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Original Article

Correlation of the Laboratory Findings with a Etiology of Patients Presenting with Fever followed by Altered Consciousness in a Teaching Hospital

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Abstract

Consecutive fifty subjects having fever with altered consciousness admitted into medical wards in Rangpur Medical College Hospital, Rangpur were selected to find out the aetiology and its correlation with laboratory findings of the subjects. Subjects having prolonged fever, (more than 21 days) pregnancy, trauma, drug intoxication, cerebrovascular disease and metabolic causes including liver diseases were excluded from the study. Study revealed that majority of the study subjects were below 39 years (76%) of age and most of them were male (80%). Predominant cases were found to be pyogenic meningitis (44%), followed by encephalitis (32%), cerebral malaria (20%) and tubercular meningitis (4%). Neutrophilic leucocytosis, high cerebrospinal fluid protein, very high cell count and low sugar were a common observation in pyogenic meningitis while very high erythrocytic sedimentation rate was the main findings in tubercular meningitis and high lymphocytic count was observed in encephalitis as compared to other. So it is concluded that subjects suffering from fever with altered consciousness are 1. Predominantly male of young age group. 2. pyogenic meningitis is a predominant cause. 3. Cerebrospinal fluid findings were observed to have usual findings in disease of pyogenic meningitis, encephalitis and tubercular meningitis.

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Introduction

Fever is an elevation of body temperature that exceeds the normal daily variation and occurs in conjunction with an increase in the hypothalamic set point[1]. It is a very common symptom of systemic disorder having varying pathology. Consciousness is an individual state of awareness of the self and environment when provided with adequate stimili[2]. Altered consciousness may take the form of confusional state and up to the state of coma. Fever accompained by altered consciousness presents a serious form of disorder. No ages and sexes are immune to this condition. Patients having short history of fever with altered consciousness are frequenty diagnosed as a case of meningitis, encephalitis, cerebral malaria and pontine haemorrhage. Meningitis is one of the most common emergency and has poor neurologic outcome when associated with coma at any time during the crisis of the disease[3]. At least 30 countries have reported serious outbreak of bacterial meningitis in the recent year[4]. It is a major international health problems as it remains an important cause of morbidity and mortality[4,5]. In one study in Minnesota, the reported incidence

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of acute encephalitis is between 3.5 and 7.5 cases per 1,00,000 patient per year[6]. and 20,000 cases of encephalitis occur in the united states each year[7]. The incidence is more, in the developing countries. In cerebral malaria, coma may occur within hours and unrecognized infection by P. falciparum results in 30% mortality rate[3]. Few etiological studies on comatose patient was done which showed cerebrovascular disease contributes the main bulk of the patients. It was observed that 3.2% cases had meningitis[8] and 3% cases had encephalitis[9] in comatose subject. Another study showed that 10.6% patients had cerebral malaria in case of subject suffering from *P.falciparum* infection[10]. Although it is not proved that early antibiotic therapy improved outcome in bacterial meningitis, still prompt therapy recomended[11]. Permanent neurologic sequelac occurs in approximately one-third to one half of the survivors of bacterial meningitis[12]. Chronic meningitis produce profound neurologic disability and may be fatal if not successfully treated especially tubercular meningitis[13]. On the light of above studies and observations it was felt that subjects suffering from fever with altered consciousness attending a peripheral medical college like Rangpur Medical College Hospital should be evaluated and keeping this in mind we performed this present study of find out the aetiology of this disorder. We feel that the out come of this study will help medical professional in understanding and management of subject suffering from similar problems.

Materials and methods

It was a hospital based study on consecutive 50 subjects who were found to have fever with altered consciousness. Subjects having prolonged fever (more than 21 days), pregnancy, trauma, drug intoxication and liver diseases were exluded from the study. After selection of the subject detailed history was taken and thorough clinical examination was done and recorded in a pre designed form. Verbal consent was taken after proper information to the subject of legal guardian about the study. Patients were followed up from admission till discharge. Following investigations were carried out for every subject:

1. Full blood count
2. Blood for malarial parasite.
3. Blood urea, serum creatinine,serum bilirubin, SGPT.
4. Urine for RME and C/S where required.
5. Chest X-ray P/A view
6. CSF study :-
   Bacteriological
   Biochemistry
   Cytological
7. Blood sugar two hours after breakfast.
8. Tuberculin test
9. Blood culture
10. Serum electrolytes.

Results

In our study 40 (80%) patients were male and only 10 (20%) were female, the mean (mean ± standard deviation [m±sd]) age of patients was 31.72 ± 18.32 years. Depending on clinical findings and lab investigations subjects were distributed into four groups (Table-1)

1. Pyogenic meningitis (44%): Group-1.
2. Encephalitis (32%): Group-2.
3. Cerebral malaria (20%): Group-3.
4. Tubercular meningitis (4%): Group-4.

