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Diagnostic Utility of XPERT MTB/RIF in Sputum Negative, Scarce Sputum Patients Using Bal and Gastric Lavage - An Institutional Observational Study

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1. Introduction

TB has been a Globally affecting disease since ages. So continuous efforts are there for a diagnostic success. By all means conventional microscopy having sensitivity of 36 - 43%.Culture method which is gold standard, which takes 21 days for the result. All microbiological detection only successful when the bacterial load is high. So getting a good quality sample with substantial microbial load is tough. All serological tests are substandard, unreliable & banned. So WHO endorsed XPERT GENE - a real time PCR device for rapid detection.

Sputum smear negative & sputum scarce cases of pulmonary TB is always a diagnostic challenge. About 40%-60% of either suspected TB/active TB fail to demonstrate mycobacterium. Those patients are still infectious.

XPERT MTB/RIF provides an accurate & rapid diagnostic tool using biological samples (BAL, Gastric lavage). So hereby we are presenting the results of an observational study showing diagnostic utility of xpert mtb/rif in sputum negative, scarce sputum patients using BAL and gastric lavage.

Purpose of Study
To evaluate the yield of XPERT MTB/RIF in BAL and gastric lavage fluid in smear negative, sputum scarce patients Who are having high clinico-radiological suspicion of PTB.

Setting
Department of Respiratory medicine, JLN hospital, Bhilai

Study Design:
1) Prospective observational study.
2) Study period: April 2018 – Dec 2018.
3) Written informed consent from each patient.
4) 72 patients included.
5) Institutional ethical committee approval.

Inclusion Criteria
1) Age more than 18yrs.
2) High clinico-radiological suspicion of active TB with a H/O cough > 2 weeks.
3) At least 2 consecutive sputum smear sample negative for PTB.
4) Inability to produce sputum sample.

Exclusion Criteria:
1) H/O structural lung diseases like COPD, Bronchiectasis, DPLD.
2) Patients who are too breathless or hypoxic to undergo the procedure.
3) Patients who received more than 2 weeks ATT in past 90 days.
4) Unwilling for follow up.

2. Material and Methods

1) Methods of collection:
   - Gastric lavage collection
   - Bronchoalveolar lavage
2) Procedure: XPERT MTB (Cepheid, Sunnyvale, CA, USA).
3) Proforma:
   - Baseline demography
   - Clinical
   - Radiological
   - Laboratory information-standard proforma
   - Pre test counselling – HIV test

Gastric Lavage
- Overnight fasting.
- Early morning sample collection.
- 50 ml normal saline instilled through a naso-gastric tube.
- Aspirate about 20 to 40 ml in a sterile syringe.

After 20 -30 min sample transported to GENE XPERT LAB.

Bronchoalveolar Lavage (BAL):

- Followed by gastric lavage, same morning video bronchoscopy was performed.
- 60-100 ml NS was instilled and aspirated from the suspected diseased alveolar segments.
- 20 -30ml of lavage fluid collected in trap bottle.
- 1 ml of sample without centrifugation & decontamination processed.
- Rest sample sent for liquid culture.
- Data entry form maintained on age, sex, history.
- Patients observed for complications.

XPERT – MTB/RIF (CBNAAT):

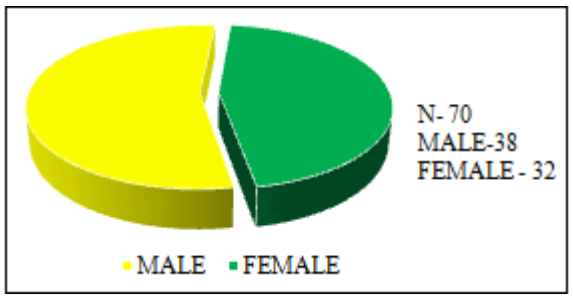
- Its cartridge based nucleic acid amplification test (CBNAAT).
- Real time PCR – Results within 2hr.
- Detects MTB complex DNA and rifampicin resistance in PTB.
- Sensitivity - 88% - initial diagnostic tool
- Specificity - 98% - initial diagnostic tool.
- In smear +ve/culture +ve cases - 98% sensitive.
- In smear –ve - 68%,HIV - 80% sensitive.
- In extra pulmonary TB – 80% sensitive. Specificity > 95%.

Advantages of Gene Xpert:

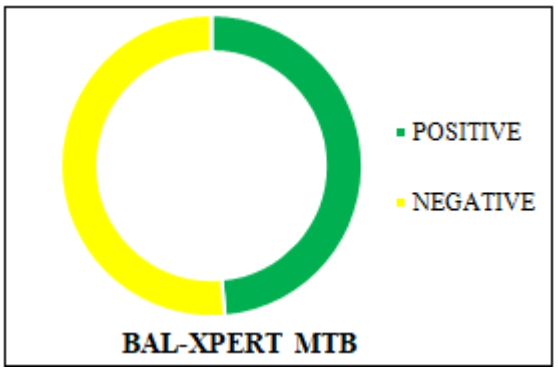
- Very less bio hazard than smear microscopy.
- Risk of cross contamination-reduced by closed cartridge system.
- Limit of detection (LOD) - 131 CFU/ml of sputum.
- Recommended for diagnosis of both PTB and EPTB (TBM, LN-TB).
- Increases TB detection by 23%.

