

INTERPRETATION OF CEREBROSPINAL FLUID CBNAAT IN THE DIAGNOSIS OF TB MENINGITIS IN TERTIARY CARE HOSPITAL

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Received : 09/10/2022

Received in revised form : 05/11/2022

Accepted : 17/11/2022

Keywords:

Tuberculosis meningitis,

Meta-analysis, TBM.

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DOI: 10.47009/jamp.2022.4.5.97

Source of Support: Nil,

Conflict of Interest: None declared

Int J Acad Med Pharm

2022; 4 (5); 473-475



Abstract

Background: Tuberculosis is the infectious communicable disease caused by Mycobacterium tuberculosis.^[1] India is overburdened with pulmonary tuberculosis which is the most common presentation however extra pulmonary TB also plays an important role in terms of morbidity and mortality. Gene Xpert or CBNAAT which is a real time PCR test has emerged as a potentially important technique for rapid detection and definite diagnosis of MTB. [The purpose of the present study was to evaluate the role of CBNAAT in early detection of tubercular meningitis and to also detect rifampicin resistant strains of mycobacterium. **Materials and Methods:** The study was at Karnataka institute of medical sciences, hubli between January 2019 and November 2021. Inclusion criteria: patients with signs and symptoms and investigations suggestive of TB meningitis with age more than 12 years were included. Exclusion criteria: cases of meningitis other than tubercular etiology and patients or relatives not giving consent for the study were excluded from the study. **Result:** In the present study 86 cases of TB meningitis were included out of them 42 patients were in the age group of 41 to 60. Mean age of the study group was 43.6 years. Out of 86 patients 52 were males and 34 were females. Out of 86 patients all had history of fever, 73 patients had headache, 44 had altered sensorium, 27 had history of seizures, 42 had history of vomiting. Patients were categorized in to definitive TB meningitis n=1(1.16%), probable TB meningitis n=72(83.72%) and Possible TB meningitis n=13(15.11%). 86 CSF Samples were subjected for CBNAAT out of which MTB was detected in 24 samples and MTB was not detected in 62 samples. **Conclusion:** TB Meningitis requires rapid diagnosis. Definitive diagnosis by culture and demonstration of organisms takes weeks to months but CBNAAT is an effective, simple and rapid method which gives results in hours to diagnose MTB and detection of rifampicin is an added advantage.

INTRODUCTION

Tuberculosis is the infectious communicable disease caused by Mycobacterium tuberculosis.^[1] India is overburdened with pulmonary tuberculosis which is the most common presentation however extra pulmonary TB also plays an important role in terms of morbidity and mortality. Tubercular meningitis is a form of extra pulmonary TB if untreated can lead chronic neurological insult in the form of cerebral vasculitis and hydrocephalus.^[2] Diagnosis of TB Meningitis is not easy because definitive diagnosis is based on demonstration of tubercular bacilli in CSF sample by smear microscopy or culture but due to its paucibacillary nature it has less positive rate of

detection.^[3] Conventional method like culture takes 6 to 8 weeks and has less sensitivity which makes it unsuitable as a routine technique Hence in order to overcome these limitations, Gene Xpert or CBNAAT which is a real time PCR test has emerged as a potentially important technique for rapid detection and definite diagnosis of MTB.^[4] WHO recommends Xpert over conventional tests for diagnosis of EPTB because apart from detecting DNA of mycobacterium TB it also provides additional information regarding identification of Rifampicin resistance by detecting rpoB gene mutations which is highly predictive of MDR TB.^[5] The Gene Xper system is a single use cartridge based real time PCR and is fully automated system

that performs nucleic acid amplification and can give results in 3 to 6 hours.^[6] The purpose of the present study was to evaluate the role of CBNAAT in early detection of tubercular meningitis and to also detect rifampicin resistant strains of mycobacterium.

MATERIALS AND METHODS

The study was at Karnataka institute of medical sciences, hubli between January 2019 and November 2021 after obtaining clearance from the institute ethical committee.

Inclusion Criteria

Patients with signs and symptoms and investigations suggestive of TB meningitis with age more than 12 years were included

Exclusion Criteria

Cases of meningitis other than tubercular etiology and patients or relatives not giving consent for the study were excluded from the study.

Demographic details of the patient and history, clinical signs, lab parameters were entered in a master chart. lab investigations like complete hemogram, renal function tests, liver function tests, serum electrolytes, csf analysis, csf cbaat, csf ADA, fundoscopy, mri /ct brain, chest x ray were done for the patients and were classified as definitive TBM, Probable TBM, possible TBM as per criteria by suzaan marais et al.^[7] Tables and graphs such as bar diagram, pie diagram, were generated using Microsoft word and Microsoft excel. SPSS statistis software version 22 was used to analyze data. means, percentages, sensitivity were calculated using this software.

