

PREVALENCE STUDY OF ACUTE TONSILLITIS AMONG PAEDIATRICS AGE GROUPS

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ABSTRACT Tonsils and adenoids are the body's first line of defence at the oropharyngeal pathway. They "sample" bacteria and viruses that enter the body through the mouth or nose. Tonsillitis is the inflammation of tonsils; a common clinical condition often encountered in Pediatrics and E.N.T. practice. The management of this condition is often empirical with the choice of antibiotics not based on any culture reports. The increasing incidence of resistance in many organisms is due to β -lactamase production and resistance transfer factors that lead to unsuccessful medical therapy which results in recurrent or chronic forms of tonsillitis.

The present study was conducted to identify the prevalent bacterial pathogens and their antibiotic sensitivity that would indicate the optimum line of treatment and prevent the complications of acute tonsillitis and avoids unnecessary surgical treatment. Study Design: The clinical and laboratory (culture and sensitivity) study on acute tonsillitis was carried in the family medicine, pediatric and ENT outpatient clinic of Al-Raed Health Center in Riyadh K.S.A., The laboratory studies were carried out in the Department of Microbiology. One hundred cases of acute tonsillitis were selected 58 males and 42 females aged from 4-18 years at random from the patients attending the outpatient Department of family medicine, paediatrics and ENT during a period of one year from July 2017 to August 2018; each selected case has been studied as per the standard procedures. The chosen patients were not given antibiotics for one week before the study.

KEYWORDS Acute tonsillitis, acute follicular tonsillitis, acute membranous tonsillitis, tonsillectomy, intracapsular, extracapsular, antibiotics

Introduction

Tonsillitis is inflammation of tonsils, a common clinical condition caused by either bacteria or viral infection [1], [9]. It affects a significant percentage of the population more so in children [1]. The condition can occur occasionally or recur frequently. Visible white streaks of pus characterise acute tonsillitis on tonsils, and the surface of the tonsils may become bright red colour [2], [8]. The bacterial tonsillitis is caused mainly by β -haemolytic Streptococcus, called strep throat and to a lesser extent

by Staphylococcus aureus and several other bacteria [3],[7]. The more common symptoms of tonsils are a sore throat, red swollen tonsils, pain when swallowing, fever, cough, headache, tiredness, chills, swollen lymph nodes in the neck and pain in the ears or neck and the less common symptoms include nausea, stomach ache, vomiting, furry tongue, bad breath, and change in voice and difficulty in opening of mouth [3],[4].

The present study was conducted to identify the prevalent acute tonsillitis, bacterial pathogens and their antibiotics sensitivity that would indicate the optimum line of treatment and prevent the complications of acute tonsillitis and avoids unnecessary surgical treatment [5], [6].

Materials and Methods

Ethical approval was obtained from the local research ethics committee of Al-Raed Health Center, and parents of all children gave informed written consent before the study. Clinical and laboratory study for all patients in the form of age and sex of

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Table 1 Showing age distribution of patients

Sl. No.	Age Group	No. of cases	Percentage
1	4-5 years	17	17
2	6-12 years	69	69
3	13-18 years	18	18

Table 2 Showing socioeconomic status of patients

Sl.No.	Income	No. of cases	Percentage
1	Low income group	66	66
2	Middle income group	34	34
3	Hi income group	07	07

everyone at present, The clinical and laboratory (culture and sensitivity) study on acute tonsillitis was carried in the family medicine, pediatric and ENT outpatient clinic of Al-Raed Health Center in Riyadh K.S.A., The laboratory studies were carried out in the Department of Microbiology.

One hundred cases of acute tonsillitis were selected 58 males and 42 females aged from 4-18 years at random from the patients attending the outpatient Department of family medicine, paediatrics and ENT during a period of one year from July 2017 to August 2018; each selected case has been studied as per the standard procedures. The chosen patients were not given antibiotics for one week before the study.

