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Clinical Outcomes of Transcervical and Transoral Approaches in Parapharyngeal Abscesses

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ABSTRACT

Objective: The aim of this study was to identify the microorganisms cultured from abscesses in patients who underwent drainage with transoral and transcervical approaches and to compare the demographic data, anaesthesia duration, and length of hospital stay of patients using both techniques.

Material and Methods: We included 96 patients who underwent surgery for parapharyngeal abscesses at the Dicle University, Faculty of Medicine, Ear, Nose, and Throat and Head and Neck Surgery Clinic between 2015 and 2023. Drainage was performed using a transoral approach in 48 patients and using a transcervical approach in 48 patients. We compared both groups based on gender, age, comorbidities, bacteriology, length of hospital stay, and duration of anaesthesia.

Results: Upon evaluating the culture results for all patients in both groups, we found that no growth was detected in 50% of the cultures, whereas growth was detected in the other 50%. The average duration of anaesthesia in the transcervical group was 85 min, whereas in the transoral group, it was 52 min, with the duration of anaesthesia in the transoral group being significantly shorter than in the transcervical group. The average length of hospital stay in the transcervical group was 10 days, whereas in the transoral group, it was 8 days, indicating a significantly shorter hospital stay in the transoral group.

Conclusion: In our study, we found that patients undergoing transoral drainage had less morbidity, shorter anaesthesia duration and length of hospital stays.

Keywords: Parapharyngeal abscesses, transcervical, transoral, culture

INTRODUCTION

Parapharyngeal infections account for approximately 50% of deep neck infections. These infections are often caused by odontogenic infections in adults, whereas in children, they are frequently caused by pharyngeal infections (1). If these infections are not treated, they can spread along the deep fascial plane and form abscesses, leading to significant morbidity and mortality. They can result in life-threatening complications, such as septicaemia, internal jugular vein thrombosis, carotid artery rupture, mediastinitis, pericarditis, Horner syndrome, cavernous sinus thrombosis, and even death (2-4). Early and aggressive treatment is necessary to prevent these complications.

The recommended treatment for parapharyngeal abscesses is surgical drainage combined with intravenous antibiotic therapy (5). There are two surgical methods for drainage: transoral and transcervical. Transoral surgery is usually preferred for infections located in the medial part of the great vessels and in a single area, whereas transcervical surgery is preferred for infections located in the lateral part of the great vessels and in multiple areas (6, 7). However, the optimal method for the surgical treatment of Parapharyngeal abscesses is a matter of debate, and no global consensus has yet emerged (8). The transoral approach has become a frequently preferred method, especially in medial and single-area parapharyngeal abscesses, as it causes less morbidity (1). The aim of this study was to identify the microorganisms cultured from abscesses in patients who underwent drainage with transoral and transcervical

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approaches and to compare the demographic data, duration of anaesthesia, and length of hospital stay of patients using both techniques. Furthermore, we compared patients with and without comorbidities in terms of the length of hospital stay and duration of anaesthesia in our study.

MATERIALS AND METHODS

We included 96 patients who underwent surgery for parapharyngeal abscesses at the Dicle University, Faculty of Medicine, Ear, Nose, and Throat and Head and Neck Surgery Clinic between 2015 and 2023. This study was approved by the Dicle University Faculty of medicine, Ethics Committee (Date: 17.01.2024, No: 220). Patients who underwent surgical drainage through an oral incision were called the transoral group, and patients who underwent drainage through a neck incision approach were called the transcervical group.

Transoral Approach: A tonsillectomy mouth gag is placed in the patient's mouth and opened to obtain adequate exposure of the oropharynx. The lateral pharyngeal wall on the involved side was palpated intraorally to localise the abscess. Once localised, an 18-gauge needle is inserted, transorally, through the lateral pharyngeal wall and into the abscess cavity, and the pus is aspirated through the needle. Then, an incision is made in the overlying mucosa, and dilation with a large clamp is performed longitudinally. The mouth gag was removed and the wound was left open for continued drainage of the abscess into the oropharynx.

Transcervical Approach: The conventional method for approaching the parapharyngeal space is to approach the lateral cervical. This method involves an external skin incision made about 3 cm below the inferior border of the mandible. The sternocleidomastoid muscle and great vessels are retracted posteriorly. The parapharyngeal space is entered anterior to the posterior belly of the digastric and under the submandibular gland. Finger dissection was used to break up any loculations. After a drain is left in the cavity, the wound is closed.

