

## Frequency of Hydrocephalus in Cases of Tuberculous Meningitis

MUHAMMAD UMAR WAHEED<sup>1</sup>, MUHAMMAD ABUBAKAR<sup>2</sup>, MOEEN AKHTAR MALIK<sup>3</sup>, JUNAID MUSTAFA<sup>4</sup>, FERROZ ALI<sup>5</sup>, AKMAL HUSSAIN<sup>6</sup>

<sup>1</sup>Senior Registrar, MBBS, FCPS Medicine, SZMC, RYK

<sup>2</sup>Medical Officer

<sup>3</sup>MBBS, SZMC, RYK

<sup>4</sup>Assistant Professor, MBBS, FCPS Medicine, SZMC, RYK

<sup>5</sup>Assistant Professor, MBBS, FCPS Medicine, SZMC, RYK

<sup>6</sup>Senior Registrar, MBBS, FCPS Medicine, SZMC, RYK

<sup>7</sup>Associate Professor, MBBS, FCPS Medicine, SZMC, RYK

Correspondence to: Muhammad Umar Waheed, Email: [umarwaheed191@yahoo.com](mailto:umarwaheed191@yahoo.com)

### ABSTRACT

**Aim:** To determine the frequency of hydrocephalus in cases of Tuberculous meningitis

**Methods:** This was a cross sectional study conducted during 01-07-16 to 31-12-2017 at Department of Medicine, Sheikh Zayed Hospital, Rahim Yar Khan. The cases of tuberculosis meningitis of age range of 15 to 50 years of either gender with tuberculous meningitis were included in this study. The diagnosis of TBM was made on the basis of combination of clinical symptoms and laboratory data. The symptoms were fever, weight loss and neck rigidity with or without fits. These cases then underwent CSF analysis under aseptic measures. The findings to label TBM on CSF were low glucose (< 40 mg/dl), increased protein content (> 100 mg/dl) and high WBC count with predominance of lymphocytes. The cases of TBM were divided according to standard BMRC scale into three stages. The cases with bacterial meningitis, having any SOL in brain and those with any previous history of neurosurgery were excluded from this study. Then these cases underwent CT brain in the same institute and diagnosis of Hydrocephalus was made when any of the ventricle is dilated more than 25% of the baseline.

**Results:** In this study there were total 93 cases of TBM with mean age of 37.11±08.67years. There were 54(58.06%) males and 39(41.94%) females. Maximum cases were seen in stage II of TBM which affected 65 (69.89%) cases. Hydrocephalus was seen in 61(65.59%) of the cases as shown in figure 01. Hydrocephalus was significantly high in male gender as compared to females where it affected 39(72.22%) of cases with p value of 0.03. It was also more common in cases that had age group 15-29 years affecting 40(67.79%) of cases with p= 0.86. Hydrocephalus was also significantly high in cases with stage II and III of TB affecting 66.15% and 77.27% of cases respectively with p= 0.01.

**Conclusion:** Hydrocephalus is very common in cases of TBM and it is significantly high in male gender and stage II and III of TBM.

**Key words:** TBM, Hydrocephalus

### INTRODUCTION

Tuberculosis (TB) is a disease of the ancient times and still its burden is amongst the commonest causes of infectious diseases. The number are highest in the developing countries and its incidence rate is 275 per 100,000 population in Pakistan according to World Health Organization.<sup>1</sup> Its prevalence is also increasing in the developed world due to emergence of HIV.

Tuberculosis usually involves lungs and is spread by respiratory tracts secretions, but it can involve any part of the body and is a great mimicker of wide range of disease; hence leading to delay in diagnosis and worst outcomes. It can involve brain in the form of abscess, meningitis encephalitis, Tuberculoma etc.

