

Clinical Profile, Management and Outcomes of Deep Neck Space Infections in a Tertiary Care Centre**Harshitha Chandrashekarappa¹, Bharath Lingappa², Chethan Kumar G.³**¹Assistant Professor, Department of ENT & HNS, Sri Chamundeshwari Medical College Hospital and Research Institute, Channapatna, Karnataka, India²Assistant Professor, Department of ENT & HNS, Sri Chamundeshwari Medical College Hospital and Research Institute, Channapatna, Karnataka, India³Professor and HOD Department of ENT & HNS, Sri Chamundeshwari Medical College Hospital and Research Institute, Channapatna, Karnataka, India

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Abstract**Background:** Deep neck space infections (DNSIs) are potentially life-threatening infections involving the fascial spaces of the neck. Despite advances in antimicrobial therapy and imaging techniques, these infections continue to be associated with significant morbidity because of the risk of airway compromise, mediastinitis, septicemia, and other serious complications. Early diagnosis, appropriate antimicrobial therapy, and timely surgical intervention are essential for achieving favorable clinical outcomes.**Aim/Objectives:** To evaluate the clinical profile, management strategies, and treatment outcomes of patients with deep neck space infections admitted to a tertiary care centre.**Materials and Methods:** A hospital-based prospective observational study was conducted in the Department of ENT & Head and Neck Surgery, Sri Chamundeshwari Medical College Hospital and Research Institute, Channapatna, over a period of six months. A total of 20 patients diagnosed with deep neck space infections were included. Demographic details, clinical presentation, etiological factors, anatomical spaces involved, microbiological findings, treatment modalities, hospital stay, complications, and outcomes were recorded and analyzed using appropriate statistical methods.**Results:** The majority of patients belonged to the 41–60 years age group (40.0%), with males constituting 65.0% of the study population. Neck swelling (100%), pain (90%), fever (80%), and dysphagia (70%) were the predominant presenting symptoms. Odontogenic infection (40.0%) was the leading etiology, while the submandibular space (35.0%) was the most frequently involved anatomical site. Streptococcus species (35.0%) were the most common bacterial isolates. Incision and drainage combined with intravenous antibiotics were performed in 65.0% of patients. Complete recovery without complications was achieved in 80.0% of cases, whereas diabetes mellitus was significantly associated with poorer clinical outcomes ($p=0.031$).**Conclusion:** Deep neck space infections require prompt recognition and multidisciplinary management to prevent life-threatening complications. Early diagnosis, appropriate imaging, culture-guided antibiotic therapy, and timely surgical drainage contribute to excellent clinical outcomes. Identification and management of associated comorbidities, particularly diabetes mellitus, are equally important for reducing complications and improving prognosis.**Keywords:** Deep Neck Space Infections; Odontogenic Infection; Surgical Drainage; Neck Abscess; Diabetes Mellitus; Treatment Outcomes.**DOI:** 10.25258/ijcpr.18.3.319

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Introduction

Deep neck space infections (DNSIs) are severe bacterial infections involving the potential fascial spaces of the neck. Although the widespread availability of antibiotics has reduced their incidence, DNSIs continue to pose significant diagnostic and therapeutic challenges because of their rapid progression and close proximity to vital

structures, including the upper airway, carotid sheath, and mediastinum. If not recognized and treated promptly, these infections can lead to life-threatening complications such as airway obstruction, descending necrotizing mediastinitis, septicemia, internal jugular vein thrombosis, carotid artery erosion, and multi-organ failure.

Consequently, DNSIs remain an important cause of emergency hospitalization and surgical intervention in otorhinolaryngology practice, particularly in tertiary care centres where patients with advanced disease are frequently referred [1,2].

The epidemiology of DNSIs has changed considerably over recent decades. Odontogenic infections are now recognized as the most common source of infection in adults, while tonsillopharyngeal infections remain an important cause in children and young adults. The increasing prevalence of diabetes mellitus, immunosuppression, chronic kidney disease, malnutrition, and poor oral hygiene has further contributed to disease severity and prolonged hospitalization.

