

Peritonsillar Abscess: Clinico-bacteriological Profile and its Management

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Abstract

Background: Peritonsillar abscess requires early identification and its management is very crucial. This study was conducted with the aim that presentation of this disease process will be better understood along with the microbiological study of the causative organisms so that better and more targeted use of anti-microbials can be put into place and also curative way of this disease can be identified.

Objectives: To assess the clinico - bacteriological profile and the management modalities of peritonsillar abscess.

Materials and Methods: A cross-sectional study was conducted in the Department of Otorhinolaryngology in collaboration with the Department of Microbiology, Regional Institute of Medical Sciences, Imphal, Manipur for a period of 2 years from September 2018 to October 2020. 90 patients with peritonsillar abscess were enrolled in the study. The clinico -bacteriological profile of peritonsillar abscess and different aspects of its management features were studied.

Results: Most of the patients were in the 4-5th decade of life with an overall female preponderance. The most common presenting complaint was throat pain and the common clinical finding was congestion and bulging of the soft palate. The majority of the patients had the first episode of peritonsillar abscess. The most common gram positive organism isolated was *Streptococcus pyogenes* and was more sensitive to linezolid and least sensitive to amoxicillin. The most common gram negative organism isolated was *Klebsiella pneumonia* which was most sensitive to imipenem and least sensitive to amikacin. All the patients were treated with medical treatment and the majority of the patients underwent incision and drainage.

Conclusion: *Streptococcus pyogenes* and *Staphylococcus aureus* were more commonly associated with peritonsillar abscess. Although incision and drainage or aspiration by needle along with antibiotic therapy helped in the immediate relief of symptoms, the curative method of treatment is interval tonsillectomy.

Keywords: Peritonsillar Abscess; Antibiotic Sensitivity; Interval Tonsillectomy; Microbiology of Peritonsillar Abscess

Introduction

Peritonsillar abscess or quinsy is a collection of pus between the fibrous capsule of the tonsil and the superior constrictor muscle. It usually arises as a complication of tonsillitis, but also de novo in the absence of a history of previous recurrent acute tonsillitis. It may happen at any age but the majority is in young adults between 20 and 39 years of age [1]. *Streptococcus pyogenes* and *Staphylococcus aureus* are most commonly associated with Peritonsillar abscess. Other micro-organisms isolated Haemophilus influenza, Pseudomonas aeruginosa, Escherichia coli and some anaerobic groups like Prevotella, Porphyromonas, Peptostreptococcus species [2].

Peritonsillar abscess can be diagnosed through history and physical examination. Patients often present with peritonsillar cellulitis with the potential to progress to abscess formation. In peritonsillar cellulitis, the area between the tonsil and its capsule is edematous and erythematous, but pus is not formed. Transcutaneous or intraoral ultrasonography also can be helpful in identifying an abscess and in distinguishing peritonsillar abscess from peritonsillar cellulitis [1]. X-ray soft tissue neck lateral view can demonstrate any features of airway obstruction. In complicated cases like extending beyond the peritonsillar space or involving lateral neck spaces, computed tomography (CT) or magnetic resonance imaging (MRI) is indicated [3].

The surgical drainage provides quick relief to the patient and help in better identification of the causative organisms. After drainage of the pus, the patient often requires hospitalization because of a lack of food intake. Antibiotic coverage is needed intravenously to prevent the progression of the disease and further complications. The most common empirical antibiotics given are cephalosporin, penicillin, metronidazole, and co-amoxiclav [4].

The complications of peritonsillar abscess are para pharyngeal abscess (PPA), Ludwig’s angina, upper airway obstruction, Lemierre’s syndrome, necrotizing fasciitis, mediastinitis, erosion of the internal carotid artery, brain abscess, and Streptococcal toxic shock syndrome [5].

To achieve better improvement of peritonsillar abscess needs to be treated immediately and cannot wait for the culture and sensitivity report. Hence, it is important to know which organisms

are most commonly isolated from the cases of peritonsillar abscess and their antibiotic sensitivity.

Materials and Methods

A cross-sectional study was conducted in the Department of Otorhinolaryngology in collaboration with the Department of Microbiology, Regional Institute of Medical Sciences, Imphal, Manipur, India for a period of 2 years from September 2018 to October 2020 after obtaining approval from Institutional Ethics Committee.

