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Case Series

Role of GeneXpert in diagnosis of rifampicin resistant tuberculosis in patients with cervical lymphadenopathy

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ABSTRACT

Tuberculosis is one of the most common causes for cervical lymphadenopathy apart from distant metastasis and lymphoma. Early diagnosis of this disease reduces the patient's morbidity by initiating early course of Antitubercular treatment with complete resolution of disease. Hence, for diagnosis of this condition we are searching for a modality which can give results in shorter period of time, which is more sensitive, specific and most important easier to perform. Gene Xpert is one such modality which fits into these criteria. In our case series, we are aiming to study the role of Gene Xpert in diagnosis of rifampicin resistant tuberculosis in patients with cervical lymphadenopathy. In our study, excisional biopsy from cervical region was done in 30 cases and were sent for acid fast bacilli culture, Ziehl Neelsen staining and GeneXpert studies, histopathological examination and results were analyzed.

Keywords: Tuberculosis, Gene Xpert, case series, rifampicin resistant, Antitubercular treatment, HPE, AFB Culture, ZN staining

INTRODUCTION

Tuberculosis is a major health problem specially in a developing country like India where incidence of tuberculosis is still high. Cervical lymphadenopathy is common presentation in ear, nose and throat (ENT) clinics in India majority of which are caused due to tuberculosis. Despite of early presentation in the clinics most of the diagnosis are made late due to failure of early positivity in culture or biopsy. Due to delay in diagnosis of rifampicin resistant tuberculosis cases, patient endures, which increases the morbidity of the patient. The World Health Organization (WHO) has endorsed the implementation of GeneXpert MTB/RIF assay for national tuberculosis programs in developing countries.[2] Here, we are aiming to study the role of Gene Xpert in diagnosis of rifampicin resistant tuberculosis in 30 patients presenting with cervical lymphadenopathy.

CASE SERIES

All 30 patients presented with complaints of unilateral or bilateral neck swelling at outpatient department of ENT, Geetanjali Medical College Hospital (Figure 1). The swelling was insidious in onset and gradually progressive. There were no aggravating or relieving factors associated with neck swelling. Some presented with complaints of pain in the swelling site along with low grade evening rise of temperature without chills and rigor. The patients gave history of progressive weight loss or loosening of clothes. History of contact to tuberculosis patient was present. There was no history of any trauma to neck, difficulty in swallowing food or difficulty in breathing. Chest radiographs along with Mantoux test was conducted in all the patients. Those presented with productive cough, sputum sample was taken and sent for culture and Ziehl Neelsen (ZN) staining. Fine needle Aspiration was done

from cervical lymph node swelling site and excisional biopsy was performed from swelling site and sent for GeneXpert study, histopathological examination (HPE), ZN staining, acid fast bacilli (AFB) culture, and the results were analyzed.

Figure 1: Swelling over right-side neck (a) lateral view, and (b) anterior view.

HPE of biopsy specimen came positive for tubercular lymphadenitis in 50% of patients while in rest 16.6% were reported as reactive lymphadenitis, 16.6% resulted as necrotizing granulomatous lymphadenitis and rest 16.6% reported as granulomatous lymphadenitis (Table 1).

Table 1: Results of biopsy done in 30 patients.

Parameters	Frequency (%)
Reactive lymphadenitis	5 (16.6)
Tubercular lymphadenitis	15 (50)
Necrotizing granulomatous lymphadenitis	5 (16.6)
Granulomatous lymphadenitis	5 (16.6)

Table 2: Gene Xpert report in 30 cases.

Gene Xpert result	Number (%)
***Mycobacterium tuberculosis* detected/rifampicin sensitive**	19 (63.3)
***Mycobacterium tuberculosis* detected/rifampicin resistance**	3 (10)
***Mycobacterium tuberculosis* not detected**	8 (26.6)

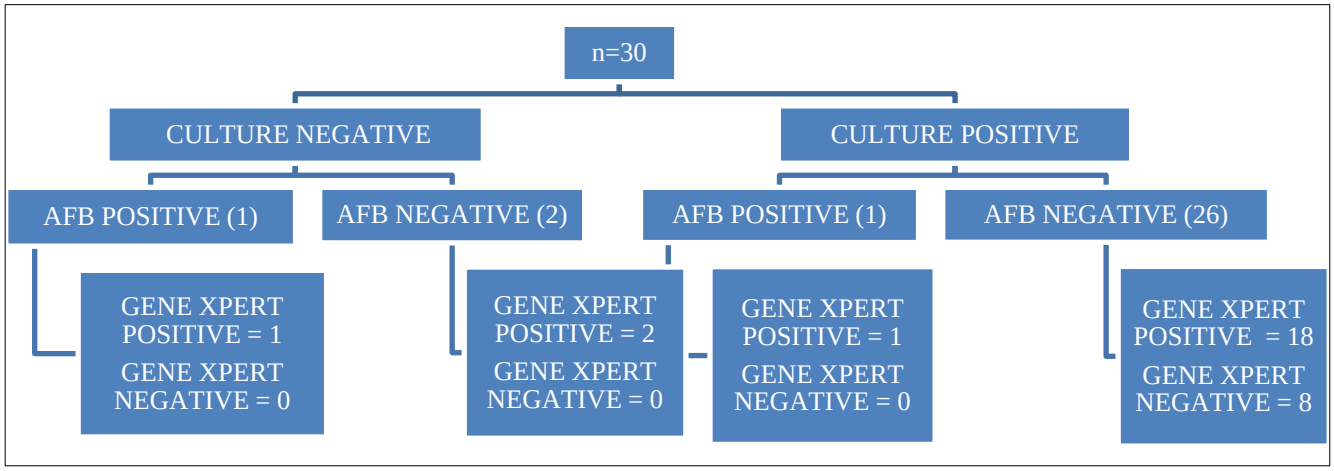

Figure 2: Culture and Gene Xpert reports in 30 patients.

