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ORIGINAL RESEARCH

PERITONSILLAR ABSCESS (PTA) MANAGEMENT: A LITERATURE REVIEW COMPARING DIFFERENT APPROACHES OF PTA DRAINAGE

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ABSTRACT

Background: Peritonsillar abscess (PTA) is the most common deep infection of neck space that occurs in adults and is potentially life threatening if not treated appropriately. The surgical treatment of peritonsillar abscess that is not complicated with upper airway obstruction still remains controversial.

Objectives: This review attempts to explore the controverseries between different types of management and compare the efficacy of needle aspiration, tonsillectomy and/or incision and drainage.

Methodology: This study was done in King Abdulaziz University. All researches, between 1988 to 2015 were recruited and reviewed in this study.

Results and conclusion: Studying the three accepted methods of draining: incision and drainage, abscess tonsillectomy, or needle aspiration, Incision and drainage is an efficient and safe procedure to treat peritonsillar abscess. As well as it is superior to Needle aspiration in terms of the post-procedure pain score. It can be performed as the first-line treatment of peritonsillar abscess. Quinsy tonsillectomy can offer several advantages, by allowing full evacuation of the abscess cavity, effectively relieving symptoms, but holds risk in general anesthesia intubation. and also higher post-operative complication like Peritonsillar abscess make it not a favorable step.

KEY WORDS: Peritonsillar Abscess, Drainage, Incision, Tonsillectomy.

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INTRODUCTION

Review of Literature

Peritonsillar abscess (PTA)—also known as 'quinsy'—is a localized deep neck infection that develops between the tonsil and its capsule It is the endpoint of an infection that begins as acute tonsillitis, PTA may also originate from an infection in the dental area or minor salivary glands progressing to peritonsillar cellulitis, and develops into PTA at its later stage.

Peritonsillar abscess (PTA) is the most common deep infection of neck space that occurs in adults and is potentially life threatening if not treated appropriately. The infection can get complicated in rare cases and progress to airway obstruction, abscess rupture and asphyxia by aspiration of pus and necrosis resulting in septicemia or hemorrhage. The surgical treatment of peritonsillar abscess that is not complicated with upper airway obstruction still remains controversial.

To protect the body, a well-equipped defense mechanism is present in the skin and along many mucosal linings: the SALT (skin associated lymphoid tissue) and MALT (mucosa-associated lymphoid tissue), respectively [1].

According to the anatomical and physiological characteristics of the different mucosae, MALT can

further be specified into many sites, where the tonsils are a major components [2]. They consist of aggregations of lymphoid cells that are present in the mucosa of the nasopharynx (NALT), the oropharynx (GALT), and the laryngopharynx (LALT) [16]. As a result, all tonsils together form a ring of lymphoid tissue in the pharyngeal wall, called the "Waldeyer ring" [3]. Its location at the crossing of the digestive and respiratory tracts plays a key role in immunity as this is the site where vast amounts of foreign antigens enter the body during feeding and breathing [4]. Both right and left tonsils form part of the circumpharyngeal lymphoid ring [5].

Anteriorly and posteriorly, the tonsil is related to the palatoglossus and palatopharyngeus muscles, lying within their respective folds. A few fibers of the palatopharyngeus are found in the tonsil bed and are attached to the lower part of the capsule along with the fibers of the palatoglossus. Superiorly, the tonsil extends into the edge of the soft palate; inferiorly, the tonsillar capsule is firmly attached to the side of the tongue (fig 1) [6].

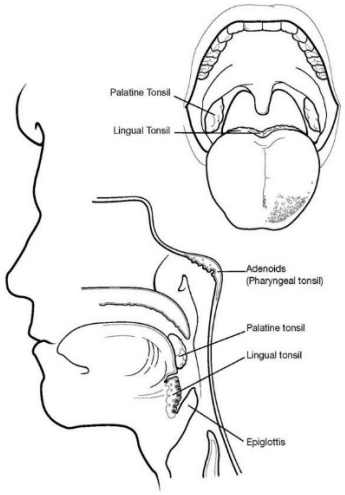

Fig 1: anatomy of tonsil (I)

Containing mostly CD4+ (helper) T-cells, the tonsils provide both primary and secondary T-cell responses. After stimulation by the T-cells in the extra follicular space, the immature B-cells colonies the follicles and differentiate into memory and plasma cells, producing various immunoglobulin subtypes [7].

