

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

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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. McIsaac scoring technique is clinical symptoms based scoring method designed for diagnosing streptococcal tonsillitis. **Aims:** To find out the association between McIsaac 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 McIsaac 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 McIsaac 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 amoxycyclavulnic acid in 20 isolates (41.6%) and amikacin in seventeen (35.4%) isolates. **Conclusion:** The correlation between throat swab culture and McIsaac 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, McIsaac 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} 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, soft palate petechiae, tonsillar crypts containing necrotic or purulent exudates, cervical lymphadenopathy are more suggestive of bacterial infection.⁴ 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.⁷ The present study was conducted to correlate the throat swab culture with Mclsaac 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 Mclsaac 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. amoxycillinclavulnic 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 Mclssac score and the GABHS. The Significance between Mclssac score and GABHS was calculated by using chisquare test.

Criteria Points	
Temperature > 38°C	1
No cough	1
Tender anterior cervical adenopathy	1
Tonsillar swelling or exudates	1
Age 3–14 y	1
Age 15–44 y	0
Age ≥ 45 y	-1

Table I: Mclsaac Score

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.

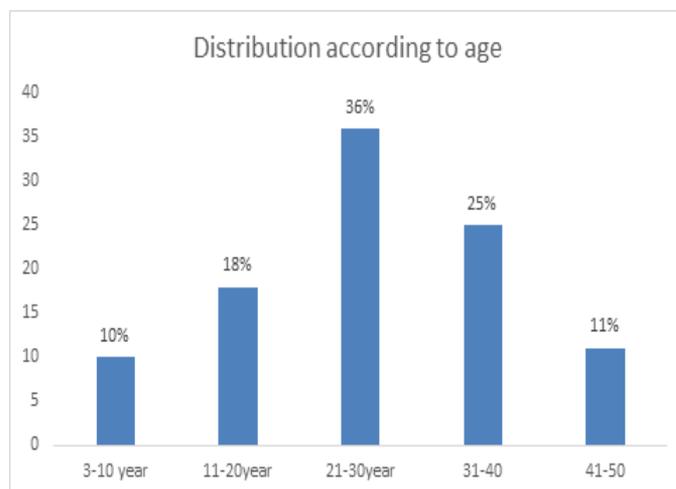


Figure 1: Age distribution

Serial No	Organism	Frequency	Percentage
1	GABHS	48	48
2	No isolates	25	25
3	Pseudomonas	10	10
4	Enterococcus	9	9
5	Klebsiella	8	8
Total		100	100

Table II: Organisms isolated

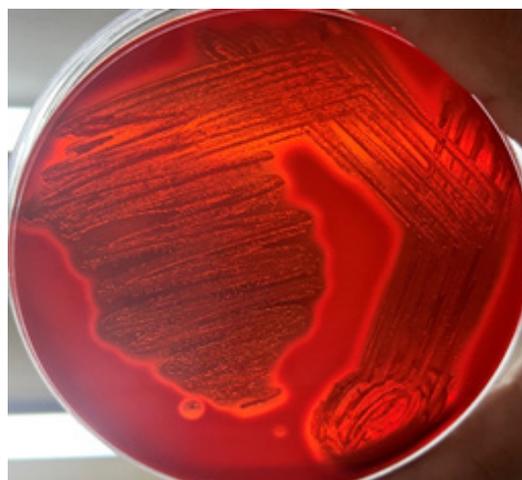


Figure 2: Growth of GABHS in blood agar media

When the Mclssac 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.

Mclssac Score	GABHS						Chi Square	
	Positive		Negative		Total		Value	significant
	N	%	N	%	N	%		
1	2	4.2	19	36.5	21	21	20.645	0.0003
2	12	25	15	28.8	27	27		
3	18	37.5	6	11.5	24	24		
4	9	18.8	6	11.5	15	15		
5	7	14.6	6	11.5	13	13		
Total	48	100	52	100	100	100		

Table III: Association of GABHS with Mclsaac score

Antibiotics	GABHS (N=48)			Pseudomonas (N=10)			Enterococcus (N=9)			Klebsiella (N=8)		
	S	I	R	S	I	R	S	I	R	S	I	R
Ceftriaxone	25	10	13	4	3	3	4	-	5	5	3	-
Cefixime	11	19	18	1	5	4	5	2	2	4	4	-
Amoxy-Clavulanic acid	20	16	12	2	6	2	6	-	3	2	3	3
Ciprofloxacin	8	5	35	6	2	2	4	2	3	3	2	3
Amikacin	17	15	16	3	4	3	3	-	6	5	2	1
Doxycycline	10	25	13	4	2	4	3	2	4	4	2	2
Azithromycin	12	19	17	-	4	6	-	-	-	-	5	3
Gentamicin	15	18	15	-	-	-	4	2	3	-	3	5
Levofloxacin	13	19	16	4	1	5	5	1	3	1	7	-
Vancomycin	9	39	-	-	-	-	5	2	2	-	-	-
Roxithromycin	10	38	-	-	-	-	-	-	-	3	3	2

S=Sensitive I=Intermediate R=Resistant

Table IV: Antibiotic sensitivity pattern

DISCUSSION

Sore throat swab cultures may not be the optimum diagnostic tool for GABHS infections because the accuracy of culture results is affected by several factors. Variations in collection, transportation, and culture methods are some of these factors.^{8,9,10} The incidence of acuteton sillitis was found to vary differently in various population. In the study done by MS Vijayshree et al¹ maximum tonsillitis cases were observed in the preteen age group (6-12 years) with 61% followed by teen age groups (12-18 years) 20%, children (4-5 years) 10% and the least incidence of 9% in youth (19-30 years) but our study showed that maximum number of tonsillitis occurred in age group of 21-30 year (36%) followed by 31-40 years (25%).

In the study done by P.T. Wakode et al¹¹ the predominant pathogenic organism grown was coagulase positive staphylococcus in 77 cases out of 305 reports and GABHS in 32 cases. This is in contradiction to the our study as GABHS was found to be the most common pathogen followed by Pseudomonas (10%), Enterococcus 9%) and Klebsiella(8%) associated with tonsilitis which was similar to study done by MS vijayshree et al¹ which showed the occurrence of

predominant bacteria GABHS in 51.4%, followed by coagulase positive Staphylococci (12.5%) and Pneumococci (9.7%) and only one case of presence of Corynebacterium diphtheria was observed. It has been seen that gram-positive bacteria are more commonly isolated because they are the normal colonisers of skin and other oral cavities.

In this study GABHS was sensitive to ceftriaxone and amoxycillin clavulanic acid, Pseudomonas was sensitive to ciprofloxacin,ceftriaxone and amikacin and Enterococcus sensitive to amoxy-clavulanic acid, vancomycin and levofloxacin while study done by Wakode PT et al¹¹ showed streptococcus sensitive to gentamicin and cefotaxime, Pseudomonas to ciprofloxacin like the present study, Klebsiella to norfloxacin.

In the study done by ZeynepYilmaz Ozturun et al¹², the Centor/Mclsaac 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 Mclssac score more will be the chance of positive GABHS in culture. Similar to this study, Stefaniuk et al¹³ stated that GABHS positive throat culture was present in 48% of those with a Centor/Mclsaac score of 3, and in 50% of those with a Centor/Mclsaac score of 4 or 5. There was a strong correlation between the results of positive throat culture and Centor/Mclsaac 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 Mclssac 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 help to increase the value and reliability of Mclsaac score in the early diagnosis of GABHS.

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