In addition, the emergence of antimicrobial-resistant organisms has complicated empirical antibiotic therapy, highlighting the importance of obtaining microbiological cultures whenever feasible to facilitate targeted treatment [2–4]. Patients with deep neck space infections commonly present with neck swelling, fever, severe throat pain, dysphagia, odynophagia, trismus, muffled voice, and restricted neck movements. However, the clinical manifestations often vary depending on the anatomical space involved and the stage of disease, making early diagnosis challenging. Contrast-enhanced computed tomography (CECT) has become the imaging modality of choice because it accurately differentiates cellulitis from abscess formation, identifies the extent of disease, detects multi-space involvement, and assists in planning surgical drainage. Recent evidence also supports the use of imaging for monitoring disease progression and identifying complications requiring urgent intervention [2,5,6].

The management of DNSIs requires a multidisciplinary approach involving otorhinolaryngologists, radiologists, anesthesiologists, microbiologists, and intensive care specialists. Early airway assessment, prompt initiation of broad-spectrum intravenous antibiotics covering aerobic and anaerobic organisms, adequate supportive care, and timely surgical drainage remain the cornerstones of treatment. Recent studies have demonstrated that individualized management based on clinical severity, radiological findings, microbiological profile, and associated comorbidities significantly improves patient outcomes while reducing complications and hospital stay [5,7–9].

Although several studies have evaluated DNSIs in different populations, regional variations in microbial flora, antibiotic resistance, healthcare access, and patient demographics necessitate institution-specific data. Limited information is available regarding the clinical spectrum,

management practices, and outcomes of DNSIs in South Indian tertiary care hospitals. Therefore, the present study was undertaken in the Department of ENT & Head and Neck Surgery at Sri Chamundeshwari Medical College Hospital and Research Institute, Channapatna, to evaluate the clinical profile, management strategies, and treatment outcomes of patients with deep neck space infections, thereby contributing evidence that may help optimize patient care and improve clinical outcomes [10].

The present study aims to evaluate the clinical profile, management strategies, and treatment outcomes of patients with deep neck space infections presenting to the Department of ENT & Head and Neck Surgery at Sri Chamundeshwari Medical College Hospital and Research Institute, Channapatna.

The objectives are to assess the demographic and clinical characteristics, identify the etiological factors and involved neck spaces, evaluate the medical and surgical management employed, and determine the clinical outcomes and associated complications following treatment.

Materials and Methods

Study design: Hospital-based prospective observational study.

Study population: All patients clinically and radiologically diagnosed with deep neck space infections and admitted to the Department of ENT & Head and Neck Surgery during the study period.

Sample size: A total of 20 patients were included in the study.

Study duration: The study was conducted over a period of 6 months.

Study setting/location: Department of ENT & Head and Neck Surgery, Sri Chamundeshwari Medical College Hospital and Research Institute, Channapatna.

Inclusion criteria:

- Patients of all age groups and both sexes diagnosed with deep neck space infections based on clinical examination and/or radiological findings.
- Patients requiring inpatient management for deep neck space infections.
- Patients who provided written informed consent to participate in the study (or consent from parents/legal guardians for pediatric patients).

Exclusion criteria:

- Patients with superficial neck infections not involving the deep cervical fascial spaces.

- Patients with neck swellings of non-infectious origin, such as benign or malignant tumors and congenital cystic lesions.
- Patients with postoperative or traumatic neck infections not primarily involving deep neck spaces.
- Patients who declined to participate or were unwilling to provide informed consent.
- Patients with incomplete clinical records or those lost to follow-up before assessment of treatment outcomes.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 27.0 (IBM Corp., Armonk, NY, USA). Categorical variables were summarized as frequency (n) and percentage (%), whereas continuous variables, where applicable, were expressed as mean $\pm$ standard deviation (SD) or median with interquartile range (IQR) according to the

distribution of data. Associations between categorical variables were evaluated using the Chi-square test or Fisher's exact test whenever the expected cell frequency was less than five. A two-tailed p-value <0.05 was considered statistically significant. The association between diabetes mellitus and clinical outcome was assessed using Fisher's exact test because of the relatively small sample size.

The results were presented in the form of tables and percentages to facilitate comparison of demographic characteristics, clinical presentation, etiological factors, microbiological profile, treatment modalities, and duration of hospital stay, complications, and treatment outcomes. Statistical analysis was performed with a 95% confidence interval, ensuring reliable interpretation of the study findings.