The epithelial cells of tonsils also participate in producing antimicrobial peptides, human β-defensing, the natural antibiotics produced by the body [8]. Despite this important immunodefence task, tonsil removal has not been shown to affect general health [9].

Peritonsillar abscess can progress to airway obstruction, abscess rupture and asphyxia by aspiration of pus and necrosis resulting in septicemia or hemorrhage [10,11].

They are mainly situated in the region of the upper pole and involve the soft palate pushing the tonsils forwards and towards the midline but abscesses of the inferior and middle parts are also possible, infratonsillar abscesses remain rare [12].

Two hypotheses are currently described to explain the pathogenesis of PTA. The predominant theory states that PTA is a complication of AT [11]. However, this theory is without scientific literature that provides direct supporting evidence. The second is a hypothesis that has been slowly gathering more supporting evidence and highlights the association between damaged tissue and abscess development: the 'Weber gland hypotheses.

Recurrent episodes of AT and sore throat are commonly reported in PTA [13]. Marom et al. found that 79% of patients in their study reported a sore throat preceding the development of PTA fig 2. However, other studies have reported that up to 68% of patients with PTA have no preceding histories of tonsillitis or sore throat [13,14].

Considering the bacteriology, isolated bacteria commonly found in PTA are also found in the oropharynx of patients with AT and recurrent AT [13].

A further area of discrepancy concerns the modal peak of incidence groups with the highest diagnoses of AT and PTA. The incidence of PTA is highest from the mid-teens to 40 years old [14]. AT, on the other hand, has its highest incidence at ages 5–15 [15].

Ong et al [16] found no consistent seasonal correlation between the incidence of PTA and other upper respiratory tract infections. Passy [15] hypothesized that PTA results from damage to the salivary glands of the upper soft palate known as the Weber glands. These glands are proximal to the palatine tonsils and help to keep the peritonsillar niche and tonsil crypts clean.

Chen et al. [17] found that although the upper tonsils were smooth and healthy, there was inflammation and minor fibrosis of the adjacent Weber glands, where Passy [15] suggest that localized Weber gland infection or poor dental hygiene could lead to scarring and subsequent blockage of the gland or the draining duct. A reduction in the production of saliva could increase the chances of suppuration within the tonsillar crypts and oral scar tissue.

Saliva is also known to contain elements of the innate immune system that control the resident micro flora; a blockage could potentially result in fare up of opportunists [18]. Although this is a plausible theory, Dang et al performed a prospective cohort study that found correlation between salivary flow rate and PTA [19].

Studies from Sweden and Denmark showed the highest incidence rates to be among 14-21 year olds and 15-19 year [20]. J. T. Edinger et al mentioned that male to female ratio is about 100/63 (Figure 2) while some studies have shown clear male predominance, even up to ratios as high as 3:1 [21]. Some studies describe a slightly higher likelihood of the left side being affected however, PTA may also occur bilaterally, with the incidence of 0.8-4.9% [13]

Although basic strategy of treatment of peritonsillar abscess is consists of systemic antibiotics covering group A β-hemolytic streptococci which is reported to be the most common offending organism, it is suggested that poor response to antibiotics, progressively deteriorating clinical status or development of other complications, should always redirect the therapeutic plan towards the surgical management.

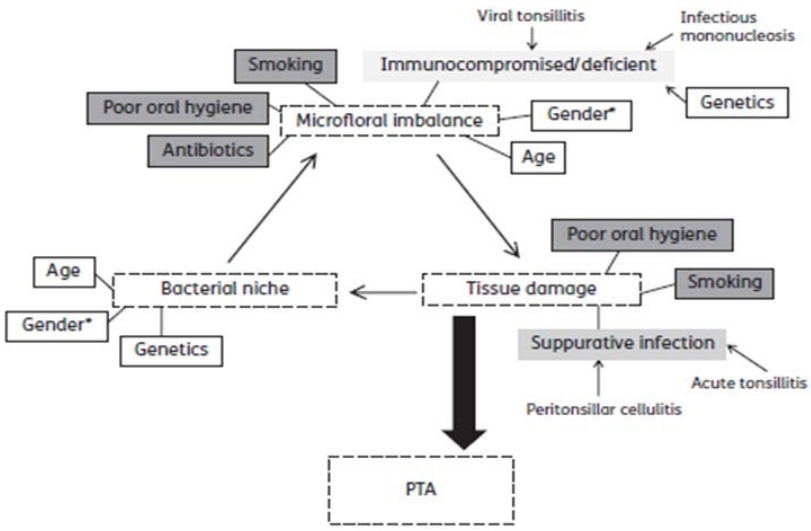

Figure 2: Summary of the effect of the interaction of host factors on the development of PTA. (II)

