



## TUBERCULOSIS MENINGITIS (TBM) AND HYDROCEPHALUS

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### ABSTRACT

**Objectives:** To determine the frequency of cases detected with hydrocephalus in cases presenting with TBM. **Material & methods;** This cross sectional study was conducted during July to December 2018 at Surraya Azeem Hospital, Lahore & Aziz Bhatti Shaheed teaching hospital, Gujrat. The detailed demographic data was collected. The cases of TBM were selected on clinical and laboratory diagnosis and then they underwent CT scan of brain (plain) and diagnosis of TBM was made in BMRC scale. **Results;** In this study, 300 cases of TBM were selected and, out of these 180 (60%) were males and 120 (40%) females with mean age of  $43.11 \pm 9.13$  years. There were 18 (6%) cases in stage I, 195 (65%) in II and 57 (29%) in stage III of TBM. Hydrocephalus was observed in 144 (48%) of the cases. There was no significant difference in terms of gender and age groups with p values of 0.67 and 0.58. The results were significantly higher in those that had stage III of TBM where it was seen in 57 (65.52%) out of 87 cases as compared to 81 (41.54%) cases in stage II and 6 (33.33%) in stage I of their respective groups with p value of 0.02 as in table 03. **Conclusion;** Hydrocephalus is seen nearly in half of the cases with TBM and it is significantly high in cases that had stage III of TBM.

**KEYWORDS:** TBM, hydrocephalus.

### INTRODUCTION

Tuberculosis (TB) is one of the commonest chronic infectious diseases and highest burden is seen in the developing countries especially Pakistan and is the disease of the ancient times. Its number was declining in the developed countries but the rate is re inclining due to emergence of Human immune deficiency virus (HIV). According to a survey about one third of the world is exposed to it and in Pakistan the incidence is 275/100000 population.<sup>[1]</sup>

Tuberculosis is mainly the disease of the lungs but the spread to any of the viscera is possible and it has wide range of clinical presentation that can mimic the various diseases and hence lead to ultimate delay in the diagnosis which can further increase the morbidity and mortality in such cases.

Central nervous system (CNS) TB is also not uncommon and can present in various ways. Tuberculoma, Tuberculous meningitis (TBM), encephalitis are the different complications and TBM is the most common one, TBM can be a fatal complication. It leads to hindrance in the flow of cerebrospinal fluid and leading to hydrocephalus that can also lead to functional, behavioral, psychological impertinent.

Despite the recent advancements in the diagnostic modalities, the diagnosis of TBM is still a dilemma and largely relies upon characteristic CSF picture and on microbiological methods of detection of Acid Fast Bacilli (AFB) smear on cerebrospinal fluid (CSF) or CSF culture for AFB. The yield is yet low for both of these due to low organism burden. Anti tuberculosis therapy (ATT) is the treatment of choice.

TBM can present with complaints of fever, weight loss, photophobia, headache, vomiting, cranial nerve palsies and altered level of consciousness that can be classified on the basis of British Medical Research Council contemporary clinical criteria (BMRC) for TBM into three stages.<sup>[2]</sup> Furthermore, TBM can complicate into seizure disorder, hydrocephalus, hearing loss, tuberculous radiculomyelitis (rare) with different degree of prepondance. The rate of hydrocephalus in TBM varied from 20%.<sup>[3]</sup> to 65%.<sup>[4]</sup> in countries where TB prevalence is high.

### OBJECTIVE

To determine the frequency of cases detected with hydrocephalus in cases presenting with TBM.

**Study settings**

Surraya Azeem Hospital, Lahore & Aziz Bhatti Shaheed teaching hospital, Gujrat.

**Study duration**

July to December 2018.

**Study design**

Cross sectional study.

**Sampling technique**

Non probability consecutive sampling

**Inclusion Criteria**

1. Both genders
2. All adults with age more than 15 years
3. Cases of TBM as per operational definition.

**Exclusion Criteria**

1. Cases with previous history of head trauma
2. Cases with end stage liver or renal failure
3. Cases with known CNS malignancy

**Tuberculous Meningitis (TBM)**

It was labeled on the presence of fever, headache, with or without vomiting and seizure along with following data.

- a) Positive AFB smear or culture on CSF
- b) Typical CSF exudative lymphocytic picture of
  - CSF Lymphocyte 20-500/mm<sup>3</sup>
  - CSF protein more than 100 mg/dl
  - CSF glucose < 60% of plasma glucose

**BMRC contemporary clinical criteria for TBM**

It was divided into 3 stages.