The diagnosis largely relies upon clinical suspicion. Isolation of mycobacterium Tuberculosis is still the investigation of choice. However, characteristic cerebrospinal fluid (CSF) picture with predominantly lymphocytes or CSF culture to isolate AFB are widely used and standard four drug regimen therapy is augmented. British Medical Research Council contemporary clinical

criteria (BMRC) devised a criterion to label the cases off TBM into three stages according to severity. The prevalence of hydrocephalus ranges from 20-65%<sup>3-4</sup>

The data from Pakistan has shown its range from 58% in a study from Rawalpindi to 72.3% in Karachi.<sup>5-6</sup> However one study from India on 45 cases revealed this hydrocephalus in 33.3 % of cases only<sup>7</sup>.

The objective of the study was to determine the frequency of hydrocephalus in cases of Tuberculous meningitis

### METHODOLOGY

This cross sectional study was conducted in Medical departments, Sheikh Zayed Hospital, Rahim Yar Khan from 01-07-2016 to 31-12-2016. Sampling technique used was non probability consecutive sampling. The cases of tuberculosis meningitis of age range of 15 to 50 years of either gender with tuberculous meningitis were included in this study. The diagnosis of TBM was made on the basis of combination of clinical symptoms and laboratory data. The symptoms were fever, weight loss and neck rigidity with or without fits. These cases then underwent CSF analysis under aseptic measures. The findings to label TBM on CSF were low glucose (< 40 mg/dl), increased protein content (>

Received on 13-01-2021

Accepted on 07-05-2021

100 mg/dl) and high WBC count with predominance of lymphocytes. The cases of TBM were divided according to standard BMRC scale into three stages. The cases with bacterial meningitis, having any SOL in brain and those with any previous history of neurosurgery were excluded from this study. Then these cases underwent CT brain in the same institute and diagnosis of Hydrocephalus was made when any of the ventricle is dilated more than 25% of the baseline.

**Statistical analysis:** The data was entered and analyzed with the help of SPSS version 23. Effect modifiers were stratified and post stratification Chi-Square test was applied with P-value < 0.05 as significant.

**RESULTS**

In this study there were total 93 cases of TBM with mean age of 37.11±08.67years. There were 54 (58.06%) males and 39 (41.94%) females. Maximum cases were seen in stage II of TBM which affected 65 (69.89%) cases. Hydrocephalus was seen in 61 (65.59%) of the cases as shown in figure 01. Hydrocephalus was significantly high in male gender 39 (72.22%) as compared to females 22 (56.41%) where it affected 39 (72.22%) of cases with p value of 0.03 as in table I. It was also more common in cases that had age group 15-29 years affecting 40 (67.79%) of cases with p= 0.86 (table II). Hydrocephalus was also significantly high in cases with stage II and III of TB affecting 66.15% and 77.27% of cases respectively with p= 0.01 as in table III.

Figure I: Hydrocephalus in TBM

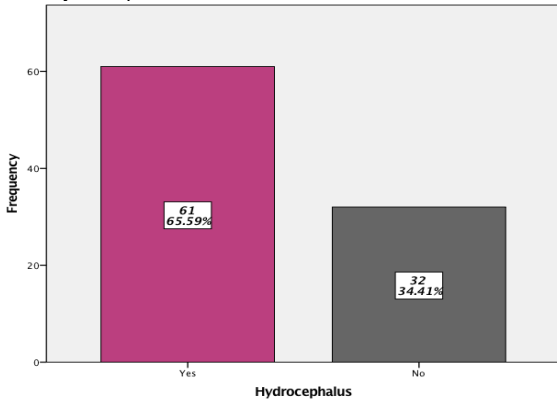


Table I: Hydrocephalus and gender

Gender	Hydrocephalus		Total
	Yes	No	
Male	39 (72.22%)	15 (27.78%)	54 (100%)
Female	22 (56.41%)	17 (43.59%)	39 (100%)
Total	61 (65.59%)	32 (34.41%)	93 (100%)