The surgical treatment of peritonsillar abscess that is not complicated with upper airway obstruction still remains controversial. There are three accepted methods of draining this infection: incision and drainage, abscess tonsillectomy, or needle aspiration.

Drainage of the pus from the abscess cavity can be accomplished via needle aspiration (sometimes ultrasound guided), incision-drainage, or immediate (quinsy) tonsillectomy [22]. Immediate tonsillectomy is an easy to perform one-stage surgical procedure assuring quick relief of trismus and pain and total evacuation of the pus. Such an operation may subsequently reveal an unsuspected contralateral peritonsillar abscess as well [23].

On the contrary, incision and drainage very unpleasant for the patient that could often lead to incomplete evacuation of the abscess cavity. That is the reason why the procedure is often necessary to be repeated several times. Besides, if an interval tonsillectomy is planned, such an operation could be technically more difficult because of the fibrosis of the tonsillar bed usually developed [24].

AIMS OF THE STUDY

1. A review literature to compare the efficacy of needle aspiration, tonsillectomy and/or incision and drainage (I & D) in management of peritonsillar abscess (PTA) in terms of recovery period and recurrence rate.
2. To Determine the current prevalent practices in the management of quinsy.

MATERIALS AND METHODS

This is a review article. Literature was reviewed and all of the studies, between 1988 to 2015 were recruited and reviewed in this study. The study was done in King Abdulaziz University.

DISCUSSION

Although the lack of consensus on the best treatment for PTA results in great variation, once a diagnosis of PTA is made drainage is the initial step in managing this infection as there have been no studies support medical therapy as the primary treatment of this disease.

Physicians preference for one method over the other has changed over the years due to a number of reasons, some of the main arguments are addressed here [25].

There was wide practice variation according to the caseload and the geographical location of the ENT department highlighting a distinct lack of evidence-based practice. When assessing the evidence for different surgical interventions in peritonsillar abscess, the problem is that there is no standardization of definitions for what constitutes a re-collection, persistent or recurrent disease, making comparison between studies difficult alone. [26].

In one survey of peritonsillar abscess management, 60% of respondents favored first-line needle aspiration, 25% incision and drainage, 1% abscess tonsillectomy and 5% intravenous antibiotics alone [26].

- Needle aspiration versus incision and drainage for the treatment of peritonsillar abscess

Two polyclinic methods of surgical opening (NA and ID) for the treatment of PTA have been used over the past several decades. Physicians' preference for one method over the other has changed over the years due to a number of reasons; some of the main arguments are addressed here [25].

I. Recurrence rate (proportion of patients needing repeat intervention).

a) The trial by Stringer et al randomized 24 patients to aspiration and 28 patients to I & D; 8% and 7% respectively developed a recurrence [27].

b) Maharaj et al. randomized 30 patients to aspiration and 30 patients to I & D with initial recurrence rates approaching13% and 10% respectively [28].

c) Chang BA,etal , When pooled data from the 10 studies the recurrence rate was higher in the needle aspiration group compared with incision and drainage, Recurrence in the needle aspiration group ranged from 4.9% to 80.0%. In the incision and drainage group recurrence ranged from 0% to 20%, timing of assessment for recurrence ranged from one day to seven days for initial

post-intervention assessment [29].
d) Chanan Shaul et al , in a study included 117 patients. One hundred four patients (88.9%) improved after 1 needle aspiration without any other intervention, whereas 13 patients (11.1%) required an additional procedure [30].
e) The management guide for peritonsillar abscesses proposed by Herzon et al. suggests that puncture-aspiration can be used as the only drainage procedure, as it obtains a resolution rate of 96%, and leaves incision-drainage as an alternative for cases of failure of the first technique. These authors emphasize the scarce discomfort, technical simplicity and low cost of the technique, as well as the fact that it does not require specialized equipment [31].
f) According to Wikstén et al. the risk of recurrence is 10%---15% depending on the follow-up period. This rate increases to 50% in patients younger than 40 years and in those with a history of repeated infections [32].