The patients were evaluated using contrast-enhanced neck computed tomography (CT) at the time of their initial presentation to determine the location of the abscess, specifically, whether it was located lateral or medial to the great vessels, and whether it was located in a single area or multiple areas. We often performed drainage with transoral surgery in patients with localised abscesses in the medial part of the great vessels and in a single area. We also performed drainage with transcervical surgery in patients with abscesses in the lateral part of the great vessels and in multiple areas. Half of our patients were on antibiotic therapy at the time of admission to our hospital. All the patients were started on intravenous antibiotic therapy consisting of Clindamycin 500 mg twice daily and Ceftriaxone 1 g twice daily.

Patients who underwent drainage with a fine needle were excluded from the study. We compared the two groups based on gender, age, comorbidities, bacteriology, length of hospital stay, and duration of anaesthesia.

Statistical analysis

The behaviour of the quantitative variables was expressed using measures of central tendency and variance: Mean±SD. The exact test (used for small sample sizes) and chi-square test were employed to determine differences between proportions or relationships among categorical variables. To assess behavioural differences of group means, an analysis of variance (ANOVA) was utilised for comparisons involving more than two groups, and Student's t-test was used for comparisons between two groups provided that the normality and homogeneity of variance assumptions were met. When these assumptions were not met, the Kruskal–Wallis H Test was used for more than two groups, and the Mann–Whitney U Test was applied for two groups. The Bonferroni post hoc correction method was used for multiple comparisons between groups. Statistical significance was set at $p<0.05$ for all analyses. Statistical analyses were conducted using the IBM SPSS (Statistical Package for the Social Sciences for Windows, Version 21.0, Armonk, NY, IBM Corp., USA) software.

Descriptive statistics

The distribution statistics of the categorical variables are presented as n (%).

RESULTS

Drainage was performed using the transoral approach in 48 patients and the transcervical approach in 48 patients. The transcervical group comprised 34 (59%) male and 14 (41%) female patients, whereas the transoral group consisted of 24 (50%) male and 24 (50%) female patients. There was no significant difference in gender distribution between the two groups ($p>0.05$). In both the transcervical and transoral groups, 14 patients had comorbidities, while 34 did not. No significant difference in comorbidity was observed between the groups (Table 1).

Upon evaluating the culture results for all patients in both groups, we found that no growth was detected in 50% of the cultures, whereas growth was detected in the other 50%. We consider that because 50% of our patients were receiving antibiotic treatment at the time of admission, there was no growth in the cultures of these patients. The identified organisms included *S. anginosus* and *S. aureus* in eight patients each, *S. constellatus* in six patients, and *Gramme-positive cocci, Prevotella oris,* and *S. pyogenes* in three patients each.

Table 1: Demographic data of the transcervical and transoral groups

Approach		Transcervikal	Transoral	p
Comorbidities	+	14 (29.2 %)	14 (29.2%)	0.99*
	-	34 (70.8%)	34 (70.8%)	
Sex	M	34 (70.8%)	24 (50%)	0.06*
	F	14 (29.2%)	24 (50%)	

n (%), P, *: Pearson Chi-Squared Test

Table 2: Parapharyngeal abscess culture results

Parameter	Group	n (%)
Culture results	*No reproduce*	48 (50.0%)
	S Anginosus	8 (8.3%)
	S Aureus	8 (8.3%)
	S Consellatus	6 (6.3%)
	Gramme Cocci	3 (3.1%)
	Prevotella Oris	3 (3.1%)
	S Pyogenes	3 (3.1%)
	Bacteroides Tectus	2 (2.1%)
	Parvimonas Micra	2 (2.1%)
	S Constellatus	2 (2.1%)
	Acidovonax Delafix	1 (1.0%)
	Bacillus Licheriform	1 (1.0%)
	Enterobac Aeroginosa	1 (1.0%)
	Fusabact Necrophoru	1 (1.0%)
	Fusabact Nucleatum	1 (1.0%)
	Neisseria Mucosal	1 (1.0%)
	Parvimonas Acne	1 (1.0%)
	Peptostreptokok	1 (1.0%)
	Prevotella Denticola	1 (1.0%)
	S Oralis	1 (1.0%)
	S Pnomonia	1 (1.0%)

Additionally, *Bacteroides tectus, Parvimonas micra*, and *S. constellatus* were identified in two patients each, and other organisms were detected in one patient each (Table 2).