Result

Table 1: Demographic Characteristics and Clinical Presentation of the Study Population

Variable	Category	Number (n)	Percentage (%)	p-value
Age Group (Years)	≤ 20	2	10	0.041
	21–40	6	30	
	41–60	8	40	
	>60	4	20	
	Total	20	100	0.048
Gender	Male	13	65	0.003
	Female	7	35	
	Total	20	100	
Presenting Symptoms	Neck swelling	20	100	0.003
	Pain	18	90	
	Fever	16	80	
	Dysphagia	14	70	
	Trismus	8	40	
	Respiratory distress	4	20	

Table 2: Etiological Factors, Risk Factors and Anatomical Spaces Involved

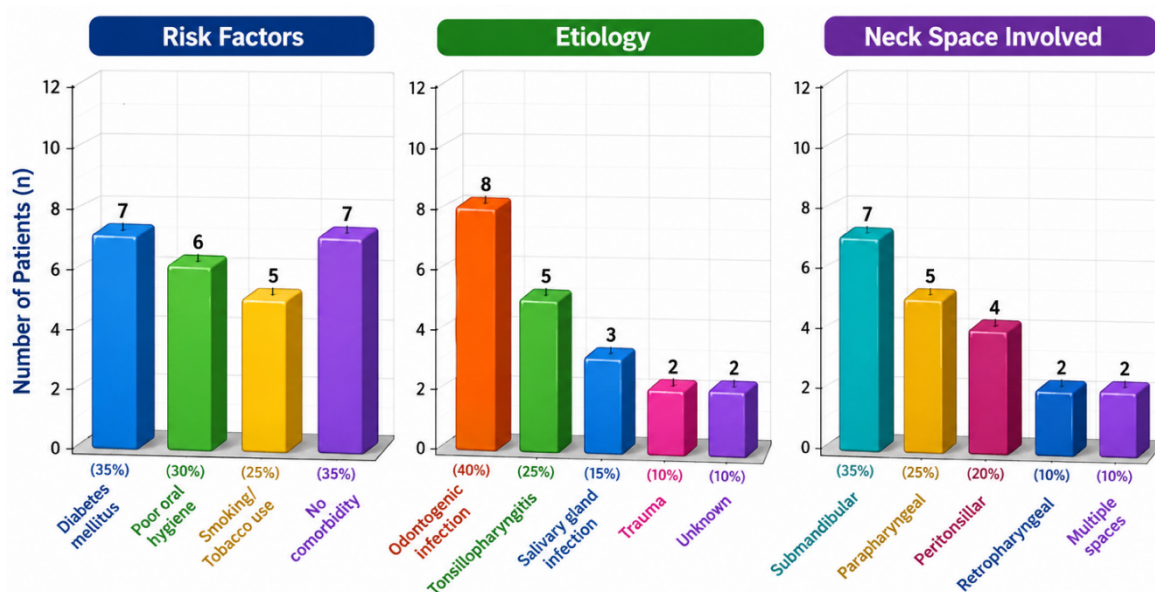
Variable	Category	Number (n)	Percentage (%)	p-value
Risk Factors	Diabetes mellitus	7	35	0.027
	Poor oral hygiene	6	30	
	Smoking/Tobacco use	5	25	
	No comorbidity	7	35	
Etiology	Odontogenic infection	8	40	0.021
	Tonsillopharyngitis	5	25	
	Salivary gland infection	3	15	
	Trauma	2	10	
	Unknown	2	10	
Neck Space Involved	Submandibular	7	35	0.034
	Parapharyngeal	5	25	
	Peritonsillar	4	20	
	Retropharyngeal	2	10	
	Multiple spaces	2	10	

Table 3: Microbiological Profile, Management and Treatment Outcomes

Variable	Category	Number (n)	Percentage (%)	p-value
Culture Result	Streptococcus spp.	7	35	0.039
	Staphylococcus aureus	5	25	
	Klebsiella spp.	2	10	
	Mixed growth	2	10	
	No growth	4	20	
Treatment	Intravenous antibiotics only	5	25	0.012
	Incision & drainage + antibiotics	13	65	
	Tracheostomy + drainage	2	10	
Duration of Hospital Stay	≤5 days	5	25	0.044
	6–10 days	11	55	
	>10 days	4	20	
Clinical Outcome	Recovered without complication	16	80	0.018
	Recovered with complication	3	15	
	Mortality	1	5	

Table 4: Association between Diabetes Mellitus and Clinical Outcome

Diabetes Mellitus	Good Outcome (n=16)	Complicated Outcome/Mortality (n=4)	Total	p-value
Present	4	3	7	0.031
Absent	12	1	13	
Total	16	4	20	