Specimens, one from the tonsillar surface and another from the cryptamagna were collected by using sterile cotton swabs, placed in sterile bottles aseptically, brought to the laboratory and subjected for direct microscopic examination of the pathogens followed by the isolation of the causal agents on different media viz., sheep blood agar, chocolate agar, Mc Conkey agar etc. The antibiotic sensitivity tests were done for all the isolated organisms. Antibiotics discs viz. penicillin, erythromycin, ampicillin, gentamycin, chloramphenicol, ciprofloxacin, cephalexin, cefotaxime, cefotaxime and amikacin were placed individually for all the isolates, and the inhibition pattern was noted. After administering the antibiotics to patients as a remedy to treat tonsillitis, and after the complete cure, patients were followed up for six months or more to observe any recurrence tonsillitis. The data collected were analyzed concerning age, sex, occupation, socioeconomic status, clinical manifestations and bacteriological results.

Results

Table 1 shown the occurrence of acute tonsillitis concerning population distribution was found to vary differently. Among the reported age groups, maximum tonsillitis cases were observed in the preteen age group (6-12 years) with 69% followed by teenage groups (13-18 years) 18%, children (4-5 years) 17%.

Table 2 shows the distribution of tonsillitis was more in males patients (58%) compared to female patients (42%). As for as socioeconomic condition concerned, 66% of cases were observed in a low-income group, 34% in middle-income group and the lowest occurrence of 7% in a high-income group.

Table 3 shown the incidence of the disease about different occupations, it was noted that 73% of the patients, maximum cases

Table 3 Showing the occupational distribution of patients

Sl. No.	Sex	No. of cases	Percentage
1	Students	73	73
2	Homemakers	14	14
3	Labourers	06	06
4	Preschool children	09	09

Table 4 Showing symptoms of patients

Sl. No.	Age Group	Percentage
1	A sore throat	100
2	Fever	74
3	Odynophagia	33
4	Constitutional symptoms	46

belonged to the student group, 14% homemakers, 6% labourers and 9% preschool children.

Table 4 shown the occurrence of symptoms indicated that a sore throat was observed in all the patients, fever in 74%, odynophagia in 33% and constitutional symptoms in 46% of the patients.

In Table 5 it was also observed that 61% of the patients exhibited acute parenchymatous tonsillitis signs, 39% acute follicular signs and only 2% of the patients had acute membranous tonsillitis. The palpable tender digastrics lymph node was observed in 69% of the cases studied.

Table 6 shown the bacteriological study of the throat swabs showed that 74% of the cases had pathogens, 12% had commensals, and however, no growth of bacteria was observed in 20% of the samples even after 48 h incubation on culture media. Among the bacteria isolated, 84.7% belonged to Gram-positive group, and only 15.3% belonged to Gram-negative group.

In Table 7 the culture and sensitivity studies indicated the occurrence of predominant bacteria β - haemolytic Streptococci (51.4%), followed by coagulase positive Staphylococci (12.5%) and Pneumococci (9.7%) and only one case of presence of Corynebacterium diphtheria was observed. Concerning monobacterial and polybacterial infections, it was observed that monobacterial infections caused 76.4% of acute tonsillitis as against polybacterial infections of 23.6%. Where both Coagulase positive Staphylococci and Pneumococci were observed in 8.3% cases, and Klebsiella and Streptococcus pyogenes were observed in 6.9% cases, and Pseudomonas sp was found to cause tonsillar infection along with Klebsiella in two cases.

Table 5 Showing signs of patients

Sl. No.	Age Group	Percentage
1	Acute parenchymatous	61
2	Acute follicular	39
3	Acute membranous	02
4	Palpable tender lymph node	69

Table 6 Showing bacterial pathogens isolated from patients

Sl. No.	Bacteria isolated	No. of cases	Percentage
1	Pathogens	74	74
2	Commensals	12	12
3	No growth	20	20
4	Gram +ve bacteria	61	84.7
5	Gram -ve bacteria	11	15.3

Table 7 Showing details of bacteria isolated from tonsillitis infected persons

Sl.No.	Bacteria isolated	No.of cases	Percentage
1	Pneumococci	7	7.91
2	β -hemolytic Streptococci	37	51.42
3	Coagulase +ve Staphylococci	9	12.51
4	Klebsiella & Streptococcus pyogens	5	6.92
5	Haemophilus influenza	2	2.81
6	Coagulase +ve Staphylococci & Pnemococci	6	8.30
7	Pseudomonas & Klebsiella	2	2.81
8	Pnemococci & α -haemolytic Streptococci	3	4.22
9	Corynebacterium diphtheria	1	1.31