A total of 90 patients diagnosed with Peritonsillar abscess who attended the Department of Otorhinolaryngology and were willing to participate in the study were included. Patients having acute tonsillitis without features of peritonsillar abscess were excluded from the study. Detailed history, clinical examination, radiological imaging, throat swab and pus for culture and sensitivity were done. The data obtained were analysed using SPSS software version 21.0 (IBM Corp., Armonk, NY, USA).

Results

In the present study, out of 90 patients, 52 were male while 38 were female which translates into 57.8% males and 42.2% as females with an M: F ratio of 1.4: 1.

The most common presenting complaint of the patients was pain in the throat 90 (100%), followed by difficulty in mouth opening 78 (86.6%), and the least common complaint was swelling in the neck 22 (24.4%).

The most common finding was soft palate bulge and congestion in 90 (100%) and least common finding was the presence of a pus point in 25 (27.7%) (Table 1).

Clinical findings	Frequency	Percentage #
Palatal bulge and congestion	90	100
Uvula pushed to opposite side	82	91.1
Trismus	75	83.3
Fever (temp.> 101 degree F)	40	44.4
Enlarged jugulodigastric node	35	38.8
Pus point	25	27.7

Table 1: Clinical findings in study participants (N = 90).

- Multiple clinical signs were cited.

32 (35.6%) had co-morbidities and the most common was diabetes mellitus 13 (14.4%) and the least common co-morbidity present was cardiac disease 3 (3.3%), the majority were experiencing the first episode of the disease (65.6%) while the rest (34.4%) had a prior episode.

A maximum of 48 (53.3%) patients were affected by Chronic tonsillitis for less than 2 years while a minimum of 10 (11.1%) were had the attack for more than 5 years.

Among 90 patients, 44 (48.9%) had taken antimicrobial drugs either at home or in the peripheral hospitals, while the rest 46 (51.1%) did not take any medications.

Bacterial growth was detected in 55 (61.1%) patients while 35 (38.9%) showed no growth. Gram staining was positive in 47 (52.2%) and negative in 8 (8.9%) patients. Among gram positive organisms, the maximum organism found was *Streptococcus pyogenes* in 26 (28.9%) patients, and the least common was *Streptococcus viridans* in 7 (7.8%). Whereas, among gram negative organisms, most common was *Klebsiella pneumonia* 8 (8.9%), and the least common was pseudomonas aeruginosa 2 (2.2%) patients (Table 2).

Type of organism	Name of organism	Frequency	Percentage
No growth	-	35	38.9
Gram positive	<i>Streptococcus pyogenes</i>	26	28.9
	<i>Staphylococcus aureus</i>	12	13.3
	<i>Streptococcus viridians</i>	7	7.8
Gram negative	<i>Klebsiella pneumonia</i>	8	8.9
	<i>Pseudomonas aeruginosa</i>	2	2.2

Table 2: Bacteriological findings in study participants (N = 90).

Most gram positive isolates became resistant to ceftriaxone, cefixitin, amoxicillin. Among the gram positive organisms, *Streptococcus pyogenes* was found to be most sensitive to linezolid 26 (100%) and least sensitive to amoxicillin 3 (11.5%). *Staphylococcus aureus* was found to be most sensitive to linezolid 14 (100%) and least sensitive to ceftriaxone 2 (14.3%). And *Streptococcus viridans* were found to be most sensitive to linezolid 7 (100%) and least sensitive to clindamycin 1 (21.4%) and cefoxitin 1 (21.4%) (Table 3).

Antibiotics	<i>Streptococcus pyogenes</i> , n = 26 (%)	<i>Staphylococcus aureus</i> , n = 14 (%)	<i>Streptococcus viridans</i> , n = 7(%)
Linezolid	26 (100%)	14 (100%)	7 (100%)
Vancomycin	26 (100%)	14 (100%)	7 (100%)
Clindamycin	12 (46.2%)	4 (28.6%)	1 (21.4%)
Erythromycin	10 (38.4%)	3 (21.4%)	2 (28.6%)
Cefixitin	6 (23.0%)	3 (21.4%)	1 (21.4%)
Ceftriaxone	5 (19.2%)	2 (14.3%)	0
Amoxicillin	3 (11.5%)	0	0
Cotrimazole	0	0	0
Ciprofloxacin	0	0	0
Gentamicin	0	0	0
Amikacin	0	0	0

Table 3: Antibiotic sensitivity of gram positive organisms (N = 47).

