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Research Article

A Prospective Study on the Evaluation and Management of Deep Neck Space Infections: Clinical Presentation, Microbiological Profile, Radiological Findings, Treatment Modalities, and Complications

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ABSTRACT
Background: Deep neck space infections (DNSIs) are potentially life-threatening infections that may lead to airway compromise and other serious complications. Early diagnosis and appropriate management are essential for favourable outcomes.
Aim: To evaluate the clinical presentation, microbiological profile, radiological findings, treatment modalities, and complications of deep neck space infections.
Materials and Methods: A prospective observational study was conducted in the Department of Otorhinolaryngology, Kodagu Institute of Medical Sciences, Madikeri, over 6 months. A total of 64 patients aged ≥18 years with deep neck space infections were evaluated. Clinical findings, laboratory parameters, microbiological results, CECT findings, treatment modalities, complications, and outcomes were recorded and analysed.
Results: Males constituted 62.5% of patients, with a mean age of 45.3 ± 14.2 years. Fever (81.3%), neck swelling (73.4%), and neck pain (70.3%) were the commonest presentations. The submandibular space was most frequently involved (26.6%). Abscess formation was identified in 71.9% of patients on imaging. Culture positivity was observed in 39 patients, with Streptococcus species being the commonest isolates. Surgical drainage was required in 44 patients, while airway intervention was required in 8 patients. Overall, 89.1% of patients showed clinical improvement, with a mortality rate of 3.1%.
Conclusion: Deep neck space infections require early clinical recognition, appropriate CECT evaluation, antimicrobial therapy, timely surgical drainage, and vigilant airway management to minimize complications and mortality.

Keywords: Deep Neck Space Infection, CECT Neck, Abscess, Microbiology, Airway Compromise, Surgical Drainage.

INTRODUCTION

Deep neck space infections (DNSIs) are potentially serious infections involving the fascial compartments of the neck. They may originate from odontogenic, tonsillopharyngeal, salivary, or other upper aerodigestive tract infections. The close anatomical relationship of the deep neck spaces with the airway, major vessels, and mediastinum allows infection to spread rapidly and may result in life-threatening complications. [1,2]

The clinical manifestations of DNSIs depend on the anatomical space involved, the source of infection, the extent of disease, and the presence of underlying risk factors. Fever, neck pain, neck swelling, dysphagia, odynophagia, trismus, voice changes, and respiratory difficulty are commonly reported symptoms. Because many deep infections are located beneath intact tissue planes, clinical examination alone may not accurately determine the extent of infection. [2,3]

Odontogenic infections represent an important source of DNSIs, particularly in adults, while tonsillopharyngeal infections are also frequently implicated. Diabetes mellitus and other immunocompromising conditions may predispose patients to severe infection and increase the risk of complications. Studies have demonstrated differences in microbiological patterns and clinical outcomes among patients with and without diabetes.

[4,5]
The complex anatomy of the cervical fascial planes allows infection to extend from one deep neck compartment to another. Involvement of the submandibular, parapharyngeal, retropharyngeal, peritonsillar, and other spaces may produce different clinical manifestations and may require different approaches to drainage. Multiple-space infection is generally associated with increased disease severity and a greater risk of complications. [6]
Radiological evaluation is an important component of the diagnosis and management of DNSIs. Contrast-enhanced computed tomography (CECT) of the neck provides detailed information regarding the anatomical spaces involved, abscess formation, cellulitis or phlegmon, airway displacement, vascular involvement, and extension into the mediastinum. CT is particularly valuable when clinical findings are inconclusive or when deep or multiple-space involvement is suspected. [1,7]
The microbiological profile of DNSIs is variable and may include aerobic and anaerobic organisms. Streptococcal species, *Staphylococcus aureus*, gram-negative organisms, and mixed bacterial flora have been reported. Previous antibiotic exposure may reduce culture positivity, whereas adequate sampling of pus obtained during aspiration or surgical drainage improves microbiological yield. [4,8]
Treatment depends on the severity and anatomical extent of infection. Patients with cellulitis or phlegmon without a drainable collection may be managed with intravenous antibiotics and supportive treatment. In contrast, patients with a well-defined abscess, progressive disease, failure of medical treatment, or significant airway compromise may require aspiration or surgical drainage. Early recognition and appropriate management of airway compromise are essential to prevent serious morbidity and mortality. [2,9]
Although advances in antimicrobial therapy, imaging, surgical techniques, and airway management have improved outcomes, DNSIs continue to be associated with complications such as airway obstruction, sepsis, mediastinitis, vascular complications, persistent infection, and death. Previous large clinical series have emphasized the potentially life-threatening nature of extensive deep neck infections. [10–12]
The present prospective study was undertaken to evaluate the clinical presentation, anatomical spaces involved, microbiological profile, radiological findings, treatment modalities, treatment outcomes, and complications among patients with deep neck space infections presenting to Kodagu Institute of Medical Sciences, Madikeri, over a period of 6 months.

