Original Article

Presentation of Tuberculous Meningitis

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ABSTRACT

OBJECTIVE: To find out the frequency of presentation of Tuberculous meningitis in different stages and to assess the role of Cerebrospinal fluid analysis and Magnetic Resonance imaging in diagnosis.

METHODOLOGY: This descriptive observational study was conducted at neurology ward at JPMC Karachi from July 2018 - December 2019. Diagnosed patients of tuberculous meningitis above 12 years of age included in the study and were classified into three stages. Stage 1 included non-specific symptoms like headache, vomiting, fever and anorexia without impaired level of consciousness. Stage 2 patients were altered level of consciousness or focal neurological deficit without coma. Stage 3 patients included coma, Cerebrospinal fluid analysis and Magnetic Resonance imaging findings were recorded. Mortality was recorded in Performa. Other variables like age, sex, residence etc. were recorded. Data was analyzed by SPSS version 24.

RESULTS: Patients were 110, presented in stage 1 were 30%(33/110). In stage 2, 60 %(66/110) and in stage 3, 10%(11/110). Mortality was 10% and patients who expired were presented in stage 3. Tuberculous Meningitis patients presented with neck stiffness 98.18(108/110), headache 70% (77/110), anorexia 60%(66/110), sign of meningeal irritation 50%(55/110) and 40%(44/110) cranial nerve palsies 40%. The Cerebrospinal fluid findings were raised protein (63.63) lymphocytosis 99.91%(109/110) low glucose 98.18%(108/119) Magnetic Resonant Imaging findings were meningeal enhancement 49.09% (54/110).

CONCLUSION: Tuberculous meningitis patients presented predominantly in stage 2(60%) then stage 1 (30%) and in stage 3 (10%). Cerebrospinal fluid analysis and Magnetic Resonance Imaging are good diagnostic investigation for Tuberculous Meningitis. Sign and symptoms were usually non-specific.

KEY WORDS: Tuberculous Meningitis, Cerebrospinal fluid, presentation of Tuberculous meningitis, stages of Tuberculous Meningitis

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INTRODUCTION

TBM is a disease which is difficult to diagnose. It is essential to make high index of suspicion to diagnose the TBM, history of contact is necessary[1]. Presentation of TBM is usually with low grade fever, loss of appetite, weight loss, headache, vomiting and then progress into reduced level of consciousness or can present with complication like hydrocephalus, brain hemorrhage, and infarction. TBM diagnosis is difficult due to non-specific symptom which cannot be differentiated from bacterial meningitis. Due to late diagnosis the mortality and morbidity of TBM is high so suspicion of TBM is necessary to early diagnose[2]. TBM only present in 5% of patients of all extra pulmonary tuberculosis and can present with unusual finding and laboratory result showed raised white blood cells ($15*10^5$) and ESR 38mm/hour and hypernatremia. The CSF examination may show normal cells, normal proteins and glucose in unusual presentation, even neck stiffness may be absent and can present only with weakness of limb[3]. Initial differential diagnosis of TBM are bacterial, viral or fungal infection of CNS. SLE and intracranial malignancy may mimic with the TBM, the risk factors like dystocia, alcoholism, diabetes mellitus and AIDS are usually associated with TBM. In CSF examination mycobacterium tuberculosis on culture, high protein and low glucose and pleocytosis is diagnostic for TBM. According to UK research council TBM can be staged as stage 1 is alert patient without focal neurologic deficit and Glasgow comma scale is 15/15 and in stage 2 patient GCS is 14-11 with focal neurological deficits and stage 3 Glasgow comma scale is 10 or less than 10 or unconscious patient[4].

CSF finding like low glucose, raised protein, lymphocytosis with pleocytosis are diagnostic feature for TBM, abnormal X-ray chest showing tuberculous findings are usually associated with it, and CT scan shows hydrocephalus and tuberculoma. MRI finding like basal meningeal enhancement also shows the TBM so the diagnosis is usually made on clinical examination, CSF finding, MRI finding and effect of ATT[4].

