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Original Research Article

Presentation and characteristics of deep neck space abscesses: a retrospective study of 128 cases in a single institution

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ABSTRACT

Background: Despite the development of antibiotic therapy, deep neck space abscesses continue to be potentially life-threatening conditions because of possible airway compromise and other complications. The purpose of this study was to present incidence, clinical features, management and outcomes of deep neck space abscesses, in patients admitted to a tertiary care facility over a 3-year period.
Methods: Medical records of the patients diagnosed to have deep neck space abscesses in the Al Nahda Hospital from January 2009 to December 2011 were reviewed retrospectively. Data on demographic characteristics, clinical presentation, imaging modalities, treatment methods, microbiology, and outcomes were obtained.
Results: A total of 30 patients (17 females and 13 males) with age ranging from 5 months to 71 years (mean age: 28.0 years) were analyzed. Majority of them presented with neck swelling, fever and pain. The parapharyngeal space (24%) was the commonest anatomical location. The majority of patients (81%) underwent incision and drainage, those remaining (19%) received intravenous antibiotics only. Culture was positive in just 17% of cases and Staphylococcus aureus was the most common organism. No patient required airway intervention. Diabetes was the most common predisposing factor.
Conclusions: Early detection and treatment are essential to avoid sequelae related with deep neck space abscesses. Surgical drainage is still the cornerstone in treatment after abscesses formation. A larger, multicenter prospective study is desirable to shed further light on the correlation between risk factors, age and treatment results.

Keywords: Deep neck space abscesses, Incision and drainage, Microbiology, Complications, Airway compromise, Neck swelling, Fever, Pain, *Staphylococcus aureus*

INTRODUCTION

Deep neck space infections involve potential fascial spaces within the head and neck, and because of their deep anatomical location, early diagnosis can be challenging. Management typically requires securing the airway, administering appropriate antibiotics, and timely surgical drainage.[1,2]

These infections are often polymicrobial-frequently including anaerobic organisms-and may stem from odontogenic, tonsillar, or other upper respiratory origins.[3] Although the widespread use of antibiotics has reduced mortality, severe complications such as airway obstruction, mediastinitis, and septicemia still occur.[3,4] The study aims to assess recent trends in the management of deep neck abscesses at a tertiary care center, reflecting the evolving clinical patterns and outcomes in this population.[5]

METHODS

Study design

A retrospective chart review of patients with deep neck space abscesses at Al Nahda Hospital from January 2009

to December 2011 was carried out. A consecutive sampling method was used, including all patients who met the inclusion criteria and presented between January 2009 and December 2011. No prior sample size calculation was performed as the study aimed to review all available cases within the specified period.

Inclusion criteria

Patients with a history and clinical features suggestive of deep neck abscess presenting to A&E. Admitted for treatment. Diagnosed by scan (CT).

Exclusion criteria

Superficial cranio-cervical abscesses, Lymphadenitis with no abscess formation

Data collection

The Al-Shifa system for electronic medical record provided the data. The related search terms used were: localized swelling, neck mass or lump, retropharyngeal/parapharyngeal abscess, dysphagia, odynophagia, dyspnoea, parotid and salivary gland swellings and foreign body in the pharynx.

Ethical approval

Ethical approval for this study was obtained from the Research Committee of Al Nahda Hospital, Sultanate of Oman. All procedures were conducted in accordance with institutional guidelines and the principles of the Declaration of Helsinki.

Statistical analysis

Data were analyzed using Microsoft Excel for simple data analysis and descriptive statistics.

RESULTS

In total, 30 patients were enrolled (57% [17/30] female, 43% [13/30] male) and their ages ranged from 5 months to 71 years (mean age: 28.0 years) (Figure 1, 2). The largest proportion of cases (32%) occurred among individuals aged 26–50 years, followed by equal proportions in the 0–5 years and 6–25 years age groups, each accounting for 28% of the total. Patients over the age of 50 years constituted the smallest group, representing 12% of cases. This pattern indicates that deep neck space abscesses were most common in middle-aged adults, with a notable presence in both young children and younger adults, and were least frequent in older adults. (Figures 1 and 2).

The most common presenting symptom was swelling, reported in 28% of cases, followed by fever and pain, each occurring in 19% of patients. Dysphagia, poor oral intake, and trismus were each observed in 9% of cases, while odynophagia accounted for 6%. Less other common presentations at 4% and foreign body sensation at 1%. These findings highlight swelling as the predominant clinical feature, with fever and pain also being frequent indicators, while other symptoms were less commonly reported (Figure 3).

