# ORIGINAL ARTICLES

## COMPARISON OF EFFICACY OF NEEDLE ASPIRATION VERSUS INCISION AND DRAINAGE IN MANAGEMENT OF PERITONSILLAR ABSCESS

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## ABSTRACT

***Objective:*** To compare the efficacy of needle aspiration versus incision and drainage (I & D) in management of peritonsillar abscess (PTA) in terms of recovery period and recurrence rate.

***Study Design:*** Randomized controlled trial.

***Place and Duration of Study:*** Otolaryngology departments, Combined Military Hospitals, Rawalpindi and Multan, from January 2011 to January 2013.

***Material and Methods:*** Using World Health Organization sample size calculator, a calculated sample of 60 subjects was divided into two equal groups. One group underwent needle aspiration and the other group underwent I & D for PTA. The groups were compared for recovery period and recurrence using independent samples t-test and Fisher's Exact test respectively calculated through SPSS version 20. A *p*-value <0.05 was considered significant.

***Results:*** The mean recovery period was 3.5 ± 1 days for the I & D group and 3.6 ± 1 days for the needle aspiration group (*p*=0.64). Recurrence rate with I & D was 6.7% and with needle aspiration was 13.7% (*p*=0.67).

***Conclusion:*** Both needle aspiration and I & D are satisfactory surgical options for the treatment of PTA with no significant difference in clinical outcome. However, needle aspiration has an advantage over I & D in terms of minimal morbidity and its ease of performance.

**Keywords:** Incision and drainage, Needle aspiration, Odynophagia, Peritonsillar abscess.

## INTRODUCTION

Peritonsillar abscess (PTA) is the most common deep infection of neck space that occurs in adults and is potentially life threatening. It is the endpoint of an infection that begins as acute tonsillitis, progresses to peritonsillar cellulitis, and develops into PTA at its most advanced stage. Untreated, it can lead to more serious and even life-threatening deep-space infections of retropharyngeal or pterygomaxillary space[1].

The incidence of PTA is about 30 per 100,000 persons per year[2]. It is most common in individuals 20 to 40 years of age and affects males and females equally[1-3].

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The treatment of PTA requires a suitable antibiotics and an appropriate surgical procedure to remove pus. The three surgical options are incision and drainage (I & D), needle aspiration, and abscess tonsillectomy[3]. Abscess tonsillectomy as primary drainage procedure is not recommended. I & D is the classical procedure that requires greater skill. It is more painful and causes more bleeding. While, needle aspiration does not require special equipment. It is easy to perform, cost effective and better tolerated[2].

Several studies comparing I & D with needle aspiration in PTA have found no significant statistical difference in the outcomes and resolution of PTA in 90% of cases, due to which, a review paper has considered needle aspiration as the drainage method of choice in PTA[4]. But studies conducted nationally

revealed different statistics. According to one study, I & D was a superior procedure resulting in shorter recovery period (6.16 ± 0.28 days) as compared to needle aspiration (7.44 + 0.58)[5]. In another study, recovery period ranged from 3 to 7 days and no recurrence was seen in patients with I & D. The patients who underwent needle aspiration had recurrence in 80% and the recovery period ranged from 6 to 16 days[6].

The rationale of this study was to investigate the controversy over the optimal treatment of PTA and to formulate guidelines for the management of PTA in our population. Keeping in view the above, the objective of the study was to compare the efficacy of needle aspiration versus I & D in management of PTA.

## MATERIAL AND METHODS

It was a randomized controlled trial carried out at the Otolaryngology Department of Combined Military Hospital, Rawalpindi and Multan from January 2011 to January 2013. After approval from the hospital ethical committee, through non-probability consecutive sampling, we included individuals of both genders of age ≥ 15 years diagnosed with PTA. Clinical diagnosis of PTA was made on clinical features of unitonsillar erythema, swelling, odynophagia (pain on swallowing), uvular deviation towards the opposite direction and trismus. The sample size was calculated using World Health Organization sample size calculator taking level of significance 5%, power of test 80%, population standard deviation 0.43, test value of population mean 6.16, and anticipated population mean 7.44. Calculated sample size was approximately 30 in each group, so the total number of patients to be included was 60. Patients with history of bleeding disorders or diabetes mellitus, on anti-coagulant drugs or diagnosed with immunodeficiency disorders or who refused to undergo the procedure under local anesthesia were excluded from the study.