Table-1: Distribution of different aetiologocal pattern

Groups	Disease	Number	Percent
Group-1	Pyogenic meningitis	22	44
Group-2	Encephalitis	16	32
Group-3	Cerebral malaria	10	20
Group-4	Tubercular meningitis	02	04
	Total	50	100

Table-2: Comparison of haematological variables among different diagnostic groups

Groups	TLC of WBC/cu mm (m ± sd)	Neutrophil percent (m ± sd)	Lymphocyte percent (m ± sd)	ESR in 1sr hour (m ± sd)
Group-1 (pyogenic meningitis)	13272 ± 1602	80 ± 7.5	19 ± 1	22 ± 6.5
Group-2 (Encephalitis)	11937 ± 4362	63 ± 10	32 ± 11	22 ± 4.5
Group-3 (Cerebral malaria)	1280 ± 3306	69 ± 13	23 ± 10	26 ± 10
Group-4 (Tubercular meningitis)	11000 ± 1000	60 ± 2	35 ± 5	80 ± 10
T/P value Group : 1vs Group 2	326/0.432	3.9/0.002	NS	NS
Group : 1vs Group 3	NS	NS	NS	NS
Group : 2 vs Group 3	NS	NS	NS	NS

Comparison of mean between groups were calculated by student "t" test $p \geq 0.05$ is taken as significant, (m ± sd) TLC of WBC = Total count of white blood cell, ESR = Erythrocyte sedimentation rate, NS= not significant.

Table-3: Comparison of CSF variables among different diagnostic groups

Groups	CSF sugar mg percent (m ± sd)	CSF protein percent (m ± sd)	CSF WBC count/mm^3 (m ± sd)	CSF polymorph percent (m ± sd)	CSF Lymphocyte percent (m ± sd)
Group-1 (pyogenic meningitis)	14 ± 5.5	59 ± 5	627 ± 293	83 ± 3.7	16 ± 3.7
Group-2 (Encephalitis)	59 ± 5	58 ± 28	9.8 ± 2.8	3.5 ± 4.7	65 ± 4.7
Group-3 (Cerebral malaria)	44 ± 15	37 ± 13	4 ± 7	00	100
Group-4 (Tubercular meningitis)	20 ± 2	214 ± 40	100 ± 10	20 ± 5	80 ± 10
Group : 1 vs Group 2	8.03/.001	316.31/.001	6.98 /.001	2.89/.002	2.88/.02
Group : 1 vs Group 3	4.27/.01	6.26/.001	7.04/0.00	74.85/.001	76.50/0.001
Group : 2 vs Group 3	NS	NS	5.50/.001	NS	NS

Comparison of men between groups were calculated by student "t" test $p \geq 0.05$ is taken as significant, (m ± sd) TLC of WBC = Total count of white blood cell, CSF = cserebrospinal fluid, NS= not significant.

Analysis was done on the basis of diagnostic classification to differentiate among pyogenic meningitis (group-1), Encephalitis (group-2) and tubercular meningitis (group-4). It was observed that mean value of total count of WBC was statistically similar among groups (Table-2). Neutrophilic leucocytosis (80 ± 7.5) was found significantly higher in pyogenic meningitis as compared to encephalitis (p=0.001), and cerebral malaria (p=0.001). Mean value of blood lymphocyte count in encephalitis is higher then pyogenic meningitis, ESR was observed to be similar in all groups except tubercular meningitis which is significantly higher as compared to group-1, group-2 and group-3 (p-0.001) (Table-2), Cerebrospinal fluid sugar (14±5.5) was significantly lower in pyogenic meningitis (p-0.001) compared to encephalitis (p-0.001) and

cerebral malaria (p-0.001), CSF protein (58±28) was observed high in all groups than normal value except cerebral malaria (Table-3). Total count of CSF WBC were significantly higher in pyogenic meningitis as compared to encephalitis, cerebral malaria and tubercular meningitis (p-0.001) (Table-3) Streptococcus pneumonia was found to be the predominant organism (54.55%) causing pyogenic meningitis (Table-4).

Table-4: Causative organism of pyogenic meningitis (n=22)

	No organism	*S. pneumoniae*	*N. meningitides*	Gram negative bacilli`
Number	05	12	04	01
Percentage (%)	22.73	54.55	18.18	4.54

Discussion

A Total number of 50 cases presented with fever and altered consciousness were studied to correlate the lab findings with aetiology of the subjects. In our study it was observed that neutrophilic leucocytosis was prominent lab finding in pyogenic meningitis comparing to other subjects suffering from encephalitis, cerebral malaria and tubercular meningitis. It is known that bacterial infection is the main cause of neutrophilic leucocytosis which is a common observation in pyogenic meningitis[15]. So our observations were also consistent with that Lymphocytic count in cerebrospinal fluid is higher in encephalitis with may be due to viral involvement because encephalitis mostly occurs due to viral infection. In tubercular meningitis ESR observed to be higher and this is normal observation in tuberculosis. Again CSF protein and cell count always remain higher in pyogenic meningitis and encephalitis which is usual findings in these diseases. CSF sugar value is always low in pyogenic meningitis. It correlates with the study of Scheld W. Michael[14]. In our study CSF findings of protein, cell count and sugar are similar as the usual observation in meningitis, encephalitis, cerebral malaria and tubercular meningitis. In our study streptococcus pneumoniae was found to be the predominant organism causing bacterial meningitis which is consistent with study of Schuchat et al[16].

From observation and results of the present study we can conclude that subjects suffering from fever with altered consciousness in medicine indoor ward are usually suffering from: 1. Pyogenic meningitis followed by encephalitis, cerebral malaria and tubercular meningitis respectively[2] 2. Neutrophilic leucocytosis with high CSF protein high cell count and low sugar remain the predominant laboratory findings in pyogenic meningitis while high ESR is associated with tubercular meningitis.

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