Table 8 shown sensitivity of isolated bacteria to different antibiotics and chemotherapeutic drugs indicated that Gram-positive bacteria were more susceptible to antibiotics than Gram-negative bacteria. Majority of the isolates were susceptible to antibiotics penicillin, erythromycin, ampicillin, gentamycin, chloramphenicol, ciprofloxacin, cephalixin, cefotaxime, cefotaxime and amikacin. Drug resistance was observed for 3 of the 9 coagulase positive Staphylococci.

Follow up of the patients treated for tonsillitis showed that the disease was recurred in 70.30% of the cases and not recurred in 27.60% of the patients. 4.21% of the patients developed a peritonsillar abscess, and they were treated with incision and drainage antibiotics (table 9).

Discussion

The occurrence of acute tonsillitis concerning population distribution was found to vary differently. Among the reported age groups, maximum tonsillitis cases were observed in the preteen age group (6-12 years) with 61% followed by teenage groups (12-18 years) 20%, children (4-5 years) 10%. Similar observations were reported by (Middleton et al.) [10] for the age group of 6-12 years. The distribution of tonsillitis was more in male patients (55%) compared to female patients (45%) probably because some patients admitted were more than female patients. As for as so-

cioeconomic condition concerned, 61% of cases were observed in a low-income group, 35% in middle-income group and the lowest occurrence of 4% in a high-income group. The most upper cases reported for the low-income group is perhaps due to their poverty, poor nourishment, unhygienic condition, illiteracy and improper medical care. The incidence of the disease about different occupations, it was noted that 70% of the patients, maximum cases belonged to the student group, 15% homemakers, 8% labourers and 4% preschool children. The reasons for such high incidence in school children may be due to low immunity in the children, cross infection because of overcrowded classrooms and poor ventilation of the classrooms.

The occurrence of symptoms indicated that a sore throat was observed in all the patients, fever in 73%, and odynophagia in 36% and constitutional symptoms in 45% of the patients. Evans and Dick2 reported similar observations for a sore throat and fever. It was also observed that 59% of the patients exhibited acute parenchymatous tonsillitis signs, 40% acute follicular signs and only one per cent of the patients had acute membranous tonsillitis. The palpable tender digastrics lymph node was observed in 70% of the cases studied. These observations are comparable to the findings of (Veltri et al.) [12].

The bacteriological study of the throat swabs showed that 74% of the cases had pathogens, 12% had commensals and however, no growth of bacteria was observed in 20% of the samples even after 48 h incubation on culture media. The reason for no growth is perhaps the patients would have administered the antibiotics before diagnosis or the tonsillitis was caused by a virus which was not isolated in the study. Among the bacteria isolated, 84.7% belonged to Gram-positive group, and only 15.3% belonged to Gram-negative group. As the gram-positive bacteria are the normal colonisers of skin and other oral cavities, their number is probably found more than gram-negative bacteria.

The bacteriological studies indicated the occurrence of predominant bacteria β - hemolytic Streptococci (51.4%), followed by coagulase positive Staphylococci (12.5%) and Pneumococci (9.7%) and only one case of presence of Corynebacterium diphtheria was observed. These observations are in line with the earlier reported works of (Surov et al.) [13]. Concerning monobacterial and polybacterial infections, it was observed that monobacterial infections caused 76.4% of acute tonsillitis as against polybacterial infections of 23.6%. Where both Coagulase positive Staphylococci and Pneumococci were observed in 8.3% cases, and Klebsiella and Streptococcus pyogens were observed in 6.9% cases, and Pseudomonas sp was found to cause tonsillar infection along with Klebsiella in two cases. Acute tonsillitis due to poly bacterial infection was reported by (Brook et al.) [14].