The parapharyngeal space was the most commonly affected site, accounting for 24% of cases, followed by the submandibular space at 20%. Retropharyngeal and parotid spaces were each involved in 12% of cases. Submental and prevertebral spaces each represented 8% of cases, while other sites collectively accounted for 16%.

These findings indicate that the parapharyngeal and submandibular spaces are the most frequent locations for deep neck space abscesses in this cohort (Figure 4). The majority of deep neck space abscess cases (68%) had no identifiable etiology. Among the known causes, diabetes mellitus was the most prevalent risk factor, accounting for 16% of cases. Other infections contributed to 10% of cases, while dental abscesses were responsible for 6% (Figure 5).

In regards to management, incision and drainage were performed in 81% of patients. Nineteen percent were managed conservatively with intravenous broad-spectrum IV antibiotics (Co-amoxiclav and Metronidazole) (Figure 6). Culture showed positive findings in 17% of patients (most often Staphylococcus aureus); 83% of cultures were negative, most likely reflecting antibiotic pre-treatment (Figure 7).

Half of the patients had follow-up as an outpatient basis and all of them completely recovered. (Figure 8). None of the patients needed to any airway management, and none of them developed any serious complications.

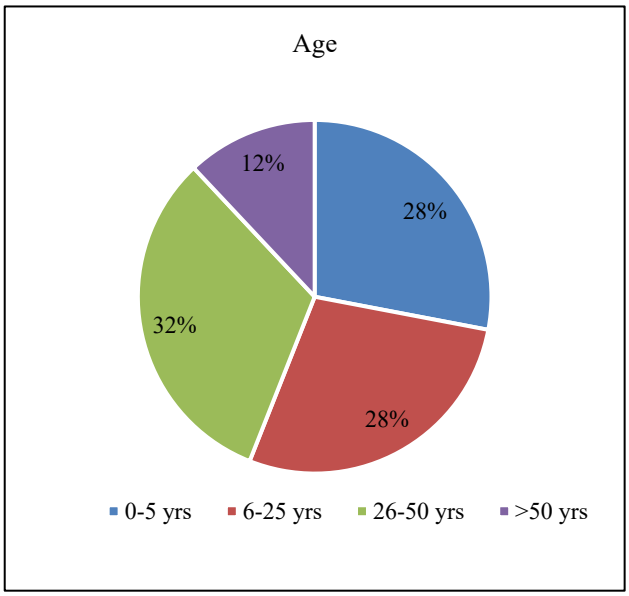

Figure 1: Distribution of patients according to age groups.

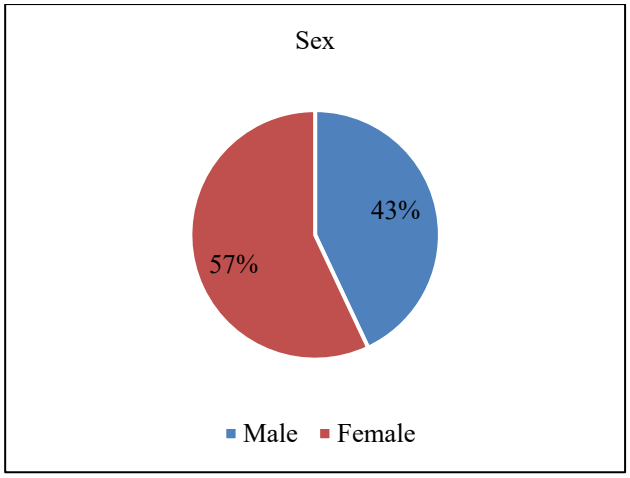

Figure 2: Sex distribution of the study population.

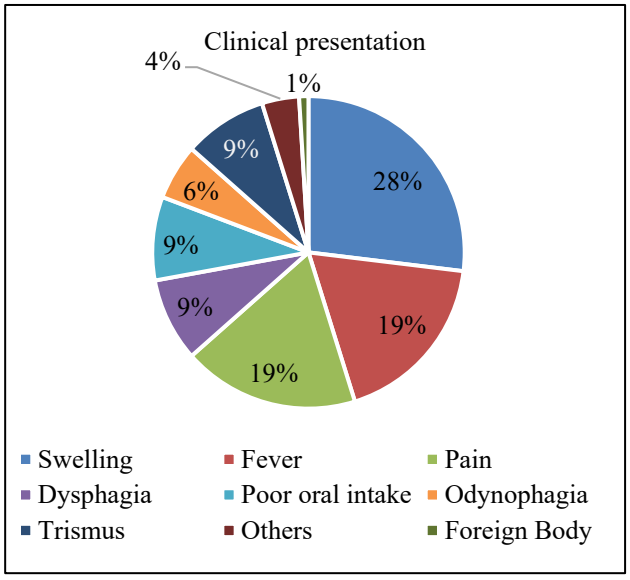

Figure 3: Clinical presentation of patients with deep neck space abscess in the study group.