Only one study reported an adverse outcome associated with the intervention [39]. In this study "reactionary hemorrhage" was described in (3.6%) in the incision and drainage group.
Spires 1987 found no difference in the average time to resumption of a normal diet between the needle aspiration versus the incision and drainage group [33]
Younas 2015 compared the percentage of patients that had returned to a semisolid or solid diet within a certain time frame. They found that 87% of patients treated with needle aspiration returned to semisolid food within two days and solid food within four days. Comparatively, they found that 88% of patients treated with incision and drainage to semisolid food by two days and solid food by four days.
Khan 2012 compared postoperative pain as measured by a "mild/moderate/severe" subjective grade. They reported a statistically significant higher proportion of patients with higher pain scores in the incision and drainage group (needle aspiration: 50.0% mild, 28.6% moderate, 21.4% severe; incision and drainage: 17.9% mild, 21.4% moderate, 60.7% severe; $P < 0.01$). [33]
Younas 2015 reported on pain five days after the intervention: 75% of patients in the needle aspiration group had no pain, whereas 78% of patients treated with incision and drainage had no pain [34].

- Immediate tonsillectomy

Chassaignac reported the first quinsy ('hot') tonsillectomy in 1859. The approach exploits the dissection plane opened by pus, which later fibroses making interval tonsillectomy more difficult. [35]
Immediate tonsillectomy can offer several advantages over other management options, by allowing full evacuation of the abscess cavity, effectively relieving symptoms and identifying any further spread of infection beyond the peritonsillar space [36].
General anesthesia for a quinsy tonsillectomy is difficult intubation. In addition, 1.5–6% of patients with peritonsillar abscess will have a coexistent infective mononucleosis, which may result in acute liver inflammation and more risky general anesthesia, and investigations for this may delay the operation and make quinsy tonsillectomy not a favorable option for some patients, [37]
TEs are divided into two types (immediate TE and interval TE) depending on the time from PTA episode to the procedure.
There are a number of variably sized prospective and retrospective case series that have reported operative complications in quinsy tonsillectomy.

II. Post-tonsillectomy hemorrhage:

Post-tonsillectomy hemorrhage rates in quinsy tonsillectomy vary widely from 0 to 13%, with surgical hemostasis required in 0–6%. [38].
The 2003–2004 national prospective UK tonsillectomy audit of 33 921 patients found post-tonsillectomy hemorrhage in 3.5%, while 0.9% returned to theatre. [39].
In a retrospective cohort study performed on 205 patients with peritonsillar abscess who underwent bilateral tonsillectomy. Bleeding occurred in (13%) of the patients. Ipsilateral hemorrhage was seen in (4%) while the contralateral hemorrhage in (9%) which is about double the ipsilateral side . The higher incidence of PTH in the contralateral side of the abscess was found to be statistically significant ($P = 0.02$).
In a review of 661 patients, post-elective tonsillectomy hemorrhage occurred in 11.6% and hemorrhages requiring surgery in 5.5%, with 8% and 2.6%, respectively, for quinsy tonsillectomy in age matched participants [40].
In a large retrospective study (n=6329) of TE patients, no difference in the bleeding rates (2.9% vs. 2.8%) was found between immediate and interval TEs 44). Thus, quinsy tonsillectomy as a procedure carries no greater risk of post tonsillectomy hemorrhage than routine tonsillectomy, and it is merely the population undergoing the procedure who is more at risk.
Quinsy tonsillectomy can potentially also save time and money over an initial acute admission with aspiration⁄ incision and drainage followed by an interval tonsillectomy at a later date (cost of a second admission).
Fagan et al (35) in South Africa, a total of 51 patients were randomized into immediate and interval TE groups, found no statistically significant difference in total hospital stay for patients treated with quinsy tonsillectomy, compared with aspiration and interval tonsillectomy. However, when comparing the number of days off work, there was a statistically significant reduction in favor of quinsy tonsillectomy.
A reduction of sick leave (from 7.2-9 to 4.4-5.5 days) was also shown in another study comparing immediate and interval TEs [41].
With the high number of cases where pus is found intraoperative (despite initial drainage), the choice of an immediate is well supported, especially if inferior pole/ parapharyngeal spread is suspected [42]
A Danish study found comparable rates of bacteremia between immediate and interval TEs [43].
Peritonsillar abscess after tonsillectomy may appear to be a strange term, assuming tonsil tissue is removed and the

peritonsillar space is obliterated (although in reality, it is very difficult to completely remove all tonsil tissue when performing a tonsillectomy, particularly at the lower pole and tongue base).