The sensitivity of isolated bacteria to different antibiotics and chemotherapeutic drugs indicated that Gram-positive bacteria were more susceptible to antibiotics than Gram-negative bacteria. Majority of the isolates were susceptible to antibiotics penicillin, erythromycin, ampicillin, gentamycin, chloramphenicol, ciprofloxacin, cephalixin, cefotaxime, cefotaxime and amikacin. (Krober et al.) [15]. had shown penicillin to be the most effective antibiotic to treat tonsillitis caused by bacteria. Drug resistance was observed for 3 of the 9 coagulase positive Staphylococci. The increasing incidence of drug resistance in many bacteria could be due to β - lactamase production by the bacteria that cleave the activity of antibiotics and resistance transfer factors that could have taken up by the susceptible strains during the recombination process.

Table 8 Showing antibiotic sensitivity assay of bacterial isolates

1	β -hemolytic Streptococci(37)	37	34	36	7	33	16	33	36	33	32	-
2	Coagulase + ve Staphylococci (9)	8	5	7	4	7	7	5	5	7	5	3
3	Pneumococci (7)	7	6	7	2	7	4	6	7	7	3	-
4	Haemophilus influenza (2)	3	r	3	3	r	r	3	3	2	3	-
5	Coagulase + ve Staphylococci & Pneumococci (6)	4	4	4	3	4	3	5	5	5	3	-
6	Klebsiella & Streptococcus pyogens (5)	r	2	1	3	r	5	4	6	6	7	-
7	Pseudomonas & Klebsiella (2)	2	1	r	r	1	2	r	2	1	r	R
8	Pneumococci & α -haemolytic Streptococci (3)	4	2	3	2	3	3	3	3	4	2	-
9	Corynebacterium diphtheria (1)	0	0	1	1	0	1	2	1	1	1	-
Sl. No	Bacteria isolates (72)	P	E	A	G	c	c	c	c	c	a	D
		e	r	m	e	h	i	e	e	e	m	r
		n	y	p	n	l	p	e	e	e	i	u
		i	r	i	a	o	r	p	p	f	o	g
		c	o	i	m	r	o	h	h	o	t	r
		l	m	l	p	a	f	a	a	t	t	e
		i	y	l	h	l	l	e	x	x	x	s
		n	i	i	e	x	x	i	i	i	c	i
		n	n	n	n	a	i	m	m	n	i	t
						c	n	e	e		n	a
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	Acute tonsillitis	Sensitivity to antibiotics										

Follow up of the patients treated for tonsillitis showed that the disease was recurred in 70.3% of the cases and not recurred in 27.6% of the patients. 4.21% of the patients developed a peritonsillar abscess, and they were treated with incision and drainage antibiotics. (Stafford et al.) [16] have observed the recurrence of acute tonsillitis.

Table 9 Showing post clinical status after the treatment of patients

Sl. No.	Results	No. of cases	Percentage
1	Recurrence	66	70.30
2	No recurrence	26	27.60
3	Peri tonsillar abscesses	04	4.21

Conclusion

The present study conducted to identify the prevalent of acute tonsillitis, bacterial pathogens and their antibiotic sensitivity on patients of acute tonsillitis indicated that the bacterial infection is more prevalent in the age group of 6-12 years and it is more so with poor section of the society. Again it was observed that β -hemolytic Streptococci to be the most predominant bacteria followed by co-agulase positive Staphylococci and Pneumococci bacteria responsible for tonsillitis infection and presence of Corynebacterium diphtheria was observed in one of the patients among the hundred patients subjected for the evaluation.

The penicillin was found to be the effective drug to cure acute tonsillitis besides other antibiotics like ampicillin, cephalexin and cephalexime, however, acute tonsillitis was found to recur 70.30% of the treated patients.

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Competing Interests

The authors declare no conflict of interest.