After taking an informed written consent to take part in the study; name, age, gender, serial number, hospital record number, address and phone number of each individual were noted. All the patients were hospitalized and were randomly allocated into two groups by using the random numbers table. Surgical procedure was performed by 3rd and 4th year otolaryngology residents under supervision of the same consultant. In both the groups, procedure to be performed was explained to the patients in the language they understood.

Group-A underwent I & D of PTA after topical anesthesia and infiltration of local anesthesia with adrenaline over the anterior tonsillar pillar to reduce bleeding. Blade number 11 was used to give incision over the

**Table-1: Studies comparing needle aspiration versus incision and drainage.**

| Authors | No. of patients | Method | Initial failure rate n (%) |
|---|---|---|---|
| Stringer et al[11] | 24 | Needleaspiration | 2 (8) |
| | 28 | Incision and draiage | 2 (7) |
| Maharaj et al[12] | 30 | Needle aspiration | 4 (13) |
| | 30 | Incision and drainage | 3 (10) |
| Ophir et al[14] | 75 | Needle aspiration | 36 (48) |
| Herzon[17] | 41 | Needle aspiration | 4 (10) |
| Spires et al[18] | 41 | Needle aspiration | 2 (4.8) |
| | 21 | Incision and drainage | 0 |
| Savolaiean et al[19] | 98 | Needle aspiration | 9 (9.2) |
| Wolf et al[20] | 86 | Needle aspiration | 62 (72.1) |
| | 74 | Incision and drainage | 8 (10.8) |

area of maximum bulge and hemostat was used to break the loculi and widen the abscess cavity. In group-B, three-point needle aspiration of PTA was done by a wide-bore needle/cannula of 18 gauge attached to 10 ml syringe after application of topical anesthesia. (fig-1). The pus collected in both groups was sent to laboratory for culture sensitivity test. Patients from both groups were empirically started with injection co-amoxiclav 1.2 g IV 8 hourly and injection metronidazole 500 mg IV 8 hourly for initial three days. After that period, the treatment was converted to oral co-amoxiclav 1g twice daily and tablet metronidazole 400 mg thrice daily for next four days. In addition, oral paracetamol 1g 8-hourly was given for fever and analgesia. Patients, who had cultured organisms resistant to these antibiotics, were excluded from this study.

Patients were assessed for the time of resolution of odynophagia, fever and recurrence. Patients were discharged from the hospital when their complaints of odynophagia and fever had settled. They were advised to come for follow-up and were re-examined for odynophagia, fever and recurrence on 7$^{th}$ and 14$^{th}$ post-op days. Follow up of patients was ensured by maintaining record of their address and contact details. They were contacted on phone for follow up. Patients failing to follow up were excluded from this study. Collected data was recorded on a specially prepared proforma. The recovery period was calculated from two parameters i.e. odynophagia days and fever days. Time taken to settle both odynophagia and fever was taken as the recovery period.

All the collected data was entered in SPSS version 20 and validated through dual entry. The analyzed variables included numerical data like age and hospital stay and qualitative data like efficacy and recurrence. Mean and standard deviation were calculated for numerical data. Frequencies and percentages were calculated for qualitative data. The comparison of group A and B was made for recovery period and recurrence using independent samplest-test and Fisher's Exact test. A $p$-value < 0.05 was taken as significant.

## RESULTS

A total of 70 patients (35 in each group) were recruited. Ten patients were excluded due to different criteria over the time course of the study. Out of remaining 60 patients, 76.7% (n= 46) were male with a mean age 32.7 ± 8.4 years (range: 17-53 years) and 23.3% (n= 14) were female with a mean age 29.3 ± 8.3 years (range: 18-43 years). Group-A (n=30) had 80% (n=24) males (mean age 32 ± 8.9 years) and 20% (n=6) females (mean age 28 ± 7.9 years). (fig-2). Group-B (n=30) had 73.3% (n=22) males (mean age: 32.63 ± 8.2 years) and 26.7 % (n=8) females (mean age: 30 ± 9 years). In group-A, odynophagia settled in 3.4 ± 1 days (range: 2-6 days) while in group-B it took 3.6 ± 1 days (range: 2-7 days). The fever was settled in 3.3 ± 1 days (range: 2-6 days) in group-A, and 3.4 ± 1 days (range: 2-6 days) in group-B. No recurrence was noted in either group on follow-up days 7 and 14. No complications were noted in either group.