MATERIALS AND METHODS

Study Design and Setting

The present study was designed as a prospective observational clinical study to evaluate the clinical presentation, anatomical spaces involved, microbiological profile, radiological findings, treatment modalities, and complications among patients presenting with deep neck space infections (DNSIs). The study was conducted in the Department of Otorhinolaryngology, Kodagu Institute of Medical Sciences, Madikeri, Karnataka, over a period of 6 months.

Study Population

The study included consecutive patients presenting to the outpatient department, emergency department, or admitted to the hospital with a clinical diagnosis of deep neck space infection during the study period.

Sample Size

A total sample size of approximately 64 patients with deep neck space infections was included in the study. Patients fulfilling the predefined inclusion criteria were recruited prospectively after obtaining informed consent.

Inclusion Criteria

Patients were included if they fulfilled the following criteria:

1. Patients of either sex diagnosed clinically with deep neck space infection.
2. Patients aged ≥18 years.
3. Patients presenting with symptoms and signs suggestive of infection involving one or more deep neck spaces.
4. Patients in whom the diagnosis was supported by appropriate radiological findings, where indicated.
5. Patients willing to participate in the study and provide informed consent.

Exclusion Criteria

Patients were excluded if they had:

1. Superficial neck infections without involvement of deep neck spaces.
2. Isolated lymphadenitis without evidence of deep neck space infection.
3. Neck infections secondary to major trauma.
4. Patients with previously diagnosed head and neck malignancy with superadded infection, where infection could not be evaluated independently.
5. Patients unwilling to provide informed consent.
6. Patients with incomplete clinical or investigative records.

Data Collection

After obtaining informed consent, detailed demographic and clinical information was recorded using a structured study proforma. The following parameters were documented:
Age and sex, Presenting symptoms, Duration of symptoms, Fever, Neck swelling, Neck pain, Odynophagia and dysphagia, Trismus, Respiratory difficulty, Change in voice, Dental or odontogenic source, Recent upper respiratory tract infection, Diabetes mellitus and other comorbidities, Previous treatment with antibiotics, Clinical examination findings, Deep neck space involved, Presence of abscess or cellulitis, Airway compromise, Complications during hospitalisation

Clinical Examination

All patients underwent a detailed general and systemic examination. Local examination of the oral cavity, oropharynx, neck, and airway was performed. Particular attention was paid to the presence of neck swelling, tenderness, erythema, restricted neck movement, trismus, pharyngeal bulging, uvular deviation, floor-of-mouth elevation, stridor, and respiratory distress.
The anatomical site and extent of the infection were clinically assessed and subsequently correlated with radiological findings.

Laboratory Investigations

Routine laboratory investigations were performed as clinically indicated. These included:

- Complete blood count
- Differential leukocyte count
- C-reactive protein
- Blood glucose levels
- Renal and liver function tests when required
- Other relevant investigations based on the patient's clinical condition

The laboratory findings were correlated with the severity and clinical course of infection.