About one third of the population has latent mycobacterial infection which can progress to active disease[5]. To early diagnose the TBM multiplex polymerase chain reaction (PCR) is important test, treatment can be used to prevent the mortality and morbidity of the patient[6].

The rationale of this study is to diagnose TBM in first stage in tertiary centers to prevent complications and mortality so that strategies can be made to prevent or

decrease the complication of TBM. The objective of study is to find out the frequency of presentation of TBM in different stages, CSF findings and MRI findings to diagnose TBM.

METHODOLOGY

It was descriptive observational study conducted at Neuro medicine department ward 28 JPMC Karachi from July 2018 to Dec 2019, 110 patients of TBM were included in study, 66 patients were male and 44 patients were female.

All diagnosed cases of TBM above 12 years of age of both males and females were included.

Patients with other brain diseases like viral encephalitis, bacterial meningitis, subarachnoid hemorrhage, intracranial bleed, cerebral malaria, enteric fever, stroke or epilepsy were excluded.

All patients of TBM above 12 years of age were admitted through OPD or emergency department of JPMCwas enrolled in study. The detail history, examination, lab investigation, findings were recorded. All routine investigations like complete blood count, liver function test, random blood sugar, urea, creatinine, electrolytes, Mantoux test, chest X-ray and fundoscopy were carried out. Computed tomography (CT) brain scan with contrast to see the hydrocephalus tuberculoma, brain infarction and CSF analysis with AFB straining, culture were carried out.The necessary ancillary investigation like lymph node biopsy in an accessible part and MRI were carried out to see the basal meningeal enhancement.

On the basis of clinical presentation patients of TBM were classified in three stages. Stage 1 included nonspecific symptoms and signs such as headache, vomiting, fever and anorexia without impaired level of consciousness. Stage 2 was altered level of consciousness or focal neurological deficit without coma or GCS from 14-11. Stage 3 included stupor or comma with severe neurological deficit, seizures, or GCS 10 or less than 10. This staging is according to British Medical Research Council. Fungal staining in equivocal cases was carried out and PCR for mycobacterium tuberculosis were carried out. Patients were diagnosed on clinical presentation, CSF finding, on basal meningeal enhancement on MRI, raised ESR and pulmonary TB finding on the X-ray chest.

Mortality was recorded in Performa. Other variables like age, sex, residence etc. were recorded.

Data was analyzed by SPSS version 24. Ethical consideration- Confidentiality of the data of patient was maintained strictly. An informed consent was taken from all patients for lumber puncture.

RESULTS

Total patient of TBM were 110 out of which 66 were males and 44 were females, 60% patients were 20-40 years of age, 15% of the patients were more than 20 years of age and 25% were between 12-20 years of age. Mortality was 10%. All patients who died were presented in stage 3. Most of the patients who developed complications like hydrocephalus, cranial nerve palsies and stroke and hyponatremia presented in stage 2 and stage 3. Table I, Table II and Table III shows stage of TBM, symptoms and signs of TBM and CSF findings.

TABLE I:
STAGES OF PRESENTATION TBM (n=110)

Stage of Presentation of TBM	No. of Patients	Percentage
Stage 1	33	30%
Stage 2	66	60%
Stage 3	11	10%

TABLE II: SYMPTOMS AND SIGNS OF TBM PATIENTS (n=110)

Symptoms and sign of TBM patient	No. of patients	Percentage
Neck stiffness	108	98.18%
Alter level of consciousness	66	60%
Headache	77	70%
Vomiting	44	40%
Focal weakness	33	30%
Weight loss	22	20%
Anorexia	66	60%
Fits	11	10%
Photophobia	2	1.81%
Urinary and fecal Incontinence	2	1.81%
Sign of meningeal irritation	55	50%
Cranial nerve palsies	44	40%
Myoclonic jerk	1	0.90%
Papilledema	11	10%
Fever	99	90%
Dementia	2	1.81%
Ataxia	2	1.81%

TABLE III: CSF FINDINGS (n=110)

