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Fine needle aspiration in chronic tonsillitis: reliable and valid diagnostic test

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Abstract
Fine needle aspiration (FNA) of the tonsil as a diagnostic tool in evaluating the microflora in chronic tonsillitis has not been popularized. A prospective study of 30 patients with chronic tonsillitis undergoing tonsillectomy was undertaken. FNA of the tonsil core was done under local/general anaesthesia. The reliability of the culture by FNA of the tonsil core was then validated with the reference (gold) standard which is the dissected tonsil core. The sensitivity of FNA culture as compared to core culture was 100 per cent and 93 per cent under general and local anaesthesia respectively. The positive predictive value of FNA culture as compared to core culture was 92 per cent and 82 per cent for general and local anaesthesia respectively. These factors indicate that FNA of the tonsil core is reliable and valid. It can safely be performed as an out-patient procedure under local anaesthesia. This is reported for the first time. Identifying the bacterial organism within the infected tonsil for appropriate antibiotic therapy could revolutionize the management of chronic tonsillitis.

Key words: Tonsillitis; Biopsy; Sensitivity and Specificity

Introduction

Chronic tonsillitis is the commonest disease in the throat occurring predominantly in the younger age group. It is due to chronic inflammation within the tonsils due to failure/insufficient penetration of antibiotics into the core, or inappropriate antibiotic therapy. Determination of the core bacteriology is important for several reasons. Failure to eradicate pathogens in the core, whether it be from inappropriate antibiotic choice or from insufficient penetration into the core, will allow persistence of core infection or re-inoculation of an initially sterilized surface.[1] Failure to achieve bacterial level of the antibiotic inside the tonsil results in bacterial survival.[2]

The diagnosis of chronic tonsillitis is mainly by history and clinical examination. It is well accepted that effective treatment of recurrent acute tonsillitis depends on identifying the infecting organism. The diagnostic test of swabbing the surface of the tonsil as a culture specimen for the determination of the organism responsible for the tonsil infection is still in practice, despite controversy. Throat swabs are often used as a guide in the selection of this therapy in tonsillitis. Several studies indicate a marked discrepancy in the surface and core pathogen flora.[2–5]

Fine needle aspiration (FNA) is a very popular technique in establishing histopathological diagnosis.[6] Under general anaesthesia FNA of the core of the tonsil has shown excellent correlation with the dissected tonsil core in two earlier studies.[7,8] The reliability of this test under the less than optimal conditions of local anaesthesia has not been done previously.

This study was thus undertaken to assess the reliability and validity of FNA of the tonsil core in chronic tonsillitis, the procedure being done under general/local anaesthesia. The reference (gold) standard was the dissected tonsil core culture. Its sensitivity, and positive predictive values were calculated.[9] The safety of this relatively non-invasive diagnostic test was also evaluated. Secondary goals were to identify the commonest causative organisms so that general guidelines could be used for rational use of antibiotics in chronic tonsillitis.

Patients and methods

This prospective study included 30 consecutive patients (both adults and children) clinically diagnosed to have chronic tonsillitis (with or without adenoiditis) who underwent tonsillectomy from August 2000 to December 2001. Consent for this procedure was obtained from the patient or the

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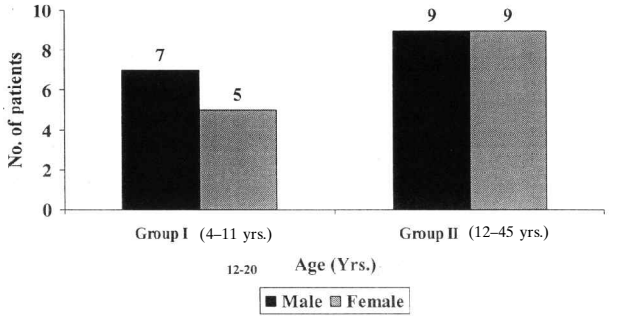

FIG. 1
Demographic profile of the patients.

guardian in the case of children. Patients who had had antimicrobial therapy four weeks prior to surgery, an acute infection such as peritonsillar abcess or suspected neoplasms for which tonsillectomy was being done were excluded from this study.

FNA of the tonsil core was performed using a 20 gauge needle which was fixed to a 5 ml plastic syringe. The needle was moved backwards and forwards within the tonsil along the same plane.[8] The needle was then removed and the collected specimen injected on to a sterile swab stick and sent for processing in a sterile culture tube. In adults, this procedure was done under local anaesthesia (four per cent xylocaine) within four hours prior to surgery. In children, this was done under general anaesthesia, after positioning the patient for tonsillectomy. Following tonsillectomy the core tissue was collected in sterile culture tubes. The FNA specimen and core specimen were transported within a half to one hour and processed.

The tissue was processed accordingly and inoculated into blood, chocolate and MacConkey's agar plates. Identification of the bacteria were performed as per conventional procedures.

Result

There were 30 patients in this study with ages ranging from four to 45 years. Group I consisted of 12 children aged four to 11 years and the procedure was carried out under general anaesthesia. Group II had older children and adults aged 12 to 40 years.