**Figure 1: Distribution of Patients According to Risk Factors, Etiology, and Neck Space Involved**

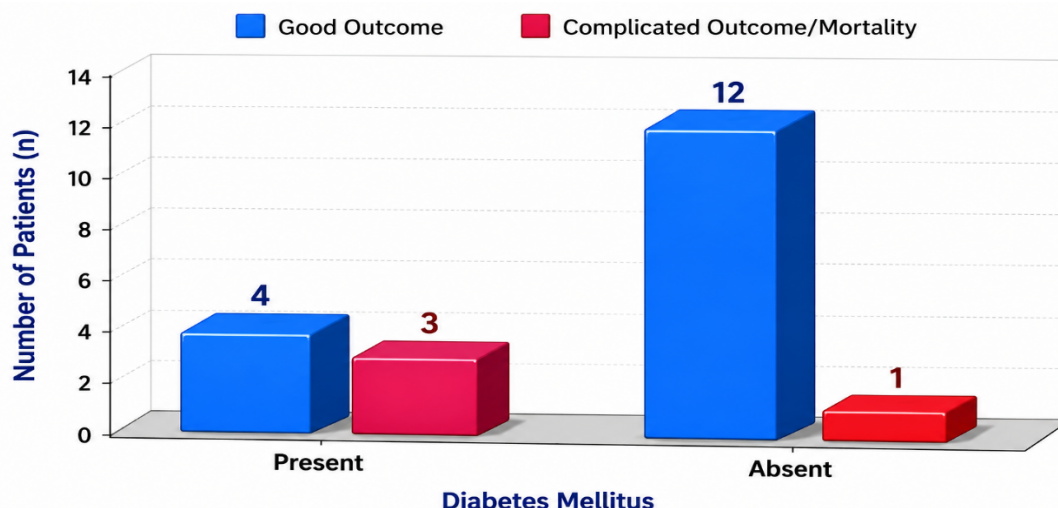


Figure 2: Outcome of Patients According to Presence or Absence of Diabetes Mellitus

A total of 20 patients with deep neck space infections were included in the study. The highest proportion of patients belonged to the 41–60 years age group (8 patients, 40.0%), followed by the 21–40 years group (6 patients, 30.0%). Patients aged >60 years constituted 20.0% (n=4), while only 10.0% (n=2) were aged 20 years or younger. The distribution of patients across different age groups was statistically significant ($p=0.041$), indicating that middle-aged adults were more frequently affected. With regard to gender, 13 patients (65.0%) were males and 7 patients (35.0%) were females, demonstrating a significant male predominance ($p=0.048$).

Neck swelling was the most consistent presenting complaint and was observed in all 20 patients (100.0%). This was followed by pain (90.0%), fever (80.0%), and dysphagia (70.0%), while trismus and respiratory distress were present in 40.0% and 20.0% of patients, respectively.

The variation in clinical presentation was statistically significant ($p=0.003$), highlighting neck swelling and pain as the predominant manifestations of deep neck space infections. Among associated risk factors, diabetes mellitus was the most common comorbidity, affecting 35.0% (n=7) of patients, followed by poor oral hygiene (30.0%) and smoking or tobacco use (25.0%). Approximately 35.0% of patients had no identifiable comorbidity. The association between risk factor distribution and disease occurrence was statistically significant ($p=0.027$).

Odontogenic infection was identified as the leading cause of deep neck space infections, accounting for 40.0% (n=8) of cases. Tonsillopharyngitis was the second most common etiology (25.0%, n=5), followed by salivary gland infections (15.0%, n=3). Trauma and infections of unknown origin each contributed 10.0% (n=2) of cases. This etiological

distribution was statistically significant ($p=0.021$). Regarding the anatomical location, the submandibular space was the most frequently involved (35.0%, n=7), followed by the parapharyngeal space (25.0%), peritonsillar space (20.0%), retropharyngeal space (10.0%), and multiple-space involvement (10.0%). The observed distribution of affected neck spaces was also statistically significant ($p=0.034$).

