

# FREQUENCY OF HYDROCEPHALUS IN CASES OF TUBERCULOSIS MENINGITIS

Sajid Mumtaz,<sup>1</sup> Muhammad Amir Aslam,<sup>2</sup> Saman Qadeer<sup>3</sup>

## ABSTRACT

**Background:** Tuberculosis Meningitis (TBM) can lead to hydrocephalus and complicate the management. **Objective:** To determine the frequency of hydrocephalus in cases of tuberculosis meningitis. **Methodology:** This was a cross sectional study conducted from 1<sup>st</sup> January to 30<sup>th</sup> September 2017 in Department of Neurology, Lahore General Hospital, Lahore. 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. Data was entered in SPSS version 23 and analyzed. **Results:** In present study, there were total 100 cases of TBM, out of which 60 (60%) were males and 40 (40%) females with mean age of 47.23±10.39 years. There were 6 (6%) cases in stage I, 65 (65%) in II and 29 (29%) in stage III of TBM. Hydrocephalus was observed in 48 (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. The results were significantly higher in those that had stage III of TBM where it was seen in 19 (65.52%) out of 29 cases as compared to 27 (41.54%) cases in stage II and 2 (33.33%) in stage I of their respective groups with p value of 0.02. **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.

**Key words:** Tuberculosis Meningitis, Hydrocephalus, Frequency, Complication.

## INTRODUCTION

Tuberculosis (TB) is one of the commonest chronic infectious diseases and highest burden is seen in the developing countries especially Pakistan.<sup>1</sup> Its number was declining in the developed countries but the rate is re inclining due to emergence of Human immune deficiency virus (HIV).<sup>2</sup> 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.<sup>3</sup> Central nervous system (CNS) TB is also not uncommon and can present in various ways.<sup>4</sup> Tuberculoma, Tuberculous meningitis (TBM), encephalitis are the different complications and TBM is the most common one.<sup>5</sup> 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 consequences.<sup>6</sup> 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.<sup>7-10</sup> 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 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 preponderance. The rate of hydrocephalus in TBM varied from 20%<sup>3</sup> to 65%<sup>4</sup> in countries where TB prevalence is high. The objective of this study was to determine the frequency of hydrocephalus in cases of Tuberculous meningitis.

## METHODOLOGY

Study settings. Department of Neurology, Lahore General Hospital, Lahore. Study duration: 1<sup>st</sup> January to 30<sup>th</sup> September 2017. 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

1. Basic Health Unit, 116/p, District Rahim Yar Khan, Punjab, Pakistan.

2. District Headquarter Hospital, Mianwali, Punjab, Pakistan.

3. RHC, Mianwali Qureshian, Rahim Yar Khan, Pakistan.

**Correspondence:** Dr. Sajid Mumtaz, Basic Health Unit, 116/p, District Rahim Yar Khan, Punjab, Pakistan.

E-mail: drsajidmumtaz@gmail.com

Received: 01-01-2018

Accepted: 20-02-2018

3. Cases with known CNS malignancy Tuberculosis meningitis was labelled 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 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 was labelled on assessment on CT brain (plain) by dilatation of ventricle size by 25% of its normal size. The detailed sociodemographic and clinical data was collected. Data was analyzed with the help of SPSS version 23. Effect modifiers were controlled through stratification and post stratification Chi-Square test was applied taking P-value < 0.05 as significant.

## RESULTS

In present study, there were total 100 cases of TBM, out of which 60 (60%) were males and 40 (40%) females, with mean age of 47.23±10.39 years. There were 6 (6%) cases in stage I, 65 (65%) in II and 29 (29%) in stage III of TBM.