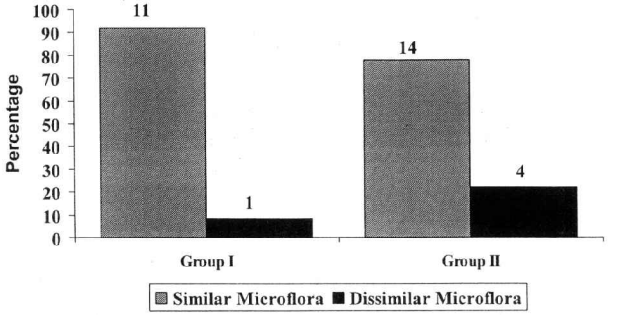

FIG. 2
Tonsil core microflora: FNA *vs* dissected.

TABLE I
MICROFLORA IN THE TONSIL CORE

Organism (Isolated)	Number
Streptococci	12
Staph. aureus	5
H. influenzae	2
Klebsiella species	1
Normal flora	10

There were 18 patients in this group the procedure being performed under local anaesthesia (Figure 1).

In group I, 92 per cent (11/12 children) showed similar microflora: seven had similar pathogens, and five had normal flora (Figure 2). The one patient with dissimilar microflora had normal flora on the FNA and *Staphylococcus aureus* in the core culture. In Group II, 78 per cent (14/18 patients) showed similar microflora: eight had similar pathogens and six had normal flora (Figure 2). The remaining four patients who showed dissimilar microflora had normal flora on FNA core while the dissected core culture showed *Klebsiella* sp in one patient and anaerobic Gram positive cocci in three patients.

This procedure was well tolerated when performed under local anaesthesia. There was no bleeding, haematoma, dysphagia or any other untoward effect following the procedure.

The commonest organisms grown were streptococci followed by *Staphylococcus aureus* (Table I).

Analysis

The reliability of the culture by FNA core was compared to the core swab (the reference standard). The sensitivity and positive predictive values for these procedures under both general and local anaesthesia were calculated.[9] In Group I where FNA was under general anaesthesia the sensitivity was 100 per cent and positive predictive value was 92 per cent (Table II). In Group II, where FNA was done under local anaesthesia the sensitivity culture was 93 per cent and the positive predictive value was 82 per cent (Table III).

Discussion

Several earlier studies indicated a marked discrepancy in the surface and core pathogen flora.[2–5] It was evident that the throat swab is neither a reliable nor a valid diagnostic test for representing the bacterial microflora in recurrent/chronic tonsillitis.

TABLE II
GROUP I (GENERAL ANAESTHESIA)

	Core culture		
FNA culture	Same or no growth	Difference or growth	Total
Same or no growth	11	1	12
Difference or growth	0	0	0
Total	11	1	12

The sensitivity of FNA culture as compared to culture was 100% and the positive predictive value was 92%

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TABLE III
GROUP II (LOCAL ANAESTHESIA)

FNA culture	Core culture: Same or no growth	Core culture: Difference or growth	Total
Same or no growth	14	3	17
Difference or grwoth	1	0	1
Total	15	3	18

The sensitivity of FNA as compared to core culture was 93% and the positive predictive value was 82%.

Fine needle aspiration (FNA) provides equivocal histopathological diagnosis and has been popularized in medicine since the early 1980s.[6] The role of FNA in recurrent/chronic tonsillitis had been reported by Timon *et al*. in 1991.[7] These authors showed a 100 per cent correlation between the FNA and dissected core culture. However, this procedure was not popularized as there was controversy regarding tolerance of this procedure in awake patients. In a recent article by Gaffney and Cafferkey the accuracy of this test has been suggested although not validated.[8]

In our series of patients FNA of the tonsil core was performed under both general and local anaesthesia. From the analysis of the test in both the groups (Table II and III) it is evident that this test has excellent sensitivity and positive predictive values be it under general or local anaesthesia. Besides, this procedure was well tolerated under local anaesthesia in older children and adults. These observations have not been reported previously.

Microbiology of both surface and core of the tonsil in our study revealed that the most commonly isolated organism was a β-haemolytic streptococcus followed by *Staphylococcus aureus* and *Haemophilus sp*. This was similar to other reports.[2,3,5] The use of surface swabs failed to recognize *Haemophilus* species in a significant number of patients.[8] This illustrates the basic therapeutic dilemma using the results of surface culture for the treatment of and poor response to medical therapy in recurrent/chronic tonsillitis.

Conclusion

To date, the medical treatment of chronic tonsillitis has been based on the surface throat swab culture which is neither reliable nor valid. From our study it is evident that FNA of the tonsil core is a valid and reliable test for the diagnosis of bacterial microflora in chronic tonsillitis. This test can be done safely under local anaesthesia in older children and adults as an out-patient procedure. FNA of the tonsil core could revolutionize the management of patients with chronic tonsillitis.

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- **This paper reports the use of tonsillar biopsy to assess the microflora of the tonsil**
- **The paper compares the bacteriology found at fine needle aspiration with that obtained by culture of the tonsil core**
- **Fine needle aspiration was sensitive and specific even when done under local anaesthetic and revealed organisms that were not seen with surface swabbing**
- **The authors claim that this technique might revolutionize the management of chronic tonsillar infection – although they do not expand on this statement**

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