The mean ages of the patients in the transcervical and transoral groups were 31 and 28 years, respectively. The age of the patients in the transcervical group was significantly higher than that in the transoral group (Table 3). The average duration of anaesthesia in the transcervical group was 85 min, whereas in the transoral group, it was 52 min; thus, the duration of anaesthesia in the transoral group was significantly shorter than that in the transcervical group (Table 3). The average lengths of hospital stay in the transcervical and transoral groups were 10 and 8 days, respectively, indicating a significantly shorter length of hospital stay in the transoral group (Table 3).

In the transcervical group, the mean duration of anaesthesia was 84.5 min, and the length of hospital stay was 13 days for patients with comorbidities. For patients without comorbidities, the mean duration of anaesthesia was 85.5 min, and the length of hospital stay was 9 days (Table 4). In the transoral group, the mean duration of anaesthesia was 54.5 min, and the length of hospital stay was 11 days for patients with comorbidities. For patients without comorbidities, the mean duration of anaesthesia was 48 min, and the length of hospital stay was 9 days (Table 5). Although no significant difference was found in the durations of anaesthesia between patients with and without comorbidities in both groups, patients with comorbidities had a longer length of hospital stay.

DISCUSSION

The parapharyngeal space is a deep cervical compartment resembling an inverted pyramid with its base adjacent to the skull base superiorly and its apex near the hyoid bone inferiorly. The buccopharyngeal fascia and constrictor muscles of the pharynx are situated medially, while the ramus of the mandible and pterygoid muscles are located laterally. This space is bordered posteriorly by the carotid sheath and anteriorly by the pterygomandibular raphe. It is anatomically divided into two regions, the prestyloid and poststyloid areas, by the stylopharyngeal aponeurosis. The prestyloid area contains more adipose tissue, while the poststyloid area houses vital structures, such as the carotid artery, jugular vein, and cranial nerves IX, X, XI, and XII (9).

Amar et al. discussed various surgical approaches to the drainage of deep neck abscesses, classifying them into intraoral and external methods (1). In our clinic, we employ two surgical techniques—transcervical and transoral—based on the location of the parapharyngeal abscesses. The literature raported that the transoral approach should be utilised only for localised abscesses, whereas the transcervical approach is recommended for larger abscesses that extend inferiorly or recur after intraoral drainage (10, 11). Daya et al. reported that in parapharyngeal abscesses located medial to the great vessels or close to the skull base, drainage with intraoral surgery may be more suitable and less morbid (12). Hidaka et al. reported

Table 3: Comparison of age, anaesthesia duration and length of hospital stay between the two groups

Aproach	Transcervical (48)	Transoral (48)	p
Duration of Anaesthesia (Min)	86.58±15.01	54.13±11.34	<0.001 (m)
	85 (63-118)	52 (38-89)	
Age	37.65±21.28	27.63±18.56	0.016 (s)
	31 (1-86)	28 (1-69)	
Length of Hospital Stay (Day)	10.73±3.52	8.13±2.83	<0.001 (s)
	10 (5-21)	8 (3-16)	

Mean±SD/Median (Min-Max), (m) Mann-Whitney U Test - (s) Student's t-test

Table 4: Comparison of length of hospital stay and anaesthesia duration according to comorbidity in the transcervical group

Comorbidity	Yes (14)	No (34)	p
Anaesthesia Duration (Min)	83.79±12.4	87.74±15.99	0.413 (s)
	84.5 (63-98)	85.5 (63-118)	
Length of Hospital Stay (Day)	12.79±3.83	9.88±3.06	0.008 (s)
	13 (7-21)	9 (5-16)	

Mean±SD/Median (Min-Max), (s) Student's t-test

Table 5: Comparison of length of hospital stay and anaesthesia duration according to comorbidity in the transoral group