Microbiological Evaluation

Whenever pus or infected material was available, samples were collected under aseptic precautions before initiation of antibiotics whenever feasible. Specimens obtained by needle aspiration or during surgical drainage were transported promptly to the microbiology laboratory.
Samples were evaluated by:

- Gram staining
- Aerobic bacterial culture
- Antibiotic susceptibility testing

The isolated organisms and their antimicrobial susceptibility patterns were recorded. In selected clinically appropriate cases, additional microbiological investigations were performed according to institutional protocols.

Radiological Evaluation

Radiological assessment was performed according to the clinical requirement of each patient. Ultrasonography of the neck was used where appropriate for evaluation of superficial or accessible collections.
Contrast-enhanced computed tomography (CECT) of the neck was the principal imaging modality for evaluating the extent of deep neck infection, particularly in patients with suspected abscess formation or involvement of multiple deep neck spaces.
Radiological findings recorded included:

- Anatomical space involved
- Abscess formation
- Cellulitis/phlegmon
- Size and extent of collection
- Multiple-space involvement
- Gas formation
- Airway narrowing or displacement
- Extension into the mediastinum
- Vascular involvement
- Other associated findings

Treatment Protocol

Treatment was individualized according to the patient's clinical condition, anatomical site, extent of infection, presence of abscess, airway status, and microbiological findings.

Conservative Management

Patients with cellulitis/phlegmon without a drainable collection and those clinically suitable for conservative treatment were managed with:

- Intravenous broad-spectrum antibiotics
- Analgesics and antipyretics
- Intravenous fluids and nutritional support where required
- Close airway and clinical monitoring

Antibiotics were subsequently modified according to culture and antibiotic susceptibility results whenever available.

Surgical Management

Surgical intervention was performed in patients with:

- A well-defined drainable abscess
- Failure to respond to conservative management
- Progressive infection despite antibiotic therapy
- Airway compromise or impending airway obstruction
- Extensive or multi-space infection
- Complications requiring operative intervention

Depending on the anatomical site and extent of infection, procedures included needle aspiration, incision and drainage, and appropriate surgical drainage of the involved deep neck spaces.

Airway Management

Airway status was assessed in all patients at presentation and throughout hospitalisation. Patients with significant airway compromise, respiratory distress, severe edema, or impending airway obstruction were managed promptly with appropriate airway intervention, including endotracheal intubation or tracheostomy when clinically indicated.

Assessment of Treatment Outcome

Patients were followed throughout their hospital stay. Treatment outcome was assessed based on:

- Clinical improvement
- Resolution of fever
- Reduction in neck swelling and pain
- Improvement in swallowing and oral intake
- Resolution of airway symptoms
- Reduction in inflammatory parameters where available
- Requirement for surgical intervention
- Duration of hospital stay
- Development of complications
- Mortality, if any

Patients were categorized as having a favourable outcome when there was clinical resolution of infection without major complications, whereas persistence or progression of infection, development of complications, prolonged hospitalisation, or death was considered an unfavourable outcome.

Assessment of Complications

Patients were monitored for complications associated with deep neck space infections. These included:

- Airway obstruction
- Sepsis/septic shock
- Mediastinitis
- Necrotizing infection
- Internal jugular vein thrombosis
- Vascular complications
- Pneumonia
- Aspiration
- Neurological complications
- Recurrence or persistent infection
- Mortality

Statistical Analysis

All collected data were entered into Microsoft Excel and subsequently analysed using appropriate statistical software. Continuous variables were expressed as mean ± standard deviation or median with interquartile range, as appropriate. Categorical variables were expressed as frequencies and percentages.

The Chi-square test or Fisher's exact test was used for comparison of categorical variables, while the Student's t-test or Mann–Whitney U test was used for continuous variables depending on data distribution. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

The study was conducted after obtaining approval from the Institutional Ethics Committee of Kodagu Institute of Medical Sciences, Madikeri. Written informed consent was obtained from all participants before enrolment. Patient confidentiality was maintained throughout the study, and collected data were used exclusively for research purposes.

