Correlation between McIssac Score and Throat Swab Culture in Patient Presenting with Acute Tonsillitis

Bhandari S\(^1\), Paudel DR\(^1\), Gurung K\(^2\)

ABSTRACT

Introduction: Tonsillitis is inflammation of tonsils which is characterized by various signs and symptoms with sore throat being the most consistent symptom. The condition is mostly caused by bacterial infection with Streptococci being the most common bacteria. McIssac scoring technique is clinical symptoms based scoring method designed for diagnosing streptococcal tonsillitis. Aims: To find out the association between McIssac Score and beta hemolytic streptococcal infection in acute tonsillitis. Methods: This hospital based, prospective study was carried out in the Department of ENT, Nepalgunj Medical College from July 2020 to June 2021. Patients were scored as per McIssac score. The specimens were collected from the tonsillar surface using sterile cotton swabs and subjected for culture and sensitivity. Results: The most common affected age group was 21 to 30 years (46%). Females were affected more commonly (57%). The most common organism isolated in the study was Group A beta hemolytic Streptococcus (48%), followed by Pseudomonas (10%), Enterococcus (9%) and Klebsiella (8%) and no organisms were isolated in 25% of the patients. It was observed that high McIssac score was associated with higher chance of having positive beta hemolytic streptococcal infection. Out of 48 group A beta hemolytic streptococci culture positive patients 18 (37.5%) patients scored 3, 9 (18.75%) patients scored 4 and 7 (14.5%) patients scored 5. The most common antibiotic effective against group A beta hemolytic streptococci was ceftriaxone in 25 (72.9%), followed by amoxyclavulinic acid in 20 isolates (41.6%) and amikacin in seventeen (35.4%) isolates. Conclusion: The correlation between throat swab culture and McIssac score emphasized that this clinical scoring system aid in early diagnosis of group A beta hemolytic streptococci tonsillitis.

Keywords: Acute tonsillitis, Group A Beta hemolytic streptococcus, McIssac score

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INTRODUCTION

Tonsillitis is an inflammation of tonsils, a common clinical condition caused by either bacteria or viral infection contributing to significant social-economic impact worldwide.\(^1\) It is characterized by a sore throat, red swollen tonsils, pain during swallowing, fever, cough, headache, tiredness, chills\(^2,3\)\(^4\)\(^5\) There are no single or combination of physical findings specific for distinguishing bacterial from viral infection but several features such as enlarged tonsils, pharyngeal erythema, level of pyrexia\(^6\), soft palate petechiae, tonsillar crypts containing necrotic or purulent exudates, cervical lymphadenopathy are more suggestive of bacterial infection.\(^6\) The bacterial tonsillitis is caused mainly by Group A beta hemolytic Streptococcus (GABHS), and to lesser extent by Staphylococcus aureus and several other bacteria.\(^5\)

The reasons for treatment failure are poor patient compliance, colonization of beta-lactamase producing bacteria, production of biofilm and presence of mixed bacteria in the biofilm.\(^6\) The score predicts GABHS infection using five criteria: age, tonsillar swelling or exudates, anterior cervical lymphadenopathy, absence of cough, and temperature >38°C. The patient having GABHS infection increases with the total score, which will be used to assist decisions in respect to prescribing antibiotics. The management of sore throat according to the McIsaac Score has been shown to result in a 48% reduction in antibiotic use, a 63.7% reduction in unnecessary antibiotic prescriptions, and a
35.8% reduction in the culture of throat samples. The present study was conducted to correlate the throat swab culture with McIsaac scoring to predict GABHS infection and to identify the prevalent bacterial pathogens and their antibiotics sensitivity.