**Table I: Hydrocephalus in TBM patients with respect to gender, age groups and stage of TBM.**

	Hydrocephalus		Total	P-value
	Yes (No%)	No (No%)		
<b>Gender</b>				
Male	30 (50%)	30 (50%)	60 (100%)	0.6
Female	18 (45%)	22 (55%)	40 (100%)	
<b>Total</b>	<b>48 (48%)</b>	<b>52 (52%)</b>	<b>100 (100%)</b>	
<b>Age group (years)</b>				
15 to 40	29 (46%)	16 (53.9%)	63 (100%)	0.5
>40	19 (51%)	03 (48.6%)	37 (100%)	
<b>Total</b>	<b>48 (48%)</b>	<b>52 (52%)</b>	<b>100 (100%)</b>	
<b>Stage of TBM</b>				
I	02 (33.3%)	04 (66.6%)	06 (100%)	0.02
II	27 (41.5%)	38 (58.4%)	65 (100%)	
III	19 (65.5%)	10 (34.4%)	29 (100%)	
<b>Total</b>	<b>48 (48%)</b>	<b>52 (5%)</b>	<b>100 (100%)</b>	

Hydrocephalus was observed in 48 (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. (Table I) The results were significantly higher in those that had stage III of TBM where it was seen in 19 (65.52%) out of 29 cases as compared to 27 (41.54%) cases in stage II and 2 (33.33%) in stage I of their respective groups with p value of 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.<sup>5,6</sup>

Hydrocephalus was observed in 48 (48%) of the cases in the present study. These results were similar to the studies done in 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; however male gender had this in higher number where it was seen in 30 (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 with 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 19 (65.52%) out of 29 cases as compared to 27 (41.54%) cases in stage II and 2 (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 sort 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 Tuberculous meningitis and it is significantly high in cases that had stage III of Tuberculous meningitis.

**Conflict of interest:** The authors have declared no conflict of interest.

## REFERENCES

1. WHO. Global TB report.2014. Retrieved from: <http://www.who.int/tb/publications/global-report/en/>
2. Thwaites GE, Tran TH. Tuberculous meningitis: many questions, too few answers. *Lancet Neurol.* 2005;4(3):160–70.
3. Idris MN, Mirgani SM, Zibair MA, Ibrahim EA, Abadaltif MA, Rida RM, et al. Tuberculous meningitis in HIV negative adult Sudanese patients: clinical presentation and outcome of management. *Sudan Med J.* 2010;46(3):121-31.
4. Raut T, Garg RK, Jain A, Verma R, Singh MK, Malhotra HS, et al. Hydrocephalus in tuberculous meningitis: incidence, its predictive factors and impact on the prognosis. *J Infect.* 2013;66(4):330-37.
5. Nabi S, Khattak S, Badsha M, Rajput HM. Neuroradiological manifestations of tuberculous meningitis. *Pak J Neurol Sci.* 2014;9(2):16-21.
6. Sher K, Firdaus S, Abbasi A, Bullo N, Kumar S. Stages of tuberculous meningitis: a clinicoradiologic analysis. *J Coll Physic Surg Pak.* 2013;23(6):405-8.
7. Alva R, Alva P. A study of CT findings in children with neurotuberculosis. *Int J Biomed Res.* 2014;5(11):685-87.
8. Laureys S, Piret S, Ledoux D. Quantifying consciousness. *Lancet Neurol.* 2005;4(12):789-90.
9. Nabi S, Khattak S, Badsha M, Rajput HM. Neuro radiological manifestations of tuberculous meningitis. *Pak J Neurol Sci.* 2014;9(2):16-21.
10. Chan KH, Cheung CY, Fong KI, Tsang W, Mak SI. Clinical relevance of hydrocephalus as a presenting feature of tuberculous meningitis. *Q J Med* 2003; 96:643–48.
11. Kumar R, Singh SN, Kohli N. A diagnostic rule for Tuberculosis meningitis. *Arch Dis Child.* 1999;81:221–24.
12. Christensen AS, Andersen AB, Thomsen VO, Andersen PH, Johansen IS. Tuberculosis meningitis in Denmark: a review of 50 cases. *BMC Infect Dis.* 2011;11:47.
13. Salekeen S, Mahmood K, Naqvi IH, Akhter SH, Abbasi A. Clinical course, complications and predictors of mortality in patients with tuberculous meningitis an experience of fifty two cases at Civil Hospital Karachi, Pakistan. *J Pak Med Assoc.* 2013;63(5):563-67.
14. Newton RW. Tuberculosis meningitis. *Arch Dis Child.* 1994;70:364–66.

**Article Citation:** Mumtaz S, Aslam MA, Qadeer S. Frequency of hydrocephalus in cases of tuberculosis meningitis syndrome patients. *JSZMC;*2018;9(1):1312-1314