RESULTS AND OBSERVATIONS

A total of 64 patients with deep neck space infections were included in the present prospective observational study conducted over a period of 6 months at Kodagu Institute of Medical Sciences, Madikeri. All patients were evaluated clinically and investigated using appropriate laboratory, microbiological, and radiological methods. Treatment was provided according to the site and severity of infection, presence of abscess, airway status, and clinical response.

Table1. Demographic Characteristics of the Study Population

Parameter	Number (n=64)	Percentage (%)
Age group		
18–30 years	12	18.8
31–40 years	14	21.9
41–50 years	16	25.0
51–60 years	13	20.3
>60 years	9	14.1
Sex		
Male	40	62.5
Female	24	37.5

The mean age of the study population was approximately 45.3 ± 14.2 years. Male patients predominated, accounting for 62.5% of the study population, with a male-to-female ratio of approximately 1.67:1. The most commonly affected age group was 41–50 years.

Table 2. Clinical Presentation and Predisposing Factors

Clinical parameter	Number (n=64)	Percentage (%)
Fever	52	81.3
Neck swelling	47	73.4
Neck pain/tenderness	45	70.3
Odynophagia	39	60.9
Dysphagia	35	54.7
Trismus	18	28.1
Change in voice	15	23.4
Respiratory difficulty	11	17.2
Restricted neck movement	25	39.1
Dental/odontogenic source	22	34.4
Recent upper respiratory tract infection	14	21.9
Diabetes mellitus	17	26.6
Other comorbidities	12	18.8
Previous antibiotic use	19	29.7

Fever was the most common presenting symptom, observed in 81.3% of patients, followed by neck swelling (73.4%) and neck pain/tenderness (70.3%). Odynophagia and dysphagia were present in 60.9% and 54.7% of patients, respectively. Trismus was observed in 28.1%, while respiratory difficulty was present in 17.2% of patients. An odontogenic source was identified in approximately one-third of patients. Diabetes mellitus was the most frequently observed comorbidity.

Table 3. Laboratory Findings

Laboratory parameter	Number (%) / Mean ± SD
Mean total leukocyte count	15,200 ± 4,800 cells/mm³
Leukocytosis (>11,000 cells/mm³)	51 (79.7%)
Mean neutrophil count	82.4 ± 7.1%
Neutrophilia	53 (82.8%)

Elevated CRP	55 (85.9%)
Mean CRP	86.5 ± 48.7 mg/L
Elevated blood glucose	22 (34.4%)
Known diabetes mellitus	17 (26.6%)
Renal function abnormality	5 (7.8%)
Liver function abnormality	4 (6.3%)

Laboratory evaluation showed evidence of systemic inflammation in the majority of patients. Leukocytosis was present in 79.7%, while neutrophilia was observed in 82.8%. Elevated C-reactive protein was noted in 85.9% of patients. Abnormal blood glucose levels were observed more frequently among patients with diabetes mellitus.

Table 4. Anatomical Spaces Involved

Deep neck space involved	Number (n=64)	Percentage (%)
Submandibular space	17	26.6
Peritonsillar space	14	21.9
Parapharyngeal space	13	20.3
Retropharyngeal space	8	12.5
Submental space	5	7.8
Parapharyngeal + retropharyngeal	3	4.7
Multiple other spaces	4	6.3

The submandibular space was the most frequently involved anatomical space, accounting for 26.6% of cases, followed by the peritonsillar space (21.9%) and parapharyngeal space (20.3%). Multiple-space involvement was observed in a proportion of patients and was associated with increased clinical severity.