CSF findings	No. of patients	Percentage
Raised proteins	70	63.63%
Low glucose	108	98.18%
Lymphocytic pleocytosis	109	99.09%
Neutrophil pleocytosis	2	1.81%
AFB positivity	5	4.5%

DISSCUSION

Presentation of TBM in stage 1, was 30% and stage 2, 60% and in stage 3, 10%. All patients expired were in stage 3 so the mortality in this study was 10%, but in comparison the mortality in other study was 30.4 % in all patients diagnosed as TBM[7], Mortality rate was comparatively low than other studies. This low mortality rate in our study may be due to the reason of early presentation of TBM. 90% of TBM patient presented in stage 1 & 2 and only 10% of patients presented in stage 3. Predominantly patients presented in stage 2 are in accordance with most of the other studies[8]. Presentation of patient in stage 3 and resistant of mycobacterium[7] is high predictor of mortality. In this study the relative low mortality of TBM patient may be due to the early presentation of patient (stage 1&2) and young age of patient. Mortality can be reduced further if high index of suspicion among our physician is made in our setup to early diagnose the TBM. In this study 90% patients presented in stage 1 and 2 and mean age was 31 year. TBM was associated with 40% in extra CNS tuberculosis and was associated 30% with pulmonary Koch. In study conducted in civil hospital Karachi, TBM had 30% association with extra CNS TB. International study shows the same results[7,8].

In our study patient with TBM presented with headache (70%), fever (90%), vomiting (40%), anorexia (60%), seizures (10%), neck stiffness (98%), focal weakness (30%) as compared to other study in which the patient presented with fever 60-95%, headache 50-80%, anorexia and weight loss 60-80%, vomiting (30-60%)[4], and patient presented with clinical sign in other study with seizure, stroke, hydrocephalus, brain damage and death is usually due to stroke and hydrocephalus[9]. These signs are usually depend on site of tuberculoma in brain[10]. Bilateral papilledema and loss of vision is common presentation in children in TBM. Our 10% patientshave papilledema and blindness most of the patient recovered with ATT and steroid so it is proved papilledema is also common in adult. Ataxia and dementia were also found in 1.81% patients in our study, it was less common as in other study. Acute seizure occurs in about 50% of children and in 5% of adult. Rarely status epilepticus and non-compulsive seizure may complicate TBM. After first seizure recurrent seizure are common[12]. In this study 10% patients developed who were successfully treated with benzodiazepine and with phenytoin.

In CSF analysis low glucose was in 98.18%, raised protein was 63.63%, lymphocyte pleocytosis was 99.09% and AFB positive was in 4.50% in our study. Same result were found in local and international studies[11]. MRI brain revealed meningeal enhancement in 49.09%, hydrocephalus in 60%, cerebral edema in 35.45%, tuberculoma in 32.73%, infarct in 16.36% and encephalomyelitis in 9.09%. These findings are same as in national and international studies[11].

The survival of patient depends on the severity of hydrocephalus[12.13]. So early CSF analysis should be done to diagnose TBM in stage I[13, 14].

It is recommended that high mortality in TBM can be prevented only by early diagnosis of TBM patient in stage 1 disease. So always make high index of suspicion in nonspecific presentation in TBM patients. Early lumber puncture for CSF analysis and early MRI brain can be done for early diagnosis of TBM to prevent the TBM patient to enter in to stage 2 and 3. In this way we can prevent hyponatremia, hydrocephalus and use of mechanical ventilator which can lead to mortality and morbidity. If this complication already developed then aggressive management of this complication should be done to reduce the mortality. BCG vaccination in children should be enforced in Pakistan. Public awareness program to reduce the contact with known patients of TB Should be addressed.

Limitation in this study was exclusion of children. Mortality may be increased if we include children. Some patients came in coma and expired undiagnosed may be case of TBM.

CONCLUSION

Patient presented predominantly in stage II (60%) then stage I (30%) so 90% patients were presented in stage 1 and 2. CSF analysis and MRI were good diagnostic investigation for TBM. Sign and symptoms were usually non-specific.

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AUTHOR CONTRIBUTIONS

Haji S = Study design, data collection and all work carried out by the author.

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