- **Stage I:** Alert and oriented without focal neurological deficits and GCS is 15/15.
- **Stage II:** Glasgow coma score of 11-14 or 15 with focal neurological deficits.
- **Stage III:** Glasgow coma score of 10 or less, with or without focal neurological deficits.

**Hydrocephalus**

It was labeled on assessment on CT brain (plain) by dilatation of ventricle size by 25% of its normal size.

**Statistical analysis**

The detailed sociodemographic and clinical data was collected. Data was analyzed with the help of SPSS version 23. Effect modifiers will be controlled through stratification and post stratification Chi-Square test was applied taking P-value < 0.05 as significant.

**RESULTS**

In this study, 300 cases of TBM were selected and, out of these 180 (60%) were males and 120 (40%) females with mean age of 43.11±9.13 years. There were 18 (6%) cases in stage I, 195 (65%) in II and 57 (29%) in stage III of TBM. Hydrocephalus was observed in 144 (48%) of the cases. There was no significant difference in terms of gender and age groups with p values of 0.67 and 0.58 respectively in table 1 and table 2. The results were significantly higher in those that had stage III of TBM where it was seen in 57 (65.52%) out of 87 cases as compared to 81 (41.54%) cases in stage II and 6 (33.33%) in stage I of their respective groups with p value of 0.02 as in table 03.

**Table 1 Hydrocephalus With Respect To Gender In Tbm n=300.**

Gender	Hydrocephalus		Total
	Yes	No	
Male	90 (50%)	90 (50%)	180 (100%)
Female	54 (45%)	66 (55%)	120 (100%)
<b>Total</b>	<b>144 (48%)</b>	<b>156 (52%)</b>	<b>300 (100%)</b>

p = 0.67

**Table 2: Hydrocephalus With Respect To Age Groups In Tbm n=300.**

Age Group	Hydrocephalus		Total
	Yes	No	
15 to 40	89 (46.03%)	48 (53.97%)	189 (100%)
> 40	57 (51.35%)	09 (48.65%)	111 (100%)
<b>Total</b>	<b>144 (48%)</b>	<b>156 (52%)</b>	<b>300 (100%)</b>

p = 0.58

**Table 3: Hydrocephalus With Respect To Stage Of Tbm n=300.**

Stage of TBM	Hydrocephalus		Total
	Yes	No	
I	06 (33.33%)	12 (66.67%)	18 (100%)
II	81 (41.54%)	114 (58.46%)	195 (100%)
III	57 (65.52%)	10 (34.48%)	57 (100%)
<b>Total</b>	<b>144 (48%)</b>	<b>156 (52%)</b>	<b>300 (100%)</b>

**p = 0.02**

## DISCUSSION

Tuberculosis is one of the most dreadful infectious disease of the ancient times as it can involve any organ and its vague presentation can pose a diagnostic delay and ultimately fatal outcome can be seen, especially in cases of CNS involvement in the form of tuberculous meningitis which can be life threatening.

Hydrocephalus was observed in 144 (48%) of the cases in the present study. These results were similar to the studies done in the same vicinities of the under developed countries where it was observed in about 60% of the cases in a study conducted by Nabi S *et al.*<sup>9</sup> However, the study conducted by Chan *et al* found relatively lower incidence rate and in their study it was seen in only 29% of the cases.<sup>[10]</sup> The reason of this high number in present and the study by Nabi S *et al* can be explained that these both studies were conducted in the developing country as compared to the later one which has a slight better socioeconomic and health care facilities.

There was no significant difference in terms of gender in both groups; where it was seen in 90 (50%) of the cases with p value of 0.67. These results were similar to the study done by Kumar R and Christensen AS *et al* that also found males with higher no of hydrocephalus but non significant difference.<sup>[11-12]</sup>

The results were significantly higher in those that had stage III of TBM where it was seen in 57 (65.52%) out of 87 cases as compared to 81 (41.54%) cases in stage II and 6 (33.33%) in stage I of their respective groups with p value of 0.02. These results were also strengthened by the study of Chan *et al* who also found highest number of cases that had hydrocephalus in stage II and III where it was seen in almost 90% of the cases combined.<sup>[10]</sup> Similar sorts of results were observed by Salekeen S and Newton RW *et al*, however they did not find any significant difference.<sup>[13-14]</sup>

## CONCLUSION

Hydrocephalus is seen nearly in half of the cases with TBM and it is significantly high in cases that had stage III of TBM.

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