium, or a parasite. In febrile illnesses, encephalopathy may result from pathogenic mechanism directly affecting the nervous system or it may be due to systemic complications like hypoglycemia, hyperpyrexia, hypotension, hypoxia, or electrolyte imbalance[3].Fever with altered mental state commonly results from bacterial meningitis, Japanese B encephalitis (JE), cerebral malaria (CM), and typhoid encephalopathy[11]. The patients with acute febrile patients with encephalopathy can make complete neurological recovery once the underlying cause is identified and treated promptly and appropriately, but considerable skill and knowledge is required to distinguish the various groups.

Fifty cases of fever with altered mental state were included in this study. Mean age of study population was 27.14 ±9.36 years with a majority in age group 16-29 years. Male predominance was noted in this study with 66% (n=33) male and 34% (n=17) female. Although none of the CNS infections are known to have a male predominance, yet this apparent male predominance can be attributed to the male dominated social system where a sick male gets preferential medical attention.

In this study, 32% (n=16) of the patients diagnosed as cases of pyogenic meningitis where 24% (n=12) as encephalitis, 20% (n=10) as cerebral malaria, 14% (n=7) as coma vigil and 10% (n=5) as tubercular meningitis. Various studies in children A study of non-traumatic coma in children by Bansal et al. has indicated that Tubercular Meningitis, Pyogenic Meningitis, and encephalitis together constitute more than 90% of the cases[12]. In another study by Karmakar et al., of 151 children, viral encephalitis was the most common etiology seen in 57 patients and a diagnosis other than viral encephalitis was reached in 94 (62.3%) patients where pyogenic meningitis was the most frequent diagnosis (33.8%), followed by tubercular meningitis (7.9%) and Cerebral Malaria (5.2%)[13]. Mymensingh Medical College Hospital is surrounded by endemic zone of malaria and most of the patient of cerebral malaria came from endemic zone itself. 70% of the patient of cerebral malaria had come from or had history of traveling to endemic zone.

Fever pattern was persistent among 76% of total study population and irregular among 24% patients. Onset of altered sensorium was sudden in 64% patients where it was gradual in 36% patients. Most of the patients diagnosed with pyogenic meningitis (71.42%) and encephalitis (83.33%) presented with persistent

fever. But almost all the patients with tubercular meningitis and majority patient with cerebral malaria (60%) was suffering from irregular fever. Almost all the patient of pyogenic meningitis and encephalitis had photophobia which may be due to involvement of piamater of meninges and that feature was consistent with a review literature by Durand et al[14].

A distinct pattern of duration of fever was observed in this study where almost all the cases of pyogenic meningitis, encephalitis and cerebral malaria were with acute presentation and all the cases of coma vigil had fever with a duration between 7-21 days. The patients with tubercular meningitis presented with fever of more than 21 days.In an immunocompetent individual, central nervous system (CNS) TB usually takes longer duration to form of meningitis that causes an acute-to-subacute illness. Signs of meningeal irritation were noted in 76% of patient. Almost all patients with pyogenic meningitis presented meningeal irritation and 84% of encephalitis, and 80% of tubercular meningitis patients had also features of meningeal irritation. This findings is consistent with the findings of Durand et al. which showed that signs of meningeal irritation is more prominent in pyogenic meningitis. This feature was very much scarce in cerebral malaria and coma vigil. Convulsion was present mainly among patients of cerebral malaria. Photophobia was present in almost all patients with pyogenic meningitis and encephalitis, which may be due to involvement of piamater of meninges.

Regarding laboratory findings, neutrophilic leucocytosis was a predominant feature among patients. As it is well known that bacterial infection is a common cause of neutrophilic leucocytosis, so it's a common observation as majority respondents were of pyogenic meningitis. ESR was significantly higher in patients of tubercular meningitis, which was also a common observation. CSF protein and cell count was always high in pyogenic and tubercular meningitis as also in encephalitis. CSF sugar was always low in pyogenic meningitis. In case of cerebral malaria and coma vigil CSF findings were nonspecific.

