

## Catridge Based Nucleic Acid Amplification Test (CBNAAT)

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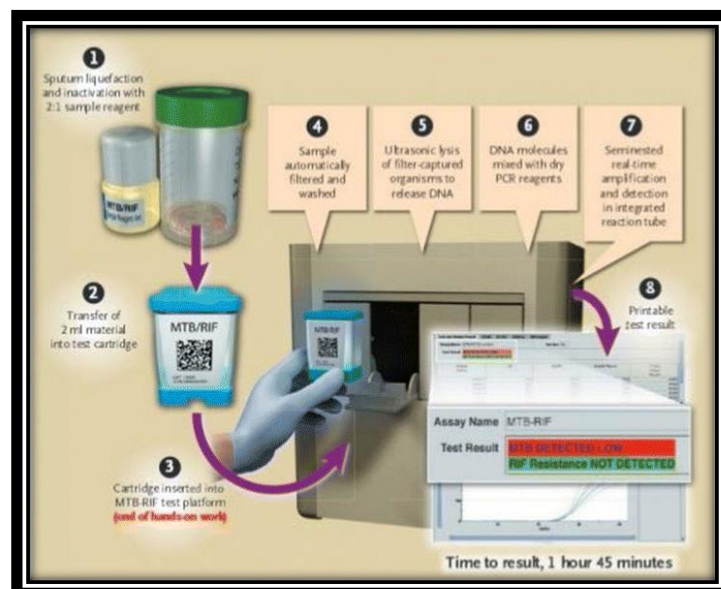
Date of acceptance: 28-04-2021

The CBNAAT or other name X-pert assay test/ gene X-per/ true-nat test. CBNAAT is used for the rapid diagnosis of TB disease and drug resistance TB. It detects Mycobacterium tuberculosis complex (MTBC) and bacilli resistance to Rifampicin in less than 2 hours.

In comparison, standard cultures can take 2 to 6 weeks for MTBC to grow and conventional drug resistance tests can add 3 more weeks.

The information provided by the X-pert assay aids in

- Selecting treatment regimens
- Implement infection control decisions quickly.
- Diagnosis of Extra- pulmonary TB



### **How Does the CBNAAT Assay Work?**

- The CBNAAT is a nucleic acid amplification (NAA) test that uses a disposable cartridge
- A sputum sample is collected from the patient with suspected TB.
- The sputum is mixed with the reagent that is provided with the assay, and a cartridge containing this mixture is placed in the machine.
- All processing from this point on is fully automated

### **Working phases**

Sputum is liquefied with reagents (NaOH and Isopropanol) in 2:1 ratio



Transfer the material into test cartridge



Cartridge is placed into the CBNAAT machine



Ultrasonic lysis and nucleic acid amplification and PCR technique of organism to release DNA



Finally detects the targeted nuclei acid genome

### **Advantages of CBNAAT**

- Results are available quickly
- Now it is indicated for patients on ART
- Minimal technical training is required to run the test.
- Quickly identify possible MDR TB and EPTB.
- Rapid diagnosis of RIF resistance potentially allows TB patients to start on effective treatment much sooner
- Implement necessary respiratory isolation very soon
- Bio-safe method with no special facilities

### **Limitations**

- Temperature control is essential( below 24 degree)
- Recalibration is required annually
- Shelf life of the cartridge is only 18 months
- Cannot monitor response to the therapy

### **INTERPRETATION OF TEST RESULT**

Results from the CBNAAT indicate If MTBC was

- Detected
- Not detected
- Indeterminate.