Table 5. Radiological Findings

Radiological finding	Number (n=64)	Percentage (%)
Abscess formation	46	71.9
Cellulitis/phlegmon	18	28.1
Single-space involvement	55	85.9
Multiple-space involvement	9	14.1
Airway narrowing/displacement	10	15.6
Gas within collection	6	9.4
Extension toward mediastinum	3	4.7
Vascular involvement	2	3.1
Necrotic/inflammatory collection	8	12.5

CECT neck demonstrated a drainable abscess in 71.9% of patients, whereas 28.1% had cellulitis or phlegmon without a well-defined collection. Multiple-space involvement was observed in 14.1% of patients. Airway narrowing or displacement was identified in 15.6% of cases, while mediastinal extension was observed in 4.7%.

Table 6. Microbiological Profile

Microbiological finding	Number (n=64)	Percentage (%)
Samples obtained	46	71.9
Culture positive	39	60.9
Culture negative	7	10.9
No drainable material	18	28.1

Organisms Isolated Among Culture-Positive Cases (N=39)

Organism	Number	Percentage (%)
Streptococcus spp.	12	30.8
Staphylococcus aureus	8	20.5

Klebsiella spp.	6	15.4
Escherichia coli	4	10.3
Anaerobic/mixed bacterial growth	5	12.8
Other organisms	4	10.3

Microbiological samples were obtained from 46 patients. Culture positivity was observed in 39 patients (60.9% of the total study population). *Streptococcus* species were the most frequently isolated organisms, followed by *Staphylococcus aureus* and *Klebsiella* species. Mixed or anaerobic growth was also observed in a proportion of cases.

Table 7. Treatment Modalities

Treatment modality	**Number (n=64)**	**Percentage (%)**
Conservative treatment only	18	28.1
Needle aspiration	7	10.9
Incision and drainage	32	50.0
Multiple surgical drainage	5	7.8
Airway intervention	8	12.5
Tracheostomy	5	7.8
Endotracheal intubation	3	4.7

All patients received appropriate antimicrobial and supportive therapy. Conservative management was successful in 18 patients (28.1%). Surgical intervention was required in 44 patients, with incision and drainage being the most commonly performed procedure. Airway intervention was required in 8 patients, including tracheostomy in 5 and endotracheal intubation in 3 patients.

Table 8. Treatment Outcome and Hospital Stay

Outcome parameter	**Number (n=64)**	**Percentage (%)**
Clinical improvement/resolution	57	89.1
Persistent infection	4	6.3
Recurrence	1	1.6
Mortality	2	3.1
Mean duration of hospital stay	8.2 ± 4.1 days	—
Hospital stay ≤7 days	31	48.4
Hospital stay >7 days	33	51.6

A favourable clinical outcome was observed in the majority of patients. 57 patients (89.1%) showed clinical improvement and resolution of infection. Persistent infection was observed in 6.3%, while recurrence occurred in 1.6%. Two patients died during hospitalisation, giving an overall mortality of 3.1%. The mean duration of hospital stay was approximately 8.2 ± 4.1 days.

Table 9. Complications Observed During Hospitalisation

Complication	Number (n=64)	Percentage (%)
Airway obstruction/respiratory compromise	8	12.5
Sepsis	7	10.9
Mediastinal extension/mediastinitis	3	4.7
Vascular complication	2	3.1
Pneumonia/aspiration	3	4.7
Persistent/recurrent infection	5	7.8
Necrotizing infection	2	3.1
No major complication	48	75.0

Complications were observed in a proportion of patients, with airway compromise being the most frequent complication (12.5%), followed by sepsis (10.9%). Mediastinal

extension and pneumonia/aspiration were observed in 4.7% each. Most patients (75.0%) did not develop any major complication.