RESULTS

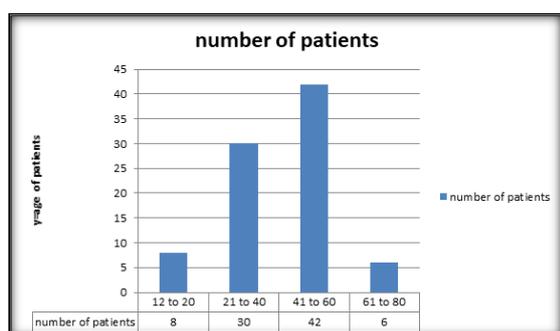


Figure 1: showing age distribution of patients

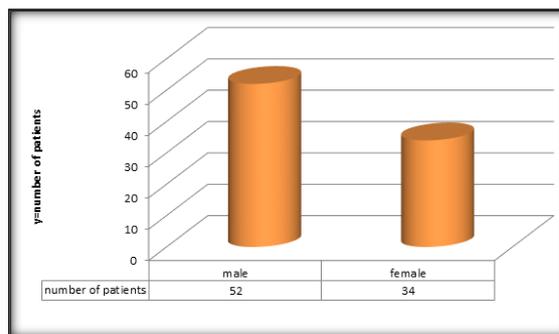


Figure 2: showing gender distribution of patients

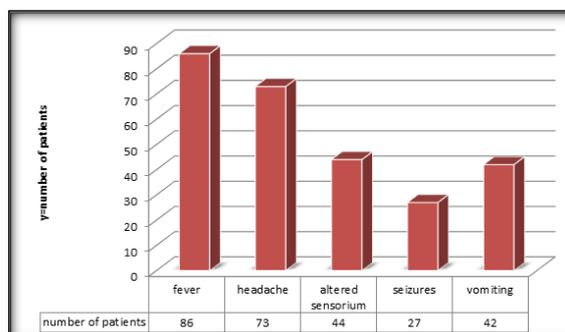


Figure 3: showing symptomatology of patients

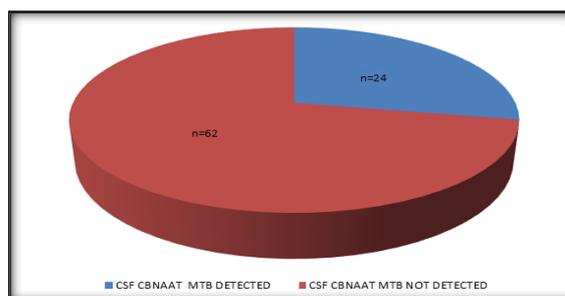


Figure 4: showing number of patients with MTB Detected on CSF CBNAAT

Category	Number of patients	percentage
Definitive tb meningitis	01	1.16%
Probable TB meningitis	72	83.72%
Possible TB meningitis	13	15.11%
Not TB meningitis	0	0%

Number of patients	CSF CBNAAT MTB	CSF CBNAAT MTB	Rifampicin resistance

		detected	Not detected	detected
TB MENINGITIS	86	24	62	0
NOT TB MENINGITIS	0	0	0	0

In the present study 86 cases of TB meningitis were included out of them 42 patients were in the age group of 41 to 60. Mean age of the study group was 43.6 years. Out of 86 patients 52 were males and 34 were females. Out of 86 patients all had history of fever, 73 patients had headache, 44 had altered sensorium, 27 had history of seizures, 42 had history of vomiting. Patients were categorized in to definitive TB meningitis n=1(1.16%), probable TB meningitis n=72(83.72%) and Possible TB meningitis n=13(15.11%). 86 CSF Samples were subjected for CBNAAT out of which MTB was detected in 24 samples and MTB was not detected in 62 samples.

DISCUSSION

Extrapulmonary tuberculosis accounts for about 15 to 20% of all cases of tuberculosis.^[8] TB meningitis is most devastating form of extrapulmonary TB. In the present study 84 patients of TB meningitis were studied and results were analyzed and compared with various similar studies. In the present study definite TB Meningitis was diagnosed in 1 case, Probable TB meningitis in 72 cases and possible TB meningitis in 13 cases. The number of cases in each category differed between other similar studies which can be attributed to differences in the place of study and study design. 86 CSF samples of TB meningitis were subjected for CBNAAT out of which MTB was detected in 24 samples whereas Singh et al subjected 47 cases of TB meningitis out of which MTB was detected in 15 samples.

The sensitivity of CSF CBNAAT in our study was 27.90% which is comparable with results of study done by Singh et al,^[9] and discordant with studies done by Lavanya et al,^[5] and Rai A et al.^[10] this discordance can be due to variation in the amount of CSF sample subjected for CBNAAT and variation in sample size of the study.

Study	Sensitivity of CSF CBNAAT
Lavanya et al, ^[5]	9%
Singh et al, ^[9]	31%
Rai A et al, ^[10]	40%
Ashi Singh et al, ^[11]	38.6%

Thus Gene Xpert MTB/RIF assay is an efficient and reliable technique for detection of M.TB in CSF samples. Its simplicity, speed and automation, and detection of resistance at the same time makes this technique a very attractive tool for the rapid

diagnosis of TB meningitis, especially in suspected cases.

CONCLUSION

TB Meningitis requires rapid diagnosis. Definitive diagnosis by culture and demonstration of organisms takes weeks to months but CBNAAT is an effective, simple and rapid method which gives results in hours to diagnose MTB and detection of rifampicin is an added advantage

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