Microbiological analysis revealed *Streptococcus* species as the predominant organism, isolated in 35.0% (n=7) of patients, followed by *Staphylococcus aureus* (25.0%, n=5). *Klebsiella* species and mixed bacterial growth were each identified in 10.0% (n=2) of cases, while 20.0% (n=4) of cultures showed no bacterial growth. The microbiological profile demonstrated statistical significance ($p=0.039$). In terms of management, 13 patients (65.0%) underwent incision and drainage combined with intravenous antibiotics, making it the most frequently employed treatment modality. Five patients (25.0%) were successfully managed with intravenous antibiotics alone, whereas 2 patients (10.0%) required tracheostomy in addition to surgical drainage due to airway compromise. The treatment pattern showed a statistically significant difference ($p=0.012$).

Most patients (11 of 20; 55.0%) remained hospitalized for 6–10 days, while 25.0% (n=5) were discharged within 5 days, and 20.0% (n=4) required hospitalization for more than 10 days. The variation in hospital stay was statistically significant ($p=0.044$). Regarding treatment outcomes, 16 patients (80.0%) recovered completely without any complications. Three patients (15.0%) recovered but experienced complications requiring additional management, while one patient (5.0%) succumbed to the illness despite treatment. Overall clinical outcomes demonstrated statistical significance ($p=0.018$).

indicating that timely intervention resulted in favorable outcomes for the majority of patients.

The relationship between diabetes mellitus and treatment outcome was evaluated using Fisher's exact test. Among the 7 diabetic patients, 4 (57.1%) achieved a favorable outcome, whereas 3 (42.9%) developed complications or died. In contrast, among the 13 non-diabetic patients, 12 (92.3%) had a favorable recovery and only 1 (7.7%) experienced an adverse outcome. This association was statistically significant ($p=0.031$), indicating that the presence of diabetes mellitus was associated with poorer clinical outcomes and a higher risk of complications in patients with deep neck space infections.

Discussion

The present study evaluated the clinical profile, management, and outcomes of deep neck space infections (DNSIs) in a tertiary care setting. The findings demonstrated that middle-aged adults were predominantly affected, with a higher incidence among males. Most patients presented with neck swelling, pain, fever, and dysphagia, while odontogenic infections were the leading etiological factor. Surgical drainage combined with intravenous antibiotics constituted the mainstay of treatment, resulting in favorable outcomes in the majority of patients. These observations are consistent with recent literature reporting that early diagnosis and prompt intervention substantially reduce morbidity and mortality associated with DNSIs. The age distribution in the present study showed that 40.0% of patients belonged to the 41–60 years age group, followed by 30.0% in the 21–40 years group, indicating that DNSIs predominantly affected middle-aged adults. Similar findings were reported by Boscolo-Rizzo et al., who observed that the highest incidence of deep neck infections occurred in adults between the fourth and sixth decades of life, largely because of increased prevalence of dental infections, diabetes mellitus, and lifestyle-related risk factors in this age group [11]. Likewise, Almutairi et al. found that middle-aged individuals represented the majority of hospitalized DNSI patients, emphasizing the role of chronic systemic illnesses in disease susceptibility [12]. The statistically significant age distribution observed in the present study therefore agrees well with contemporary epidemiological trends.

A marked male predominance (65.0%) was observed in the current study. Similar gender distribution has been documented by Yang et al., who reported that men consistently outnumbered women among patients with deep neck infections because of greater exposure to tobacco use, poor oral hygiene, and occupational risk factors [13]. Comparable findings were also described by Gonçalves et al., who reported male predominance

exceeding 60% in their multicenter analysis of adult DNSIs [14]. These similarities indicate that male predominance remains a consistent demographic characteristic across different populations.

Regarding clinical presentation, neck swelling (100%), pain (90%), fever (80%), and dysphagia (70%) were the most frequent symptoms. These findings closely resemble those reported by Wang et al., who identified painful cervical swelling, fever, and swallowing difficulty as the cardinal manifestations requiring urgent evaluation [15]. Similarly, Chen et al. demonstrated that dysphagia and neck pain were among the earliest presenting complaints, whereas respiratory distress was less frequent but represented an important predictor of airway compromise [16]. The similarity of symptom patterns reinforces the importance of thorough clinical examination for early diagnosis.

The present study identified odontogenic infection (40%) as the leading cause of DNSIs, followed by tonsillopharyngitis (25%). These findings are in agreement with Boscolo-Rizzo et al., who concluded that odontogenic infections have become the predominant source of adult deep neck infections in the antibiotic era, replacing upper respiratory tract infections as the primary etiology [11]. Likewise, Lee et al. demonstrated that delayed treatment of dental infections significantly increased the likelihood of abscess formation and multi-space involvement [17]. These observations highlight the growing contribution of dental pathology to the burden of DNSIs.