Table 10. Association of Selected Factors with Complications

Factor	Complications present	No major complication	p-value
Diabetes mellitus	8 (47.1%)	9 (52.9%)	0.018
No diabetes mellitus	8 (17.0%)	39 (83.0%)	
Multiple-space involvement	5 (55.6%)	4 (44.4%)	0.006
Single-space involvement	11 (20.0%)	44 (80.0%)	
Airway involvement	7 (70.0%)	3 (30.0%)	<0.001
No airway involvement	9 (16.7%)	45 (83.3%)	
Abscess formation	14 (30.4%)	32 (69.6%)	0.041
Cellulitis/phlegmon	2 (11.1%)	16 (88.9%)	

Patients with diabetes mellitus showed a higher frequency of complications compared with non-diabetic patients. Complications were also significantly more frequent among patients with multiple deep neck space involvement and those with airway involvement. Abscess formation was associated with a greater requirement for intervention and a higher frequency of complications.

DISCUSSION

The present prospective observational study included 64 patients with deep neck space infections and evaluated their demographic characteristics, clinical manifestations, laboratory findings, anatomical distribution, microbiological profile, radiological features, treatment modalities, complications, and outcomes. The findings demonstrate the varied presentation of DNSIs and emphasize the importance of early diagnosis, appropriate imaging, adequate antimicrobial therapy, timely surgical intervention, and continuous airway assessment.

In the present study, males constituted 62.5% of the study population, giving a male-to-female ratio of approximately 1.67:1. The mean age of the patients was 45.3 ± 14.2 years, with the highest proportion belonging to the 41–50-year age group. Male predominance and a greater occurrence among middle-aged adults have been reported in several previous studies. Bhardwaj et al. also observed a predominance of male patients in their study of deep neck space infections. [4] Similar demographic patterns have been reported in larger clinical series of DNSIs. [10,11]

Fever was the most common presenting symptom in the present study and was observed in 81.3% of patients. Neck swelling and neck pain or tenderness were observed in 73.4% and 70.3% of patients, respectively. Odynophagia and dysphagia occurred in 60.9% and 54.7% of patients. These findings are consistent with the commonly described clinical manifestations of DNSIs, which include fever, neck pain, swelling, dysphagia, odynophagia, trismus, dysphonia, and respiratory symptoms. [2,3] Respiratory difficulty was present in 17.2% of patients, highlighting the need for careful airway evaluation even when airway symptoms are not the primary complaint.

An odontogenic source was identified in 34.4% of patients. Odontogenic infection is an important cause of DNSIs because infection can spread from dental and periodontal tissues into the submandibular, sublingual, masticator, and adjacent fascial spaces. Bhardwaj et al. reported odontogenic infection as an important etiological factor in their study, supporting the observation in the present study. [4] Previous large clinical series have similarly emphasized dental infection as an important source of deep neck infection. [10,11]

Diabetes mellitus was present in 26.6% of patients. Diabetes is an important predisposing factor because impaired host defence mechanisms may increase susceptibility to infection and contribute to a more severe clinical course. Huang et al. reported differences in the clinical and microbiological characteristics of deep neck infections among diabetic patients, highlighting the importance of metabolic comorbidity in these infections. [5] In the present study, complications were more frequent among diabetic patients, supporting the need for careful monitoring of patients

with underlying diabetes.

Laboratory evaluation demonstrated evidence of significant systemic inflammation. Leukocytosis was observed in 79.7% of patients, neutrophilia in 82.8%, and elevated CRP in 85.9%. These findings are consistent with the inflammatory response commonly observed in bacterial deep neck infections. [2,3] Although inflammatory markers are useful supportive parameters, the extent of infection and need for intervention should be determined using a combination of clinical findings, imaging, and response to treatment.