References

1. Berkowitz RG, Mahadevan M. Unilateral tonsillar enlargement and tonsillar lymphoma in children. *Ann Otol Rhinol Laryngol.* 1999 Sep;108(9):876–879.
2. Borschmann ME, Berkowitz RG. One-off streptococcal serologic testing in young children with recurrent tonsillitis. *Ann Otol Rhinol Laryngol.* 2006 May;115(5):357–360.
3. Brandtzaeg P. Immune functions of nasopharyngeal lymphoid tissue. *Adv Otorhinolaryngol.* 2011;72:20–24.
4. Brook I, Foote PA., Jr Comparison of the microbiology of recurrent tonsillitis between children and adults. *Laryngoscope.* 1986 Dec;96(12):1385–1388.
5. Chan CC, Chan YY, Tanweer F. Systematic review and meta-analysis of the use of tranexamic acid in tonsillectomy. *Eur Arch Otorhinolaryngol.* 2013 Feb;270(2):735–748.
6. Chiappini E, Principi N, Mansi N, Serra A, De Masi S, Camaioni A, Esposito S, Felisati G, Galli L, Landi M, Speciale AM, Bonsignori F, Marchisio P, de Martino M Italian Panel on the Management of Pharyngitis in Children. Management of acute pharyngitis in children: summary of the Italian National Institute of Health guidelines. *Clin Ther.* 2012 Jun;34(6):1442–1458.
7. Chiappini E, Regoli M, Bonsignori F, Sollai S, Parretti A, Galli L, de Martino M. Analysis of different recommendations from international guidelines for the management of acute pharyngitis in adults and children. *Clin Ther.* 2011 Jan;33(1):48–58.
8. Cingi C, Songu M, Ural A, Yildirim M, Erdogmus N, Bal C. Effects of chlorhexidine/benzylamine mouth spray on pain and quality of life in acute viral pharyngitis: a prospective, randomized, double-blind, placebo-controlled, multicenter study. *Ear Nose Throat J.* 2010 Nov;89(11):546–549.
9. Cohen JI, Mocarski ES, Raab-Traub N, Corey L, Nabel GJ. The need and challenges for development of an Epstein-Barr virus vaccine. *Vaccine.* 2013 Apr;31 Suppl 2: B194–B196.
10. Middleton DB, D'Amico F, Merenstein JH. Standardized symptomatic treatment vs penicillin as initial therapy Streptococcal pharyngitis. *J. Pediatrics* 1988; 113(6): 1089-1094.
11. Evans AS, Dick EC. Acute pharyngitis and tonsillitis in University of Wisconsin students. *JAMA* 1964; 190 (8): 699-708.
12. Veltry, RW, Sprinkle, PM, Mc Clugg JE. Epstein- Barr Virus associated with episodes of recurrent tonsillitis. *Arch. Otolaryngol* 1975; 101(9): 552-556.
13. Surrow, JB, Handler SD, Telian SA, Fleisher GR, Baranak CC. Bacteriology of tonsil surface and core in children. *Laryngoscope* 1989; 99: 261-266.
14. Brook I, Yocum P, Friedman EM. Aerobic and anaerobic bacteria in tonsils of children with recurrent tonsillitis. *Ann. Otol. Rhinol. Laryngol* 1981; 90: 261-263.
15. Krober MS, Bass JW, Michels GN. Streptococcal pharyngitis-placebo controlled double blind evaluation of clinical response to penicillin therapy. *JAMA.*1985; 253(9): 1271-1274.
16. Stafford N, VonHaacke N, Sene A, Croft C. 1986: The treatment of recurrent tonsillitis in adults. *J. Laryngol. Otol* 1986; 100 (2): 175-177.
17. Fact Sheet: Tonsillitis. [up-dated 2011 Jan; cited 2013 Jun 13]. Available from : <http://www.entnet.org/HealthInformation/tonsillitis.cfm>
18. Tonsillitis. [cited 2013 Jun 13]. Available from: http://chealth.canoe.ca/channel_condition_info_details.asp?disease_id=210&channel_id=1020&relation_id=71085
19. ENT world – Diseases of the Ear, Nose and Throat. [Updated 2010 Dec 28; cited 2013 Jun 13]. Available from: <http://earnosethroatclinic.blogspot.in/2010/12/chronic-tonsillitis-causes-types-signs.html>
20. Bansal M. Diseases of Ear, Nose and Throat. 1st ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd; 2013. p 427.
21. Bansal M. Diseases of Ear, Nose and Throat. 1st ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd; 2013. P 428.