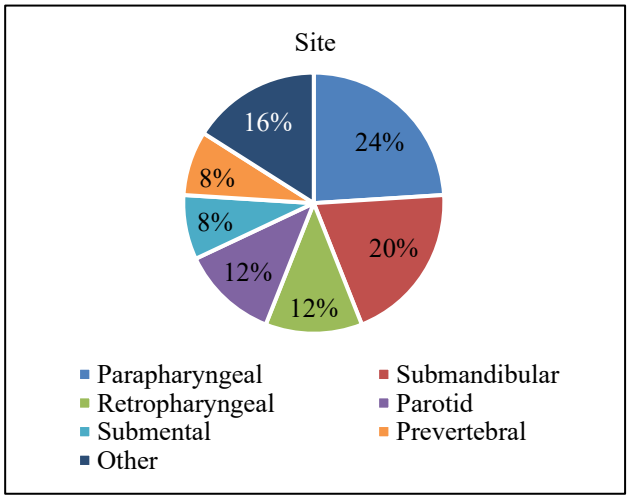

Figure 4: Site of abscess in patients with deep neck space abscess in the study group.

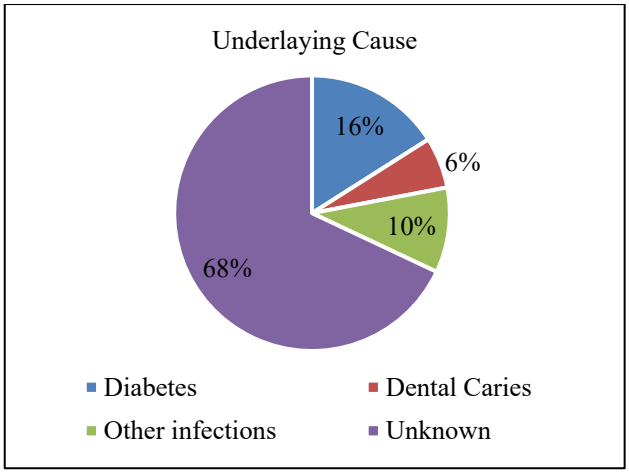

Figure 5: Underlying causes of deep neck space abscess in the study group.

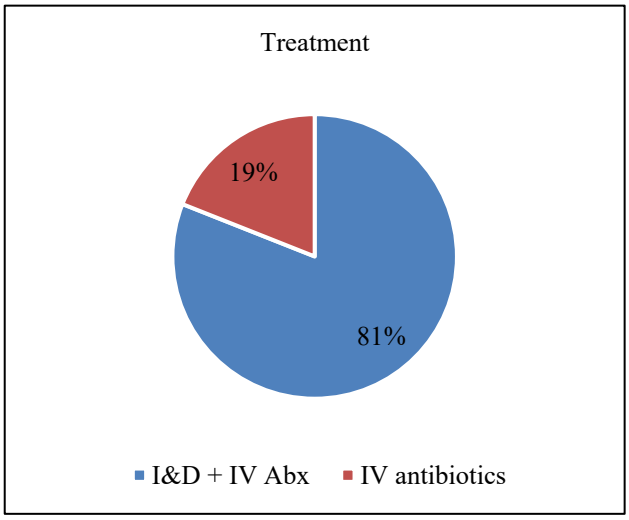

Figure 6: Management of patients with deep neck space abscess in the study group.