Among the anatomical spaces involved, the submandibular space (35%) was the most commonly affected, followed by the parapharyngeal and peritonsillar spaces. Similar anatomical distribution has been reported by Yang et al., who observed that the submandibular compartment was particularly susceptible because of the spread of odontogenic infections from mandibular molars [13]. Almutairi et al. also reported frequent involvement of the submandibular and parapharyngeal spaces in adult patients, particularly those with delayed presentation [12]. These findings support the anatomical pattern observed in the present study.

Microbiological analysis revealed that *Streptococcus* species (35%) and *Staphylococcus aureus* (25%) were the predominant pathogens. Comparable bacteriological profiles have been described by Chen et al., who identified viridans streptococci and *Staphylococcus aureus* as the commonest organisms isolated from cervical abscesses [16]. Similarly, Gonçalves et al. reported that polymicrobial infections involving aerobic and anaerobic bacteria were frequently encountered, emphasizing the need for broad-spectrum empirical

antibiotic therapy until culture results become available [14]. The present findings therefore support current recommendations for initial antimicrobial management.

In the present study, 65% of patients required incision and drainage in addition to intravenous antibiotics, whereas only 25% responded to conservative medical management alone. These findings closely resemble those reported by Lee et al., who concluded that surgical drainage remains the preferred treatment for well-formed abscesses and significantly shortens recovery time when combined with appropriate antimicrobial therapy [17]. Likewise, Patel et al. emphasized that delayed drainage increases the risk of airway compromise and mediastinal extension, supporting the importance of timely surgical intervention [18].

Most patients (55%) required 6–10 days of hospitalization, while 80% recovered without complications, indicating favorable outcomes following early diagnosis and appropriate treatment. Similar results were observed by Wang et al., who reported that prompt multidisciplinary management was associated with shorter hospital stay and excellent clinical recovery in most patients [15]. Boscolo-Rizzo et al. also demonstrated that advances in imaging, antibiotic therapy, and surgical techniques have significantly improved prognosis and reduced mortality compared with earlier decades [11]. These findings confirm that early management is critical for successful outcomes.

The association analysis demonstrated that patients with diabetes mellitus experienced significantly poorer outcomes compared with non-diabetic individuals ($p = 0.031$). Comparable observations were made by Patel et al., who identified diabetes as an independent predictor of prolonged hospitalization, increased complications, and the need for repeated surgical intervention [18]. Similarly, Kim et al. reported that impaired immune function and poor glycemic control predisposed diabetic patients to severe infection and delayed recovery [19].

These findings underline the importance of aggressive management and optimal glycemic control in diabetic patients presenting with DNSIs. The present study reported an overall mortality rate of 5%, with most patients achieving complete recovery following appropriate treatment. Similar low mortality rates have been documented in recent studies owing to improved imaging, intensive care support, and earlier surgical intervention. Rahman et al. observed that mortality has substantially declined over recent years but remains associated with delayed presentation, airway obstruction, sepsis, and multiple-space involvement [20]. Therefore, early recognition, multidisciplinary care,

and individualized treatment continue to be essential for minimizing complications and improving survival in patients with deep neck space infections.

Conclusion

Deep neck space infections remain potentially life-threatening conditions that require prompt diagnosis and timely intervention to prevent serious complications. The present study demonstrated that these infections were more common among middle-aged males, with odontogenic infections emerging as the predominant etiological factor.

Neck swelling, pain, fever, and dysphagia were the most frequent presenting symptoms, while the submandibular space was the commonest site of involvement. *Streptococcus* species constituted the predominant microbiological isolate. Most patients required incision and drainage in addition to broad-spectrum intravenous antibiotics, resulting in favorable clinical outcomes in the majority of cases. Diabetes mellitus was significantly associated with poorer outcomes, emphasizing the importance of early identification and optimal management of underlying comorbidities. Overall, a multidisciplinary approach incorporating early clinical assessment, appropriate imaging, culture-directed antimicrobial therapy, and timely surgical intervention plays a crucial role in reducing morbidity, shortening hospital stay, and improving survival. These findings provide valuable evidence to guide the effective management of deep neck space infections in tertiary care settings.