**METHODS**

This hospital based prospective study on acute tonsillitis was carried out in the Department of ENT, Nepalgunj Medical College over a period of one year from July 2020 to June 2021. The bacteriological work was carried out in the Department of Microbiology. Patients with features of acute tonsillitis who attended in outpatient department and had not taken oral or injectable antibiotics were included in the study. Patients who were younger than three years, immunocompromised were excluded from the study. Patients were categorized according to the McIsaac score System into scores 0, 1, 2, 3, 4, and 5. (Table I) Microbiological specimens from the tonsillar surface were collected by using sterile cotton swabs, and subjected for culture and sensitivity on different media like blood agar, chocolate agar, Mc Conkey agar etc. The antibiotic sensitivity tests were done for all the isolated organisms. Antibiotics discs viz. amoxycillinclavulanic acid, azithromycin, vancomycin, amikacin, ceftriaxone, ciprofloxacin, cefixime, roxithromycin, gentamycin, doxycycline, were placed individually for all the isolates and the inhibition pattern was noted. The data collected were analyzed in SPSS version 21 with respect to age, sex, symptoms, bacteriological growth, their sensitivity and resistant pattern to antibiotics and also to identify the association between McIssac score and the GABHS. The Significance between MsIssac score and GABHS was calculated by using chisquare test.

**RESULTS**

The total number of cases was 100. The age ranged from 3 to 50 years. Out of 100 patients, majority of the patients were in the age group 21 to 30, 36(36%). There were 57 females (57%) and 43 males (43%). Figure 1. The most common organism isolated in the study was Group A beta hemolytic Streptococcus (Figure 2), comprising of (48%), followed by Pseudomonas (10%), Enterococcus (9%) and Klebsiella (8%). No organisms were isolated in 25% of the patients.

![Figure 1: Age distribution](image1)

<table>
<thead>
<tr>
<th>Serial No</th>
<th>Organism</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GABHS</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>2</td>
<td>No isolates</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>Pseudomonas</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Enterococcus</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>Klebsiella</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Table II: Organisms isolated**

![Figure 2: Growth of GABHS in blood agar media](image2)

When the McIsaac score was correlated with presence of GABHS infection it was found that with increasing score the possibility of GABHS infection in acute tonsillitis increased significantly, with 25% chance in patients who had score 2 and 37.5% in score 3. (Table III) The pattern of sensitivity to different antibiotics in relation to the isolated organism is shown in table IV.
The incidence of acute tonsillitis was found to vary differently in various population. In the study done by MS Vijayshree et al³, maximum tonsillitis cases were observed in the preteen age group (6-12 years) with 61% followed by 6-12 years with 48% of those cases were observed. In the study of our findings, the least incidence of 9% in the age group of 21-30 year (36%) followed by 31-40 years (25%) in the study showed that maximum number of tonsillitis occurred in the age group of 21-30 year (36%) followed by 31-40 years (25%).

In this study, GABHS was sensitive to ceftriaxone and amoxicillin clavulanic acid, Pseudomonas was sensitive to ciprofloxacin, ceftriaxone and amikacin, and Enterococcus was sensitive to amoxy-clavulanic acid, vancomycin, and levofloxacin while study done by Wakode PT et al¹² showed streptococcus sensitive to gentamicin and cefotaxime, Pseudomonas to ciprofloxacin like the present study, Klebsiella to norfloxacin.

In the study done by Zeynep Yilmaz Oztorun et al¹³, the Centor/McIsaac score of 68 patients with GABHS positive throat culture were found to be significantly higher than those with negative throat culture. This study concluded that higher the McIsaac score more will be the chance of positive GABHS culture. Similar to this study, Stefaniku et al¹⁴ stated that GABHS positive throat culture was present in 48% of those with a Centor/McIsaac score of 3, and in 50% of those with a Centor/McIsaac score of 4 or 5. There was a strong correlation between the results of positive throat culture and Centor/McIsaac score (r=0.81). Our study also showed that out of 48 GABHS throat swab positive culture 18 (37.5%) patients scored 3, 9 (18.75%) patients scored 4 and 7 (14.5%) patients scored 5.

LIMITATION

There is always a chance of failure of superficial throat swab to predict deep pathogens present in tonsillar core tissue as core tissue of tonsil were not analyzed in this study.

CONCLUSION

Our study showed acute tonsillitis was more common in females and majority of patients were at the age of 21 to 30. About one third of patient’s throat swab culture report was negative inspite of having clinical symptoms indicating the need of core tonsillar tissue to improve the isolation of organism. Lastly a strong association between the McIsaac score and the isolation of GABHS was seen in our study which may help to start appropriate antibiotics till the culture report is awaited or in culture negative patients. So this study may help to increase the value and reliability of McIsaac score in the early diagnosis of GABHS.

REFERENCES


3. Brook I, Foote Jr PA. Comparison of the microbiology