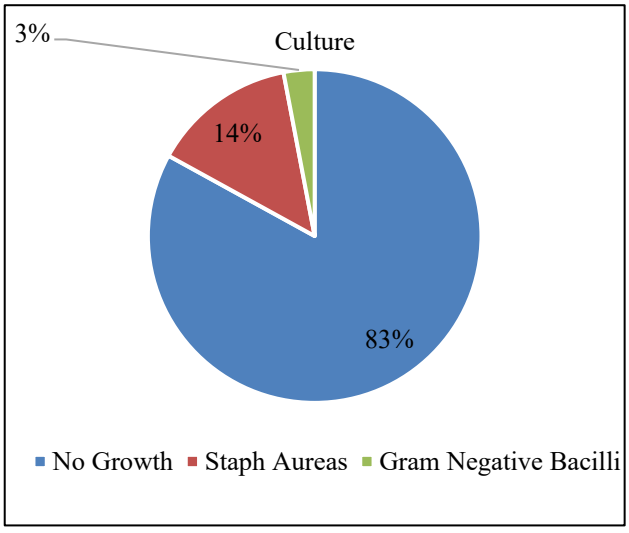

Figure 7: Culture results of patients with deep neck space abscess.

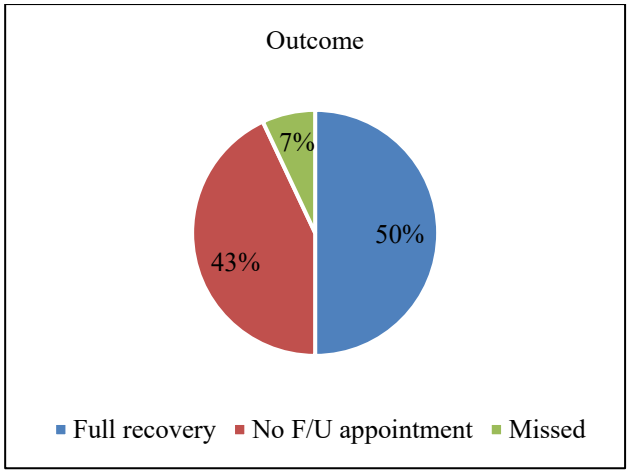

Figure 8: Outcome of patients with deep neck space abscess in the study group.

DISCUSSION

In this study, DNSAs were observed across all age groups, with a mean age of 28 years. The highest proportion occurred in adults aged 26–50 years, followed by young children (0–5 years) and young adults (6–25 years), while the lowest incidence was seen in patients over 50 years. Similar age trends have been reported in other series, with middle-aged adults more likely affected due to comorbidities such as diabetes mellitus, and young children predisposed by anatomical and immunological factors.[6,7]

A slight female predominance (57%) was noted, which differs from studies showing a male predominance (5–7), suggesting possible regional or population-specific differences. The low rate in older adults may reflect lower exposure to certain infection sources, underreporting, or different healthcare-seeking behaviours, though when DNSAs occur in this group, they may carry higher complication risks.[8] Overall, our findings highlight middle-aged adults and young children as key at-risk groups, emphasizing the need for early recognition and prompt management to prevent complications.

In our cohort, swelling was the most common presenting symptom, reported in over one-quarter of patients, followed by fever and pain, each observed in nearly one-fifth of cases. This is consistent with previous studies that describe swelling, often accompanied by localized tenderness, as a hallmark clinical feature of deep neck space abscesses due to inflammatory edema and tissue distortion.[6,7] Fever and pain are also well-recognized early indicators, reflecting the systemic and localized inflammatory response.[7,9] Other symptoms such as dysphagia, poor oral intake, trismus, and odynophagia were less frequent but are clinically significant, as they may indicate advanced disease or involvement of specific anatomical spaces.[9,10] Although rare in our series, foreign body sensation has been reported as an atypical presentation, often linked to oropharyngeal or hypopharyngeal involvement.[11]

These findings emphasize the importance of recognizing both common and less typical symptoms to facilitate early diagnosis. Prompt identification of swelling, particularly when accompanied by systemic signs such as fever or localized pain, should prompt further investigation to prevent progression to life-threatening complications. In this study, the parapharyngeal space was the most frequently involved site in deep neck space abscesses (24%), followed closely by the submandibular space (20%). This pattern aligns with previous reports identifying the parapharyngeal and submandibular regions as common sites due to their close anatomical relationship with the oropharynx, oral cavity, and odontogenic structures, which serve as frequent sources of infection.[7,12]

Retropharyngeal and parotid space involvement, each accounting for 12% of cases in our cohort, is also consistent with literature describing these spaces as vulnerable to spread from upper respiratory tract infections, tonsillitis, or salivary gland infections.[9,10] Submental and prevertebral spaces were less frequently affected (8% each), likely reflecting their relatively isolated anatomy and fewer direct sources of infection.[11] The predominance of parapharyngeal and submandibular involvement emphasizes the importance of early recognition of infections originating from dental, tonsillar, or salivary sources. Prompt imaging and surgical intervention, when indicated, are crucial in these locations to prevent rapid spread to critical structures, including the mediastinum and carotid sheath.