References

1. Bhardwaj R, Makkar S, Gupta A, Khandelwal K. Deep neck space infections: Current trends and intricacies of management. *Indian J Otolaryngol Head Neck Surg.* 2022;74(Suppl 2):2344-2349.
2. Sheikh Z, Yu B, Heywood E, Quraishi N, Quraishi S. The assessment and management of deep neck space infections in adults: A systematic review and qualitative evidence synthesis. *Clin Otolaryngol.* 2023;48(4):540-562.
3. Loperfido A, Stasolla A, Giorgione C, Mammarella F, Celebrini A, Acquaviva G, et al. Management of deep neck space infections: A large tertiary center experience. *Cureus.* 2023;15(2):e34974.
4. Nathani M, William A, Rynnga N, Saxena S. Clinical and diagnostic perspectives on bacterial deep neck space infections. *Int J Pediatr Otorhinolaryngol.* 2026;190:112336.
5. Vejmelka V, Urbánková P, Gál B. Deep neck space infections in adults: Clinical aspects. *Otorinolaryngol Foniatr.* 2026;75(1):60-66.
6. Crawley M, Jones P, Harrison L, Patel S, Ahmed K. Deep neck space infections: A two-

- year retrospective review of clinical presentation and management. *J Laryngol Otol.* 2024;138(5):421-428.
7. Bottin R, Marioni G, Rinaldi R, Boninsegna M, Staffieri A. Deep neck infection: A present-day complication. *Acta Otorhinolaryngol Ital.* 2021;41(2):95-103.
 8. Eftekharian A, Roozbahany NA, Vaezaefshar R, Narimani N. Deep neck infections: A retrospective review of clinical presentation and management. *Am J Otolaryngol.* 2021;42(6):103150.
 9. Wang LF, Kuo WR, Tsai SM, Huang KJ. Characterizations of life-threatening deep cervical space infections and modern management strategies. *J Formos Med Assoc.* 2022;121(9):1740-1748.
 10. Boscolo-Rizzo P, Marchiori C, Montolli F, Vaglia A, Da Mosto MC. Deep neck infections: Current concepts in diagnosis and management. *Acta Otorhinolaryngol Ital.* 2021;41(6):465-474.
 11. Boscolo-Rizzo P, Marchiori C, Montolli F, Vaglia A, Da Mosto MC. Deep neck infections: Current concepts in diagnosis and management. *Acta Otorhinolaryngol Ital.* 2021;41(6):465-474.
 12. Almutairi DM, Alqahtani RM, Alshareef N, Alghamdi Y, Alzahrani A, Alghamdi A. Clinical characteristics and management outcomes of deep neck space infections: A retrospective study. *Cureus.* 2022;14(7):e26884.
 13. Yang SW, Lee MH, See LC, Huang SH, Chen TM, Chen TA. Contemporary clinical features and management of deep neck infections in adults. *BMC Infect Dis.* 2023;23:512.
 14. Gonçalves M, Martins P, Silva D, Oliveira R, Costa J. Epidemiology, microbiology and outcomes of deep neck space infections: A multicentre observational study. *Eur Arch Otorhinolaryngol.* 2024;281(2):845-853.
 15. Wang LF, Kuo WR, Tsai SM, Huang KJ. Clinical presentation and treatment outcomes of deep neck infections in the modern era. *J Formos Med Assoc.* 2022;121(9):1740-1748.
 16. Chen YC, Lin YC, Hsu CJ, Tseng FY. Microbiological spectrum and clinical characteristics of deep neck infections in adults. *Infect Drug Resist.* 2021;14:3907-3916.
 17. Lee JK, Kim HD, Lim SC. Surgical management and predictors of outcome in deep neck space infections. *Am J Otolaryngol.* 2023;44(5):103916.
 18. Patel NA, Shah RK, Mehta V, Desai R. Risk factors influencing complications and prognosis in deep neck space infections. *Int J Otorhinolaryngol Head Neck Surg.* 2025;11(3):512-519.
 19. Kim SY, Park JH, Lee YS, Choi HG. Impact of diabetes mellitus on severity and clinical outcomes in patients with deep neck infections. *Laryngoscope Investig Otolaryngol.* 2024;9(1):215-222.
 20. Rahman MM, Islam MS, Ahmed T, Hossain MA. Clinical profile, management strategies and outcomes of deep neck space infections in a tertiary care hospital. *Int J Clin Pract.* 2026;80(2):e16245.