IV. Conclusion:

Pyogenic meningo-encephalitis and encephalitis was the two prominent inciting aetiology causing altered sensorium in patients with fever. They usually present with sudden onset of sensorium and headache. Overall GCS score was less than 10 along with less frequent convulsion. As the study was limited with very small sample size andexperience of single center, therefore, further study is recommended with appropriate design and sample size.

List of abbreviations:

ERC Ethical Review Committee
MRI Magnetic Resonance Imaging
OPD Outpatient Department
SPSS Statistical Package for Social Science

Declarations:

Ethical consideration

This study was approved by the ethical committee of the MMC. Moreover, the researchers were duly concerned about the ethical issues and the ethical issues were maintained in according to the current Declaration of Helsinki.

Consent of Publication: Not applicable.

Availability of data and material: Data and materials supporting study findings in the manuscript will not be shared. It was not in accordance with participants' written informed consent. However, it can be shared with the reviewer team on request.

Competing Interests: The authors declare that there is no conflict of interests regarding the publication of this paper.

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Author contributions:

TM conceived and developed the concept of the study. Conception and design of this research were made by TM, ARB andTT. TT analyze the data. TM, SKS, ARB and WH wrote the first draft of the manuscript and all authorsreviewed the draft. All authors read and revised the article and TM approved the final manuscript.

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Supplementary Materials: Available on request.

References

[1]. Dorsett M, Liang SY. Diagnosis and Treatment of Central Nervous System Infections in the Emergency Department. Emerg Med Clin North Am. 2016;34(4):917–42.
[2]. Modi M, Goyal M. Acute onset Fever and Altered Sensorium: Acute Febrile Encephalopathy. Updat Trop fever Indian Coll Physicians. 2015;60–74.
[3]. Bhalla A, Suri V, Varma S, Sharma N, Mahi S, Singh P, et al. Acute febrile encephalopathy in adults from Northwest India. J Emergencies, Trauma Shock. 2010;3(3):220–4.
[4]. Khan R, Quaiser S, Alam S. Clinical profile and prognostic markers of acute febrile encephalopathy (AFE) in adult patients presenting to a North Indian tertiary care hospital. Int J Nutr Pharmacol Neurol Dis. 2015;5(3):95–102.
[5]. Marx GE, Chan ED. Tuberculous Meningitis: Diagnosis and Treatment Overview. Tuberc Res Treat. 2011;2011:798764.
[6]. Wani AM, Hussain WM, Fatani M, Shakour BA, Akhtar M, Ibrahim F, et al. Clinical Profile of Tuberculous Meningitis in Kashmir Valley-The Indian Subcontinent. Infect Dis Clin Pract. 2008;16(6):360–7.
[7]. Østergaard C, Konradsen HB, Samuelsson S. Clinical presentation and prognostic factors of Streptococcus pneumoniae meningitis according to the focus of infection. BMC Infect Dis. 2005;5(93):1–11.
[8]. Joshi R, Mishra PK, Joshi D, Santhosh S, Parida MM, Desikan P, et al. Clinical presentation, etiology, and survival in adult acute encephalitis syndrome in rural Central India. Clin Neurol Neurosurg. 2013;115(9):1753–61.
[9]. Kakoti G, Dutta P, Ram Das B, Borah J, Mahanta J. Clinical profile and outcome of japanese encephalitis in children admitted with acute encephalitis syndrome. Biomed Res Int. 2013;1–5.
[10]. Koshy JM, Koshy J. Clinical Profile of Cerebral Malaria at a Secondary Care Hospital. J Fam Med Prim Care. 2014;3(1):4–7.
[11]. Kothari VM, Karnad DR BL. Tropical infections in the ICU. J Assoc Physicians India. 2006;54:291–8.
[12]. Bansal A, Singhi S, Singhi P, Khandelwal N RS. Non Traumatic coma in children. Indian J Pediatr. 2005;72:467–73.
[13]. Karmarkar SA, Aneja S, Khare S, Saini A, Seth A CB. A study of acute febrile encephalopathy with special reference to viral etiology. Indian J Pediatr. 2008;75:801–5.
[14]. Durand ML, Calderwood SB, Weber DJ, Miller SI, Southwick FS, Caviness VS Jr, et al. Acute Bacterial Meningitis in Adults. A review of 493 episodes. N Engl J Med. 1993;328(1):21-8.

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