In our cohort, the etiology of deep neck space abscesses (DNSAs) was undetermined in the majority of cases (68%). This is consistent with reports from other series where a substantial proportion of DNSAs have no clear source, often due to prior antibiotic use obscuring culture results or the rapid resolution of primary infection sites before evaluation.[6,7] Among identified causes, diabetes mellitus emerged as the most common predisposing factor (16%), reinforcing its well-recognized role in increasing susceptibility to severe head and neck infections through impaired immune responses and delayed wound healing.[9,10,12] Other infections accounted for 10% of cases, which may reflect secondary spread from upper respiratory tract or systemic infections, while odontogenic sources such as dental abscesses were responsible for 6%.

The relatively low proportion of dental causes in this series contrasts with some studies where odontogenic infections are a leading source, possibly reflecting differences in population dental health, referral patterns, or classification methods.[11] These findings underscore the need for meticulous evaluation of comorbidities-particularly diabetes mellitus-during both prevention and management of DNSAs. Furthermore, improved

diagnostic work-up, including early imaging and culture sampling before antibiotic initiation, may help reduce the proportion of cases with unidentified etiology.

In the series, the majority of patients with deep neck space abscesses (81%) required surgical intervention in the form of incision and drainage, while 19% were successfully managed conservatively with intravenous broad-spectrum antibiotics, primarily co-amoxiclav and metronidazole. This predominance of surgical management is in line with existing literature, which emphasizes that most DNSAs, particularly those with well-formed collections or airway compromise, require prompt drainage in addition to antibiotic therapy to achieve optimal outcomes.[6,7,12]

The proportion of patients managed conservatively in our cohort reflects a subset with early-stage infections, small abscesses, or phlegmonous changes without mature pus formation, where antibiotics alone can be effective.[9,10] Co-amoxiclav and metronidazole provide broad coverage against the polymicrobial aerobic and anaerobic flora typically implicated in DNSAs, and culture-directed adjustments remain essential once microbiological results are available.[11] These findings reinforce the importance of individualized treatment decisions based on clinical status, radiological findings, and comorbid conditions. Early identification of cases amenable to medical management can help avoid unnecessary surgical risks, while timely surgical intervention remains critical for preventing serious complications in advanced disease.

In this study, positive culture results were obtained in only 17% of patients, with *Staphylococcus aureus* being the most frequently isolated pathogen. The high proportion of negative cultures (83%) is likely attributable to prior antibiotic administration before specimen collection, a limitation commonly reported in the management of deep neck space abscesses.[6,12,13] Early empiric therapy is often initiated due to the potentially rapid progression and life-threatening complications of DNSAs; however, this practice can significantly reduce culture yield and hinder pathogen-specific treatment.[9]

The predominance of *S. aureus* in positive cultures aligns with previous studies reporting it as a significant causative organism, along with other aerobic and anaerobic bacteria of oral and upper respiratory tract origin.[10,11] Given the low microbiological yield in many cases, broad-spectrum empiric antibiotic regimens-such as co-amoxiclav in combination with metronidazole-remain the cornerstone of initial therapy, with de-escalation guided by available culture data and clinical response.[11]

These findings highlight the importance of obtaining cultures prior to initiating antibiotic treatment whenever clinically feasible. Improved sampling strategies, including image-guided aspiration in early cases, may help increase diagnostic yield and facilitate more targeted therapy. In our cohort, half of the patients were managed entirely on an outpatient basis, all achieved complete recovery, and none required airway intervention or experienced serious complications. These findings support the safety and effectiveness of ambulatory care in carefully selected cases, consistent with previous reports that most patients with mild airway-related ENT conditions recover without invasive management when treated early and followed closely.[14,15]

Evidence from structured outpatient pathways, such as those for peritonsillar abscess, shows comparable outcomes to inpatient care while reducing hospital admissions and costs.[16] The absence of complications in our study likely reflects appropriate patient selection and timely intervention, as well as robust follow-up protocols. Literature emphasizes that early, pre-scheduled follow-up significantly improves adherence and lowers readmission rates.[17] Overall, our results reinforce current guidelines advocating outpatient management for low-risk patients, provided there is access to prompt reassessment if symptoms worsen. This approach is both clinically safe and resource-efficient.