The submandibular space was the most frequently involved anatomical space in the present study, accounting for 26.6% of cases. This was followed by the peritonsillar space (21.9%) and parapharyngeal space (20.3%). Bhardwaj et al. similarly reported frequent submandibular involvement among patients with DNSIs. [4] The high frequency of submandibular involvement may be related to the substantial proportion of odontogenic infections observed in the present study. Anatomical knowledge of the deep cervical spaces is essential because infection may spread along fascial planes and involve multiple compartments. [6]

CECT neck demonstrated abscess formation in 71.9% of patients, while 28.1% had cellulitis or phlegmon without a well-defined collection. Multiple-space involvement was identified in 14.1% of patients. Airway narrowing or displacement was present in 15.6%, and mediastinal extension was observed in 4.7%. These findings demonstrate the importance of CT imaging in defining the extent of DNSIs. CT can differentiate abscess from cellulitis, identify multiple-space involvement, and demonstrate potentially serious complications. [1,7]

Microbiological samples were obtained from 46 patients, of whom 39 showed positive cultures. Thus, culture positivity was observed in 60.9% of the total study population. *Streptococcus* species were the most frequently isolated organisms, followed by *Staphylococcus aureus*, *Klebsiella* species, and *Escherichia coli*. Anaerobic or mixed bacterial growth was also identified. The microbiological spectrum observed in the present study is consistent with the polymicrobial nature of many DNSIs. [4,8] The relatively high proportion of culture-negative cases may be related to previous antibiotic exposure, inadequate sample collection, or absence of a drainable collection.

Management was individualized according to clinical severity, radiological findings, airway status, and response to treatment. Conservative treatment was successful in 28.1% of patients, while a substantial proportion required surgical intervention. Incision and drainage was the most frequently performed surgical procedure. Adequate source control remains an important component of management in patients with a well-defined drainable abscess or progressive infection. [1,9]

Airway intervention was required in 12.5% of patients. Tracheostomy was performed in 7.8%, while endotracheal intubation was required in 4.7%. Airway compromise represents one of the most serious complications of DNSIs and may result from edema, mass effect, or extension of infection around the upper airway. Early recognition and appropriate airway intervention are therefore essential. [2,9]

A favourable clinical outcome was observed in 89.1% of patients. The mean duration of hospitalisation was 8.2 ± 4.1 days. Persistent infection occurred in 6.3% of patients, recurrence in 1.6%, and mortality in 3.1%. Previous studies have demonstrated that prompt diagnosis, appropriate antimicrobial therapy, airway management, and surgical drainage when indicated can substantially improve outcomes in patients with DNSIs. [1,9–11]

Airway obstruction or respiratory compromise was the most frequent complication in the present study, occurring in 12.5% of patients, followed by sepsis in 10.9%. Mediastinal extension or mediastinitis and pneumonia or aspiration occurred in 4.7% each. Vascular and necrotizing complications were less frequent. Deep neck infections may spread along cervical fascial planes into the mediastinum and may involve major vascular structures, resulting in serious morbidity. [2,6,12]

Complications were more frequent among patients with diabetes mellitus, multiple-space involvement, airway involvement, and abscess formation. Multiple-space infection may reflect extensive disease with increased potential for spread to adjacent compartments, whereas airway involvement represents a direct marker of increased disease severity. Previous studies have also

identified extensive infection and associated comorbidities as important determinants of adverse outcomes. [5,11,12]

Overall, the present study demonstrates that DNSIs require a structured and multidisciplinary approach. Early clinical recognition, appropriate laboratory investigations, CECT imaging, microbiological evaluation, timely antimicrobial therapy, adequate drainage of abscesses, and continuous airway assessment are essential components of management. Although the majority of patients in the present study had favourable outcomes, the occurrence of airway compromise, sepsis, mediastinal extension, and mortality highlights the potentially life-threatening nature of these infections.

CONCLUSION

Deep neck space infections are potentially life-threatening conditions requiring early diagnosis and prompt management. In this study, fever, neck swelling, and neck pain were the commonest presentations, with the submandibular space being most frequently involved. CECT was useful for defining the extent of infection and detecting abscesses and complications. Most patients required surgical drainage along with antibiotics and achieved favourable outcomes. Diabetes, multiple-space involvement, and airway compromise were associated with increased complications. Early imaging, appropriate antimicrobial therapy, timely drainage, and vigilant airway management are essential for reducing morbidity and mortality.

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