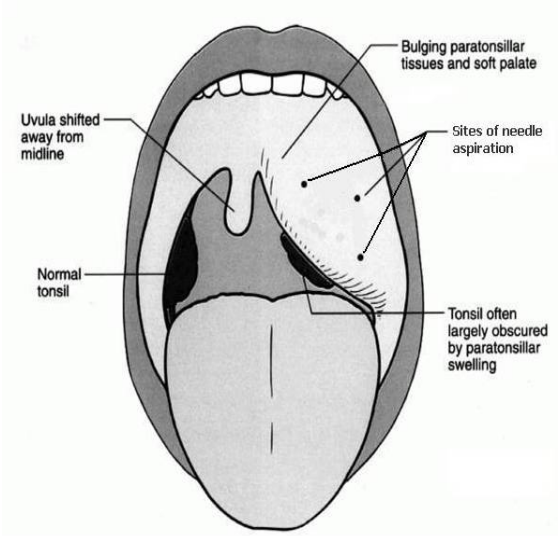


**Figure-1: Showing site of three points for needle aspiration.**

The mean recovery period was 3.5 ± 1 days (range: 2 to 6 days) for group-A and 3.6 ± 1 days (range: 2 to 7 days) for group-B ($p$= 0.7). During the course of study, 6.7% (n=2) patients in group-A had recurrence. While in group-B, 13.3% (n=4) patients had recurrence. There was no significant difference in recurrence rates in both groups ($p$= 0.67).

## DISCUSSION

In our study the mean ages for the groups for treatment with I & D and needle aspiration were 31.92 ± 8.41 and 31.2 ± 8.68 years respectively. Thus it appeared to be a true representative of the population of PTA as it closely matched the mean age reported by studies of Khan et al[7] (29.07 ± 9.05 and 32.32 ± 8.83 years respectively) , Kulkarni et al[8] (30.42 and 33.29 years)[8] and Khan et al (30.02 ± 9.42 years) respectively[9]. We had a preponderance of male patients which was also observed in previous Pakistani studies by Khan et al[7], Habib Khan et al[10] and et al[9].

So far, the published studies regarding the optimal treatment of PTA have primarily fueled the controversy in suggesting the top rated treatment. The apparent reasons appear to be initial treatment failure rates, minimal morbidity or cost issues.

In our study, we observed that the mode of treatment did not significantly affect the outcome in patients with PTA. Other comparative studies carried out at national level have come up with the opposite results. Tariq et al., in a comparative study of 50 patients reported that I & D was a much better treatment for PTA than needle aspiration in terms of recurrence and clinical outcome[6]. The same results were duplicated in other studies carried out by Khan et al and Khan et al[7,9]. In a regional study, from neighboring country India, the authors also reported a superiority of I & D over needle aspiration in the management of PTA, however, they recommended utilization of needle aspiration as first step in management of PTA for being cheap, less demanding and less traumatic[8].