In the gram negative category, *Klebsiella pneumonia* species was found to be most sensitive to imipenem 8 (100%) and least sensitive to amikacin 1 (12.5%). *Pseudomonas aeruginosa* was

found to be most sensitive to imipenem 2 (100%) and least sensitive to amikacin 1 (50%) (Table 4).

Antibiotics	<i>Klebsiella pneumonia</i> , n = 8 (%)	<i>Pseudomonas aeruginosa</i> , n = 2 (%)
Imipinem	8 (100%)	2 (100%)
Colistin	8 (100%)	2 (100%)
Piperacillin-Tazobactum	3 (37.5 %)	0
Gentamicin	2 (25.0%)	0
Amikacin	1 (12.5%)	1 (50%)
Cotrimazole	0	0
Ciprofloxacin	0	0
Ceftazidime	0	0
Ceftriaxone	0	0

Table 4: Antibiotic sensitivity of gram negative organism (N = 10).

Medical treatment was given to all 90 (100%) patients, incision and drainage were given to 56 (62.2%) where a prominent bulge of the soft palate was present without features of visible drainage, needle aspiration was given to 34 (37.8%) where visible drainage from the abscess site present. Recurrence was more observed among patients who underwent aspiration than incision and drainage. Out of 90 patients, 10 (11.1%) had undergone interval tonsillectomy after 6 weeks of conservative treatment. Cure of symptoms was achieved in these 10 (11.1%) patients during 1 year follow-up period (Table 5).

Treatment approaches	Frequency	Percentage
Medical treatment	90	100.0
Incision and Drainage	56	62.2
Needle aspiration	34	37.8
Interval tonsillectomy	10	11.1

Table 5: Treatment approaches among study participants (N = 90).

Discussion

The present study consisted of 90 patients diagnosed with Peritonsillar abscess among patients attending the Otorhinolaryngology department.

In the present study, among 90 patients, the age range was from 7 to 48 years. The majority of the patients were in the age group of 21 to 30 years. Male to female ratio was 1.4: 1. Similar results were observed in studies conducted by Waheed AA, et al. [6] and Anwar

SC., et al. [7]. Comparing to the prevalence of peritonsillar abscess in the general population, the study population can be considered adequate for the duration. Male predominance can be explained by the fact that males tend to come to hospital more due to decreased quality of life especially during manual labour.

35.6% had comorbidities where diabetes mellitus (14.4%) being the most common followed by hypertension (13.4%) and cardiac disease being the least common (3.3%). While in study by Marom T, et al. [9], cardiac disease, asthma and diabetes were most common. Higher incidence of diabetes may be because of high prevalence of diabetes among general population of Manipur.

In our study, observation of the duration of chronic tonsillitis revealed that all patients were affected for a variable period; <2 years (53.3%), 2-5 years (35.6%) and > 5 years (11.10%). A history of prior episodes of the peritonsillar abscess was observed in 31 (34%). Findings are almost similar to studies done by Muhammad Ik., et al. [8] and Garcia FJ., et al. [10]. History of recurrent attacks of tonsillitis could be due to incomplete treatment in the first attack and inadequate precautions regarding further attacks.

Out of 90 patients, 44 (49%) patients had taken anti-microbial drugs either over-the-counter or in the peripheral hospitals, while the rest 46 (51%) did not take any medication. Findings almost correlated with the findings of Ryan S., et al. [4].

In our study, the most common presenting complaint of the patients was severe pain in the throat and inability to take food

(100%), followed by difficulty in mouth opening (86.6%). On clinical examination, all the patients consistently presented with soft palate bulge and congestion in all 90 (100%). Comparing with other studies, it can be suggested that the commonest symptoms associated is severe pain in the throat and subsequent inability to take food orally. Among the clinical signs, soft palate bulge and congestion, trismus, and uvular deviation are very much characteristic of the diagnosis.