The areolar tissue in the peritonsillar space can be divided into layers superiorly. If the tonsil capsule is not completely removed during the tonsillectomy, this may explain the development of a PTA in a superior location. Even if the tonsil capsule is completely removed, there may be suppuration in any remnant peritonsillar tissue. Pus may collect between the superior constrictor muscle and any fibrosis resulting from the tonsillectomy. [44]

The etiology of PTA formation after tonsillectomy remains uncertain but there are a number of potential explanations, assuming that there is no remnant tonsil tissue infection, like presence of congenital internal branchial fistula between the tonsil and the superior constrictor muscle. [45]. It has been claimed that a tonsillectomy may predispose patients with this congenital fistula to recurrent abscesses by resulting in scarring that obstructs drainage of an infected tract or cyst [46].

An analysis of 10 papers reported ten cases of PTA after tonsillectomy (1950 to August 2010) shows that the mean patient age at presentation was 31 years, in all of these cases the post-tonsillectomy abscess was on the ipsilateral side. The majority of patients (82%) had no obvious history of interval peritonsillar infection (i.e. a peritonsillar infection after a tonsillectomy) prior to the PTA prompting the case report. However, two patients (18%) had had recurrent ipsilateral peritonsillar infections after tonsillectomy

The interval between the tonsillectomy and presentation with the post-tonsillectomy PTA ranged from 2 months to 35 years, with a mean of 16 years

Six patients (55%) were treated with incision and drainage of the PTA and five (45%) were treated with needle aspiration with or without antibiotics. Computed tomography performed in two cases confirmed absent tonsil tissue.

Table1: Summary of reported patients with peritonsillar abscess (PTA) following tonsillectomy with no residual tonsil tissue.

Reference	Age, sex	PTA interval (time after surgery)	Interval Infection	Management
Stankiewicz and Talland, 1988 (46)	18 F	4 years	No	Aspiration +penicillin 6/12 prophylactic penicillin
Stankiewicz and Talland, 1988 (46)	26 F	20 years	No	Incision and drainage + dicloxacillin
Stankiewicz and Talland, 1988 (46)	36 M	15 years	PTA x2	Incision and drainage + cefaclor
Stankiewicz and Talland, 1988 (46)	43 F	35 years	No	Incision and drainage
Roos and Lind, 1990	50 F	35 years	No	Incision and drainage
Al-Kindy, 2002 (47)	20 M	13 years	No	Incision and drainage + intravenous Antibiotics
Cannon and Lampton, 1996 (44)	32 F	27 years	No	Aspiration + antibiotics
Cannon and Lampton, 1996 (44)	26 M	Not stated	No	Aspiration + antibiotics
Al-Barrak, 2003 (48)	45	2 months	No	Aspiration
SEJ Farmer 2011 (49)	15 M	4 years	No	Aspiration + intravenous cefuroxime+metronidazole, oral antibiotics for 1/52

CONCLUSION

Literature reviewing for the best treatment strategy plan for PTA results in great variation, and lack of consensus. Once a diagnosis of PTA is made drainage is the initial step in managing this infection as there have been no studies support medical therapy as the primary treatment of this disease. Studying the three accepted methods of draining: incision and drainage, abscess tonsillectomy, or needle aspiration. Incision and drainage is an efficient and safe procedure to treat peritonsillar abscess and superior to quinsy tonsillectomy, and needle aspiration in terms of the post-procedure pain score. It can be performed as the first-line treatment of peritonsillar abscess.

AUTHORS' CONTRIBUTIONS

The participation of each author corresponds to the criteria of authorship and contributorship emphasized in the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals of the International Committee of Medical Journal Editors. Indeed, all the authors have actively participated in the redaction, the revision of the manuscript and provided approval for this final revised version.

COMPETING INTERESTS

The authors declare no competing interests.

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