The study may be limited by a relatively small or non-representative sample size, which could affect the generalizability of the findings. Additionally, the duration of the study may restrict the depth of data collection and analysis, potentially impacting the comprehensiveness and robustness of the results.

CONCLUSION

Deep neck space abscesses are relatively rare but are particularly challenging, because of the rapidity with which they can develop. In our series, most cases were successfully treated with surgical drainage and antibiotics. Imaging and prompt treatment are vital. Larger samples are needed for more exploration about the association of comorbid conditions and outcomes.

Recommendations

A larger, perhaps multicentre study is warranted to investigate correlations between risk factors, patient characteristics, and treatment results. Importance of imaging in all suspected cases should be reiterated. Better microbiological approaches to sampling prior to antibiotic exposure may increase culture yield.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Almuqamam M, Gonzalez FJ, Sharma S, Kondamudi NP. Deep neck infections. InStatPearls. StatPearls Publishing; 2024.

2. Loperfido A, Stasolla A, Giorgione C, Mammarella F, Celebrini A, Acquaviva G. Management of deep neck space infections: a large tertiary center experience. Cureus. 2023;15(2):34974.
3. Cobzeanu BM, Moisii L, Palade OD. Management of Deep Neck Infection Associated with Descending Necrotizing Mediastinitis: A Scoping Review. Medicina 2025;61:325.
4. Velhonoja, J., Lääveri, M., Soukka, T. et al. Deep neck space infections: an upward trend and changing characteristics. Eur Arch Otorhinolaryngol. 2020;277:863-72.
5. Bhardwaj R, Makkar S, Gupta A, Khandelwal K, Nathan K, Basu C, Palaniyappan G. Deep Neck Space Infections: Current Trends and Intricacies of Management. Indian J Otolaryngol Head Neck Surg. 2022;74(2):2344-9.
6. Wang LF, Kuo WR, Tsai SM, Huang KJ. Characterizations of life-threatening deep cervical space infections: a review of one hundred ninety-six cases. Am J Otolaryngol. 2003;24(2):111-7.
7. Huang TT, Liu TC, Chen PR. Deep neck infection: an analysis of 185 cases. Head & Neck. 2004;26(10):854–60.
8. Brook I. Microbiology and management of deep facial infections and Lemierre syndrome. ORL J Otorhinolaryngol Relat Spec. 2003;65(2):117-20.
9. Boscolo-Rizzo P, Marchiori C, Montesco MC, Vaglia A, Da Mosto MC. Deep neck infections: a study of 365 cases highlighting recommendations for management and treatment. Eur Arch Otorhinolaryngol. 2012;269(4):1241-9.
10. Bakir S, Tanriverdi MH, Gün R, Yorgancilar E, Yildirim M, Tekbaş G, et al. Deep neck space infections: a retrospective review of 173 cases. Am J Otolaryngol. 2012;33(5):567-73.
11. Vieira F, Allen SM, Stocks RM, Thompson JW. Deep neck infection. Otolaryngol Clin North Am. 2008;41(3):459-83.
12. Eftekharian A, Roozbahany NA, Vaezi A, Narimani N. Deep neck infections: a retrospective review of 112 cases. Eur Arch Otorhinolaryngol. 2009;266(2):273-7.
13. Yang SW, Lee MH, See LC, Huang SH, Chen TM, Chen TA. Deep neck abscess: an analysis of microbial etiology and the effectiveness of antibiotics. Infect Drug Resist. 2008;1:1-8.
14. Galioto NJ. Peritonsillar Abscess. Am Fam Physician. 2017;95(8):501-6.
15. Herzon FS. Harris P. Peritonsillar abscess: Incidence, current management practices, and a proposal for treatment guidelines. Laryngoscope. 1987;97(1):989-91.
16. Kieff DA, Bhattacharyya N, Siegel NS, Salman SD, Shapiro J. Selection of drainage procedure for peritonsillar abscess: needle aspiration versus incision and drainage versus tonsillectomy. Otolaryngol Head Neck Surg. 1999;120(3):335-40.
17. Hsueh WD, Choi AJ, Laury AM, Scott TM, Kuan EC, Tajudeen BA, et al. Improving outpatient follow-up adherence after inpatient otolaryngology consultation. Laryngoscope. 2023;133(2):364-70.

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