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ORIGINAL RESEARCH

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Comprehensive evaluation of deep neck infections: A retrospective analysis of 111 cases

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Abstract

Purpose: Our study will analyze patients' clinical characteristics, treatment strategies, and complications with deep neck infection (DNI) using their medical records for five years.

Methods: The present study included 111 patients diagnosed with DNI in our clinic between January 2018 and March 2023. The patients' complaints at admission, sociodemographic characteristics, season of diagnosis, findings from laboratory tests, radiological imaging performed at the time of first diagnosis, abscess localization, medical and surgical treatment methods used, and complications developing during follow-up were retrospectively examined.

Results: The mean age of the patients included in the study was 38.51 ± 16.92 (6–87 years). There was a significant correlation between chronic disease, smoking behaviours, oral hygiene, and DNI among patients based on their sociodemographic characteristics and medical history ($p < .005$). DNI development did not differ by season ($p > .005$). Physical examination findings predominantly revealed neck masses (39.6%) and peritonsillar abscesses (32.4%), and patients with peritonsillar abscesses had a shorter length of hospital stay than those with other localizations. No severe complications occurred during the clinical follow-up.

Conclusion: Chronic diseases, smoking, and poor oral hygiene are the primary risk factors for developing DNIs. If an abscess is located in a critical area, it may require extended hospitalization and surgery under general anesthesia. Therefore, addressing these risk factors and encouraging good oral hygiene practices are crucial to preventing DNIs and reducing the need for intensive treatment.

KEYWORDS
chronic diseases, deep neck infection, hospitalization duration, odontogenic hygiene, seasonal, smoking

1 | INTRODUCTION

Deep neck infection (DNI) is a life-threatening infection affecting the spaces and fascia within the neck. It manifests in various forms, such as cellulitis, phlegm, and advanced abscesses. Despite the reduced incidence because of widespread antibiotic use, DNI remains a prevalent clinical condition in ear, nose, and throat (ENT) practice. Although ENT physicians possess a comprehensive understanding of the clinical manifestations of DNI and can promptly diagnose and initiate treatment, the condition remains life-threatening for patients.[1–4]

DNIs tend to occur more frequently in individuals with conditions causing immunosuppression, inadequate oral and dental hygiene, prolonged and unnecessary antibiotic use, smoking, and alcohol consumption among the elderly population.[1,4,5] DNIs are also common among pediatric patients, with odontogenic infections being the primary cause in adults and tonsillar and pharyngeal infections in pediatric cases. Odontogenic infections are the second most common cause among the pediatric population.[6,7]

DNIs are polymicrobial infections caused by aerobic and anaerobic bacteria. The etiopathogenesis involves bacteria similar to the oropharyngeal or nasopharyngeal flora of the host, making identifying the primary causative pathogen often challenging. Consequently, broad-spectrum, empiric antibiotic therapy is the primary treatment approach, with culture-guided therapy reserved for cases where samples are obtained from abscess sites. Many patients with DNI who do not develop abscesses or complications can be treated with appropriate parenteral antibiotics. However, surgical drainage under local or general anesthesia is required for patients whose clinical conditions cannot be controlled medically and who develop abscesses. Thus, patients who develop abscesses can recover quickly and avoid complications.[8–11]

Contrast-enhanced computed tomography (CT) is the most effective radiological evaluation method for localizing DNI and facilitating diagnosis. Delayed diagnosis and treatment can lead to complications, such as mediastinitis, airway obstruction, jugular vein thrombosis, pericarditis, pleural empyema, and arterial erosion, significantly increasing morbidity and mortality rates. Therefore, treatment management and close clinical follow-up are crucial for such patients.[1–4]

This study aimed to retrospectively review the demographic data, clinical characteristics, microbiological and radiological findings of hospitalized patients diagnosed with DNI, and the treatment approach based on existing literature.

2 | PATIENTS AND METHODS

In this retrospective cohort study conducted between January 2018 and March 2023, the medical records of 111 patients who were treated and followed up in the ENT clinic of a tertiary-level teaching and research hospital diagnosed with DNI were analyzed. The study population comprised patients with comprehensive data obtained from hospital records and who provided informed consent to participate. The patients presented with a history of rapid growth of neck glands, severe sore throat, and difficulty breathing. Physical examinations indicated neck lumps, dental abscesses, and enlarged neck glands. Clinical and radiological assessments, including evaluations for parotitis, periorbital and premaxillary edema, dental abscess, trismus, and peritonsillar abscess, contributed to the confirmation of the DNI diagnosis.

Patients with superficial neck infections, those developing DNI after trauma or surgery, and pregnant women were excluded from the study. Patients for whom none of the parameters evaluated in the study could be accessed from the hospital registry system were also excluded. All patients who met the inclusion criteria were contacted by phone. Verbal consent was obtained from all eligible patients; however, patients who did not consent were excluded from the study.