p value = 0.03

Table II: Hydrocephalus and age groups

Gender	Hydrocephalus		Total
	Yes	No	
15 to 29	40 (67.79%)	19 (32.21%)	59 (100%)
30 to 50	21 (61.76%)	13 (38.24%)	34 (100%)
Total	61 (65.59%)	32 (34.41%)	93 (100%)

p value = 0.86

Table III: Hydrocephalus and stage of TBM

Gender	Hydrocephalus		Total
	Yes	No	
I	01 (16.67%)	05 (83.33%)	06 (100%)
II	43 (66.15%)	22 (33.85%)	65 (100%)
III	17 (77.27%)	05 (22.73%)	22 (100%)
Total	61 (65.59%)	32 (34.41%)	93 (100%)

p value = 0.01

**DISCUSSION**

Tuberculosis is itself a chronic and fatal disease if untreated and need a long term chemotherapeutic drug administration. TBM has a high degree of mortality and can be due to various complications. Fits, abscess formation, hydrocephalus are the major complications as sequel of TBM.

In the present study out of the 93 cases of TBM, hydrocephalus was seen in 61 (65.59%) of cases. This finding was similar to the studies done the past. The studies done Thwaites et al and Nabi et al found this prevalence in 58 to 63% if the cases.<sup>9-10</sup>This was in contrast to the study done in China, 29% of the cases developed hydrocephalus after TBM.<sup>11</sup>This difference in prevalence can be multifactorial. First of all, it can be due to difference in the epidemiology of the disease prevalence and its resistance pattern and moreover, difference in operational definition can be another factor to affect.

Hydrocephalus was significantly high in male gender as compared to females where it affected 39 (72.22%) of cases with p value of 0.03. Male gender was also proved as a risk factor for the development of hydrocephalus in cases of TBM by previous studies. Kumar and Christensen AS et al found that males were seen in more than 2/3<sup>rd</sup> cases of TBM; though this difference was not statistically significant with p values of 0.54 and 0.34 respectively.<sup>12-13</sup>

Hydrocephalus was also significantly high in cases with stage II and III of TB affecting 66.15% and 77.27% of cases respectively with p= 0.01. The studies have shown that there is liner association of the severity of the disease and the development of the hydrocephalus.<sup>14-15</sup>Chan et al in their study found 89% of the cases to develop hydrocephalus in cases of TBM.<sup>11</sup>The reason can be explained by the fact that the severe the disease and higher is the turbidity of the CSF and led to difficult drainage and ultimately led to hydrocephalus.

**CONCLUSION**

Hydrocephalus very common in cases of TBM and it is significantly high in male gender and stage II and III of TBM.

**Conflict of interest:** The author has no conflict of interest.

**REFERENCES**

1. WHO. Global TB report [internet]. 2014 [cited 2015 May 25]. Available from: <http://www.who.int/tb/publications/global-report/en/>
2. Thwaites GE, Tran TH. Tuberculous meningitis: many questions, too few answers. *sLancet 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 clinico-radiologic analysis. *J Coll Physicians 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. Thwaites GE, Chau TT, Stepniewska K, Phu NH, Chuong LV, Sinh DX, et al. Diagnosis of adult Tuberculosis meningitis by use of clinical and laboratory features. *Lancet.* 2002;360:1287-92.
  10. Nabi S, Khattak S, Badsha M, Rajput HM. Neuro radiological manifestations of tuberculous meningitis. *Pak J Neurol Sci.* 2014;9(2):16-21.
  11. Chan KH, Cheung CY, Fong KL, Tsang W, Mak SL. Clinical relevance of hydrocephalus as a presenting feature of tuberculous meningitis. *Q J Med* 2003; 96:643-48.
  12. Kumar R, Singh SN, Kohli N. A diagnostic rule for Tuberculosis meningitis. *Arch Dis Child.* 1999;81:221-24.
  13. 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.
  14. 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.
  15. Newton RW. Tuberculosis meningitis. *Arch Dis Child.* 1994;70:364-66.