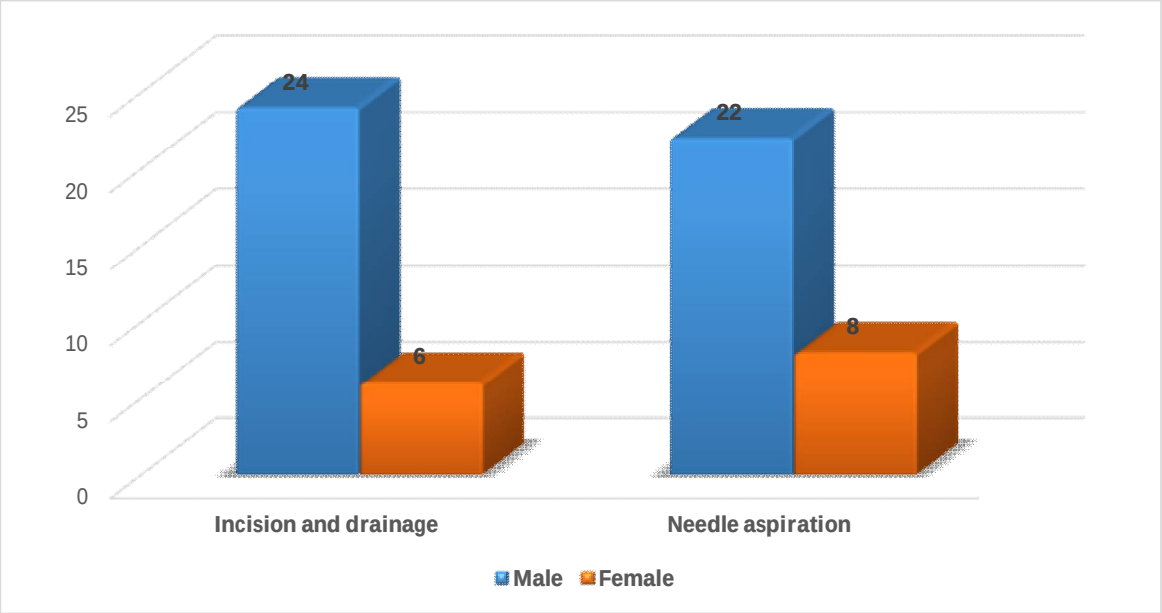


**Figure-2: Showing distribution of males and females among the two interventional groups.**

The conflict also exists at the international level. While taking failure (recurrence) rates into consideration, our results were similar to randomized controlled trials that were carried

out by Stringer et al[11] and Maharaj et al[12], who had comparable failure rates of needle aspiration and I & D as initial mode of surgical treatment of PTA. The trial by Stringer et al randomized 24 patients to aspiration and 28 patients to I & D; 8% and 7% respectively developed a recurrence[11] Maharaj et al. randomized 30 patients to aspiration and 30 patients to I & D with initial recurrence rates approaching13% and 10% respectively[12]. The most comprehensive paper on management of peritonsillar abscess is by Herzon, in which they carried out a meta-analysis of ten studies between 1961 and 1994 of 496 patients with a peritonsillar abscess treated primarily by aspiration. The abscess resolved in 464 patients (94%) without the use of an alternative method of surgical intervention[13]. In our study, abscess recurred in 13.3% of patients with initial treatment of needle aspiration and in 6.7% of patients with I & D.

Other studies e.g. by Wolf et al[14] and Ophir et al[15] have shown high immediate failure rates with needle aspirations i.e. 36% and 62% respectively. These authors concluded that despite the fact that needle aspiration had the advantages of avoiding hospitalization and being cost-effective, significantly high rates of associated early and late recurrences compared with I & D, supported recommendationof I & D as the treatment of choice in PTA. Similarly, two national retrospective studies concluded I & D as the main modality of treatment for PTA and needle aspiration to be used only to differentiate peritonsillar cellulitis from PTA[5, 16]. Results of different studies comparing the two management options are summarized in table-1[11,12,15,17-20].

The preference for the mode of treatment in PTA may get influenced by physician's expertise, mode of training, personal preferences or regional recommendations. For example, we used three point needle aspiration technique (fig-1) with 18 gauge needle for our clinical trial and we achieved comparable frequency of recurrence in needle aspiration group in relation to I & D. A recent survey of otolaryngologists in the United Kingdom (UK) regarding the treatment of PTA revealed that the majority of UK consultants manage patients on an inpatient basis, initially by needle aspiration (61%) or less commonly by I & D (25%)[21]. The departments treating more than 20 cases a year tended to use needle aspiration initially for PTA. For non-resolving cases, most (52%) performed I & D, or less commonly repeat aspiration (21%). A small proportion (12%) resort to abscess tonsillectomy. There are also geographical variations in the choice of mode of treatment; departments in England and Wales usedsignificantly more I & D than those in Scotland. Interestingly, this study demonstrated the fact that almost all surveyed consultants treated the condition on an inpatient basis, a fundamental difference to the management in the United States, where the majority was treated as outpatients[21].

Our study had a few limitations. First, the sample population was small and belonged to Rawalpindi and Multan district and surrounding area. So the sample did not represent the entire Pakistani population. Second, the comparison was only between two methods of PTA treatmentand abscess tonsillectomy was not included in the study. Third, the long term consequences, like second episode of PTA at later stage and interval tonsillectomy were not included in the variables, as the observational period was only 14 days post-operatively. Fourth, the issue of cost-effectiveness was not addressed in the current study and would need to be evaluated separately.

## CONCLUSION

Needle aspiration and I & D are comparable surgical options for the treatment of PTA when studied for the efficacy on the basis of recovery period and recurrence. However, needle aspiration has an advantage

over I & D in terms of minimal morbidity and ease of performance.

## CONFLICT OF INTEREST

The authors of this study reported no conflict of interest.

## AUTHORS CONTRIBUTION

Muhammad Riaz Khokhar and Saeed Bin Ayaz, conception, data collection, manuscript writing and analysis, Syed Nusrat Raza, review and supervision.

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