Empirical anti-microbials used most frequently in our study were the combination of ceftriaxone- sulbactam and metronidazole, cefoperazone- sulbactam and metronidazole, amoxicillin-clavulanate and metronidazole, piperacillin- tazobactam, amikacin and gentamicin which are more or less similar to study findings conducted by Ryan S., *et al.* [4], Garcia FJ., *et al.* [10] and Repanos C., *et al.* [15].

In our study, observations in the microbiological examination revealed the presence of microorganisms in 55 (61.1%) patients and sterile pus in 35 (38.9%). Gram positive organisms were seen in 47 (52.2%); of which *Streptococcus pyogenes* was found in 26 (28.9%), *Staphylococcus aureus* was obtained in 12 (13.3%), and *Streptococcus viridans* in 7 (7.8%). Gram negative organisms constituted 10 (11.1%) of total patients, of which *Klebsiella pneumonia* was seen in 8 (8.9%) and *Pseudomonas aeruginosa* was seen in 2 (2.2%). Compared with the findings of other studies, our results can be considered good. After identifying the organism, culture sensitivity testing was done by disc diffusion technique and accordingly previous antibiotic administered was changed to sensitive antibiotic.

In our study, most of the gram positive organisms were resistant to ceftriaxone and cefixitin. But all gram positive organisms were sensitive to linezolid and vancomycin. *Streptococcus pyogenes* was most sensitive to linezolid and vancomycin 26 (100%), to clindamycin 12 (46.2%), to erythromycin 10 (38.4%), to cefoxitin 6 (23%), to ceftriaxone 5 (19.2%) and least sensitive to amoxicillin 3 (11.5%). *Staphylococcus aureus* was most sensitive to linezolid and vancomycin 12 (100%), to clindamycin 4 (28.6%), to cefoxitin and erythromycin 3 (21.4%), and least sensitive to amoxicillin 1 (21.4%). *Streptococcus viridans* were found most sensitive to linezolid and vancomycin 7 (100%), to erythromycin 2 (28.6%), and least sensitive to clindamycin and cefixitin (21.4%).

Among the gram negative organisms, *Klebsiella pneumonia* was most sensitive to imipenem and colistin 8 (100%), and least sensitive to amikacin 1 (12.5%). *Pseudomonas aeruginosa* was found most sensitive to imipenem and colistin 2 (100%) and least sensitive to amikacin 1 (50%). The findings in our study were not corresponding with the studies conducted by Waheed AA., *et al.* [6], Anwar SC., *et al.* [7], and Leigh JS., *et al.* [20]. The changing pattern of antibiotic sensitivity may be due to high resistance in amoxicillin, cefoxitin, ceftriaxone, clindamycin, erythromycin, gentamicin and amikacin. This resistance might be because of frequent intake of oral or intravenous antibiotics and taking in inadequate dosage.

Among 90 patients, medical treatment was given to all 90 (100%), incision and drainage was done in 56 (62.2%), needle aspiration was done in 34 (37.8%), and interval tonsillectomy was done in 10 (11.1%). Findings are similar to the studies conducted by Matsuda A., *et al.* [16], and Garcia FJ., *et al.* [10]. Less percentage of interval tonsillectomy in our study is because of loss of follow-up, fear of operations, and postoperative complications.

The limitations of the study were the loss of follow-up patients for tonsillectomy. In the present study, we observed that incision and drainage and needle aspiration could help immediate relief of pain in the throat. Antibiotic treatment can prevent the progression of the disease and further complications. According to the results of the study, we can conclude that interval tonsillectomy is the curative method of treatment.

Conclusion

Commonly isolated organisms were *Streptococcus pyogenes* and *Staphylococcus aureus* which were sensitive to linezolid and resistant to ceftriaxone. The treatment consists of intravenous antibiotic therapy with drainage of the abscess by incision was found to be efficacious in the relief of symptoms and rapid recovery from the peritonsillar abscess. However curative treatment of choice is interval tonsillectomy which is planned after 4 to 6 weeks of acute attack of Peritonsillar abscess.

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