Whereas, culture report for *Mycobacterium tuberculosis* proved to be positive in 27 patients and negative in 3 patients. The patients were further subjected to AFB staining in all positive culture reports. 1 patient was stained positive for AFB as well as Gene xpert while rest of 26 patients were AFB negative. Among those 18 were positive for Gene Xpert study while rest 8 were negative.

Remaining 3 patients with culture negative reports when subjected to AFB staining, 1 was positive for stain while 2 were negative for AFB staining. On subjecting them to Gene Xpert all three were positive for tuberculosis in Gene Xpert report (Figure 2).

In present study GeneXpert detected *Mycobacterium tuberculosis* in 73.33% cases out of which 63.3% were rifampicin sensitive while 10% were rifampicin resistant and in rest 8% tuberculosis was not detected (Table 2).

DISCUSSION

ZN staining for diagnosing TB is less sensitive as compared to that of culture because large bacillary load is required for a smear to become positive (10^5/ml).[2] Cultures are time consuming and required biosafety setup and trained laboratory personnel.[4]

Iram et al in 2015 concluded that Xpert MTB is sensitive and specific test for rapid diagnosis of pulmonary and Extrapulmonary tuberculosis. It has an important diagnostic value for detection of MTB in smear negative cases as it has outperformed ZN microscopy by 10-15% in

their study. They further concluded that it can increase the detection of MTB in extrapulmonary tuberculosis by 2-3 times as compared to conventional techniques.[5]

Agrawal et al in 2016 studied total of 170 patients. The overall sensitivity, specificity, positive predictive value and negative predictive value of GeneXpert were 86.8%, 93.1%, 78.55 and 96% respectively.[6]

Guenaoui et al in 2016 in their study over 50 patients concluded that GeneXpert MTB/RIF assay is efficient and reliable technique for the rapid diagnosis of TB. It's simplicity, high sensitivity and specificity for RIF resistance detection make this technique a very attractive tool for diagnostic of MTB and RIF resistance in MDR cases.[7]

In present study it is shown that out of 3 culture negative samples GeneXpert was positive in all 3 patients while in case of ZN staining 28 patients had AFB negative and out of those 28 samples GeneXpert was positive in 20 cases that shows that GeneXpert is sensitive for detection of TB as compared to culture and ZN staining. Also, in our study we were able to detect rifampicin resistance *Mycobacterium tuberculosis* with the help of GeneXpert in 10% of cases which we would have missed otherwise.

CONCLUSION

GeneXpert is a quick and helpful method for the diagnosis of rifampicin resistant tuberculosis that needs minimal technique and can be operated even by a non-specialist laboratory staff. It is also more sensitive than culture and ZN stating. GeneXpert provides result in short period of time leading to early diagnosis and early treatment with antitubercular drugs which in turn reduces the morbidity.

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REFERENCES

1. Khanna R, Sharma AD, Khanna S, Kuma M, Shukla RC. Usefulness of ultrasonography for the evalusation of cervical lymphadenopathy. World J Surg Oncol. 2011;9:1-4.
2. World Health Organisation. Rapid Implementation of the Xpert MTB/RIF Diagnostic Test, World Health Organisation. 2011. Available at: http://whqlibdoc.who.int/publications/2011/9789241501569_eng.pdf. Accessed on 12 November 2022.
3. Lawn SD, Nicol M. Xpert® MTB/RIF assay: development, evaluation and implementation of a new rapid molecular diagnostic for tuberculosis and rifampicin resistance. Fut Microbiol. 2011;6(9):1067-821.
4. Hillemann D, Ru:sch-Gerdes S, Boehme C, Richter E, Rapid molecular detection of extrapulmonary tuberculosis by the automated GeneXpert MTB/RIF system. J Clin Microbiol. 2011;49(4):1202-5.
5. Iram S, Zeenat A, Hussain S, Yusuf NW, Aslam M. Rapid diagnosis of tuberculosis using Xpert MTB/RIF assay – report from a developing country. Pak J Med Sci. 2015;31(1):105-10.
6. Agrawal M, Bajaj A, Bhatia V, Dutt S. Comparative study of GeneXpert with ZN stain and culture in samples of suspected pulmonary tuberculosis. J Clin Diagnost Res. 2016;10(50):9-12.
7. Guenaoui K, Harir N, Ouardi A, Zeggai S, Sellam F, Bekri F, et al. Use of GeneXpert Mycobacterium tuberculosis/rifampicin for rapid detection of rifampicin resistance Mycobacterium tuberculosis strains of clinically suspected multi-drug resistance tuberculosis cases. Ann Transl Med. 2016;4(9):168-73.

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