3. Results

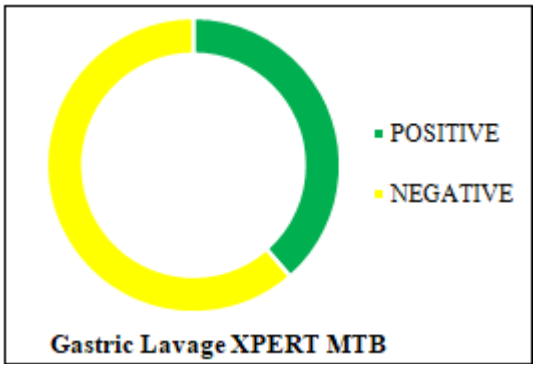
- Total patients -72
- 2 pts didn't tolerate FOB.
- 70 pts included for study.
- Male 38 (54.3%). Female 32(45.7%). Mean age 38.6 ± 18.3(18-72 yrs).



BAL-Xpert MTB
Positive - 34(48.6%)
Negative - 36(51.4%)

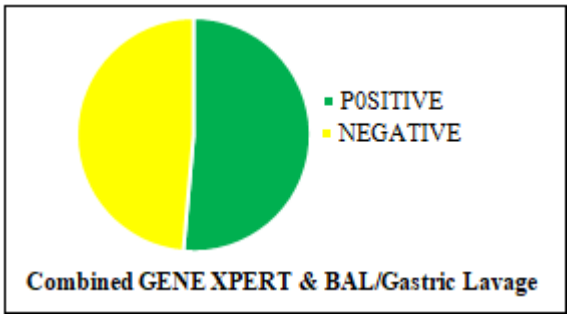


Gastric Lavage Xpert MTB
positive - 27(38.6%)
negative - 43(61.4%)



- In 25 pts(36%) - both BAL and Gastric lavage +ve.
- Only Gastric lavage +ve – 2 pts (2.8%), but BAL –ve.
- Only BAL +ve - 9 pts (13%), but gastric lavage -ve
- Rifampicin resistance 3 pts (4.2%) - further evaluated for MDR TB, which would have missed if solely relied on smear.
- 36 pts (51.4%) had XPERT MTB +ve either in BAL or GASTRIC LAVAGE samples.

Combined XPERT MTB & BAL/GASTRIC LAVAGE:
Yield is 51.4%



4. Discussion

- No direct comparative study found on those samples on XPERT MTB on adults.
- Bacteriological diagnosis- difficult in adults who can't expectorate.
- So we compared the yield in both BAL and GASTRIC LAVAGE in same sitting, both samples taken separately was found to be statistically insignificant.($p > .05$)
- In combination, they complement in same sitting - the yield is 51.4%.

- Most studies in children showed gastric sample was +ve with XPERT MTB in 48.9% of smear –ve cases.
- Gastric lavage procedure is void of complications.
- BAL - minimal complications like desaturation, throat and respiratory discomfort.
- But we don't compare the efficacy of BAL/gastric lavage.
- In limited resource area gastric lavagehas a valuable role for poor patients who can't afford the private lab cost.
- Xpert MTB decreases the diagnostic delay, dropout & mistreatment by providing accurate and early results.
- Culture was not compared with the outcome of Xpert MTB/RIF but data gathered for future reference.
- Our purpose to evaluate the patients who are out of reach of culture but have access to Xpert MTB facility – free of cost by WHO.
- In poor resource areas, gastric lavage has a valuable role to detect PTB in suspected cases who are unable to expectorate.
- The study shows Xpert MTB/RIF in BAL and Gastric Lavage are comparable to detect MTB.
- Gastric Lavage can be a good alternative to BAL who cannot tolerate FOB.

5. Conclusion

- WHO slogan - "END TB STRATERGY" by 2030.
- We can't wait for the high turnaround time of culture report to initiate the treatment.
- So those uncontaminated biological samples processed in XPERT MTB/RIF - yield concrete evidence of aetiology and treatment options in right track.
- We should use both gastric lavage and bronchial lavage with available resources more frequently as and when indicated.
- We are in the age of intervention pulmonology and we believe in evidence based medicine.
- So an accurate diagnosis with a sensitivity is the need of hour rather than an emperic prescription.
- Drug resistance TB is a curable disease and substantial efforts should be made, to quickly diagnose and prevent its upward march on chart of global mortality.

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