Comorbidity	Yes (14)	No (34)	p
Anaesthesia Duration (Min)	58.0±13.77	52.53±9.98	0.191 (s)
	54.5 (38-89)	48 (38-72)	
Length of Hospital Stay (Day)	10.93±2.56	6.97±2.04	<0.001 (s)
	11 (6-16)	7 (3-11)	

Mean±SD/Median (Min-Max), (s) Student's t-test

that in parapharyngeal abscesses located medial to the great vessels or close to the skull base, drainage with intraoral surgery may be more direct (13). The external approach requires a wider incision and increases the probability of damage to the carotid sheath. Moreover, it can be difficult to reach the parapharyngeal abscess via an external approach because the surrounding structure is shielded by the mandible (14). Thus, preoperative CT examination is essential to assess the relationship between the abscess and the surrounding critical structures, aiding in the selection of the appropriate surgical technique. We prefer the transoral approach for localised abscesses in the prestyloid area, while the transcervical method is favoured for abscesses located laterally in the poststyloid area or those extending into adjacent spaces, as it minimises the risk of injury to vital vessels and nerves.

Our study found that the surgical time and length of hospital stays were shorter for patients undergoing drainage via the transoral approach. We also noted that these patients were younger on average. Additionally, we observed that patients with comorbidities had longer length of hospital stays, although no significant difference was noted in the duration of anaesthesia. Our culture results indicated no growth in 50% of the patients, with growth detected in the remaining 50%. The identified microorganisms included *S. anginosus, S. aureus, S. constellatus, Gramme-positive cocci, Prevotella oris,* and *S. pyogenes*. Oh et al. reported similar findings, where cultures from 19 patients yielded growth of *S. pneumoniae, S. pyogenes*, and *anaerobic bacteria* in most cases, with only one culture showing no growth (5). Klug et al. highlighted that the common microorganisms found in parapharyngeal abscesses included a*naerobes, non-haemolytic streptococci*, and various other species (15). Pare et al. reported no growth in three of the 16 patients, with different bacterial species identified in the remaining cases (3). Our results corroborate these findings, showing growth in 50% of the 96 patients, primarily from the organisms mentioned.

Amar et al. performed drainage with intraoral surgery in 15 patients and with conventional lateral cervical surgery in 10 patients due to parapharyngeal abscess and compared intraoral and cervical approaches for drainage of parapharyngeal abscess and found no difference between the two groups in terms of age and gender, but noted shorter length of hospital stays and anaesthesia times in the intraoral group (1). Maroun et al. performed drainage with transoral surgery in 1063 patients and with cervical surgery in 111 patients. They noted that patients who underwent cervical surgery were younger than those who underwent intraoral surgery. They also reported that longer anaesthesia times and length of hospital stays were observed in the cervical group. Moreover, no significant difference in comorbidities was noted between the two groups (16). Oh et al. used transoral drainage for abscesses in the prestyloid area and transcervical drainage for abscesses in the poststyloid area. They found that patients who were drained transorally had shorter length of hospital stays than those treated transcervically (5). Several studies have stated that transoral surgery is associated with reduced morbidity and shorter length of hospital stays compared with transcervical surgery (10, 17). Our findings are similar to those of these studies, and we report that patients who underwent transoral surgery had shorter anaesthesia times, less morbidity, and shorter length of hospital stays compared with those who underwent transcervical surgery. Although transoral drainage may not be feasible for all patients, we assert that it is a less invasive option that requires less anaesthesia, particularly for localised parapharyngeal abscesses near the peritonsillar area.

CONCLUSION

Surgical drainage plays a crucial role in the management of parapharyngeal abscesses. In this study, we believe that the transoral technique causes less morbidity and is a more beneficial technique compared with the transcervical technique, especially in medially located abscesses.

Ethics Committee Approval: This study was approved by the Dicle University Faculty of medicine, Ethics Committee (Date: 17.01.2024, No: 220).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer Review: Externally peer-reviewed.

Author Contributions: Conception/Design of Study- Ş.C.; Data Acquisition- Ş.C., M.A., M.A.; Data Analysis/Interpretation- Ş.C., G.K.; Drafting Manuscript- Ş.C., M.A., M.A.; Critical Revision of Manuscript- Ş.C., G.K.; Final Approval and Accountability- Ş.C., M.A., M.A., G.K.; Supervision- Ş.C.

Conflict of Interest: The authors have no conflict of interest to declare.

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