Results will also state whether resistance to RIF or not

### **RELATED RESEARCH STUDY**

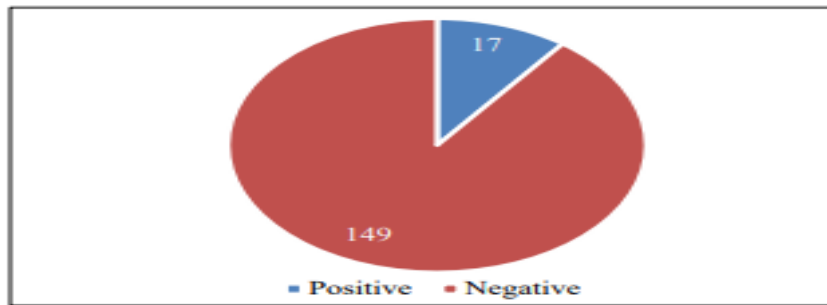
Effectiveness of CBNAAT in the diagnosis of Extra-pulmonary tuberculosis

Shivprasad Kasat, Mahendra Biradar

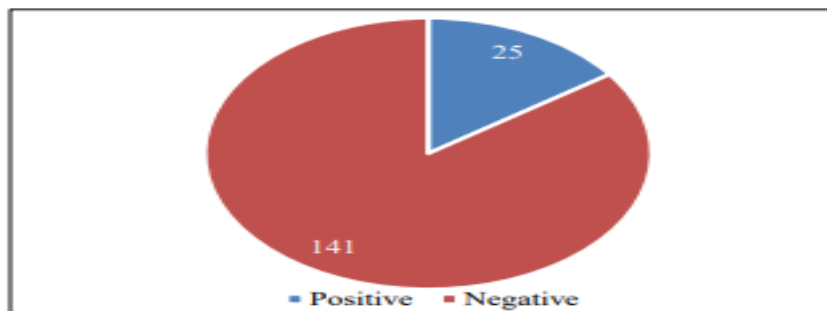
29 October 2018

Retrospective study of suspected extra-pulmonary tuberculosis patients in a tertiary care centre of the study area was conducted. The study period was from January 2017 to July 2018.

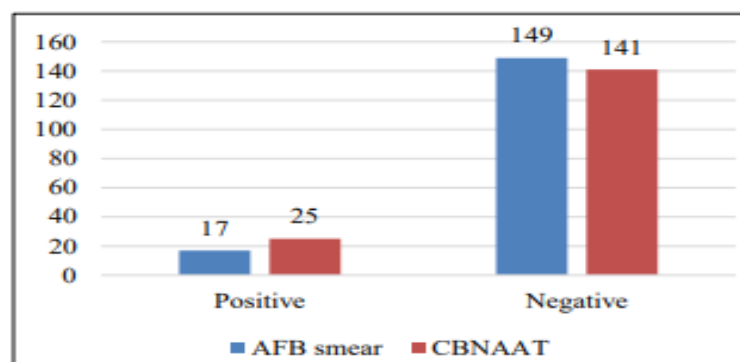
- Data of 166 consecutive suspected extra-pulmonary tuberculosis patients was retrieved.
- Effectiveness of CBNAAT in the diagnosis of EPTB was assessed as compared to that of AFB smear
- Samples collected from 166 suspected EPTB patients were subjected to AFB smear and CBNAAT.
- Samples collected included lymph node, pus, pleural fluid, tissue, CSF, gastric lavage, cystic fluid, peritoneal fluid, ascitic fluid, colonic fluid, synovial fluid, urine.
- In AFB smear results, 17 cases were positive for TB bacilli and 149 were negative for the same.
- In CBNAAT results, 25 cases were positive for TB bacilli and 141 cases were negative.
- In comparative analysis, 8 cases were AFB smear negative but CBNAAT positive.
- Conclusions: CBNAAT is a useful tool in the diagnosis of EPTB cases because of its simplicity and rapid turnaround time. CBNAAT is more effective as compared to AFB smear in the diagnosis of EPTB cases.



**Figure 1: Distribution of patients according to diagnosis based on AFB smear.**



**Figure 2: Distribution of patients according to diagnosis based on CBNAAT.**



**Figure 3: Distribution of patients according to diagnosis. A comparison between AFB smear and CBNAAT results.**

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