The hospital registry system provided demographic data and medical records, including admission complaints, habits, oral hygiene status, the season of admission, clinical characteristics, acute phase reactants, C-reactive protein (CRP), leukocyte, and neutrophil values at the time of first admission. The localization of the abscess and the presence of a condition requiring local or general anesthesia for abscess drainage, in addition to medical treatment, was evaluated during diagnostic imaging on patients. During the follow-ups, the development of complications and the need for a tracheotomy were also recorded. All patients were treated according to our clinic's protocol for the diagnosis and treatment of DNIs. The doctors who followed the patients were from the same clinic.

The study was conducted by the Declaration of Helsinki after obtaining approval from the Institutional Ethics Committee in March 2023, with reference number 2023-03/42.

2.1 | Statistical analysis

Statistical analysis was conducted using the Statistical Package for Social Sciences for Windows software (IBM SPSS version 26.0, Armonk, New York). The Kolmogorov–Smirnov test assessed the normality of continuous variables. Descriptive statistics for variables are presented as mean ± standard deviation, median (range), and frequencies *n* (%). The Kruskal–Wallis test was used to compare groups of continuous variables based on whether the assumptions were met. Pairwise comparisons of groups with significant differences from the Kruskal–Wallis test were performed using the Mann–Whitney *U* test and evaluated using the Bonferroni correction (0.05/number of groups). Categorical variables were analyzed using the chi-squared and Fisher–Freeman–Halton exact tests, depending on the number of categories and predicted values. A *p*-value of $<.05$ was considered statistically significant throughout the study.

3 | RESULTS

The mean age of the 111 patients included in the study was 38.51 ± 16.92 (6–87) years. Table 1 shows the descriptive statistics of the patients.

TABLE 1 Descriptive statistics for the variables.

Variables	*n* (%)	*p* value[a]
Sex		
Male	64 (57.7)	.107
Female	47 (42.3)	
Comorbidity		
Yes	37 (33.3)	<.001
No	74 (66.7)	
Habit		
Smoking (+)	41 (36.9)	.006
Smoking (−)	70 (63.1)	
Complaint at admission		
Neck swelling	74 (66.7)	.000
Sore throat	36 (32.4)	
Shortness of breath	1 (0.9)	
Season of admission		
Spring	24 (21.6)	.810
Summer	27 (24.3)	
Autumn	29 (26.1)	
Winter	31 (27.9)	
Attitude toward oral hygiene		
Poor	41 (36.9)	<.001
Moderate	2 (1.8)	
Good	68 (61.3)	
Physical examination		
Neck mass	44 (39.6)	<.001
Parotid mass and abscess	2 (1.8)	
Cellulitis in the periorbital and premaxillary region	2 (1.8)	
Premaxillary cellulitis, dental abscess	18 (16.2)	
Premaxillary cellulitis, dental abscess, trismus	1 (0.9)	
Neck mass, trismus, premaxillary cellulitis	6 (5.4)	
Peritonsillar abscess	36 (32.4)	
Neck mass, trismus	1 (0.9)	
Peritonsillar abscess, trismus	1 (0.9)	
Type of imaging		
USG	10 (9.0)	<.001
CT	93 (83.8)	
MRI	2 (1.8)	
No imaging	6 (5.4)	
Culture		
Not taken	38 (34.3)	.567
Culture taken, no microorganism growth	41 (36.9)	
Growth (+)	32 (28.8)	
Site of abscess		
Submental	1 (0.9)	<.001
Dental	41 (36.9)	

(Continues)

TABLE 1 (Continued)

Variables	*n* (%)	*p* value[a]
Submandibular	11 (9.9)	
Anterior sternocleidomastoid	4 (3.6)	
Peritonsillar	38 (34.2)	
Neck midline	8 (7.2)	
Parotid	4 (3.6)	
Posterior triangle of the neck	4 (3.6)	
Tracheostomy status		
No	111 (100.0)	
Type of surgical intervention (abscess drainage treatment type)		
Under general anesthesia	21 (18.9)	<.001
Under local anesthesia	90 (81.1)	
Antibiotherapy administered for treatment		
Ampicillin–sulbactam + metronidazole	90 (81.1)	<.001
Cefuroxime axetil + metronidazole	11 (9.9)	
Ciprofloxacin, levofloxacin	3 (2.7)	
Ceftriaxone	1 (0.9)	
Piperacillin–tazobactam + metronidazole	1 (0.9)	
Clarithromycin	2 (1.8)	
Penicillin	2 (1.8)	
Vancomycin + meropenem	1 (0.9)	
Pathology result		
None	79 (71.2)	<.001
Benign	3 (2.7)	
Malignant	2 (1.8)	
Cystic lesion	7 (6.3)	
Reactive lymph node	11 (9.9)	
Granulomatous lesion	7 (6.3)	
Abscess content	2 (1.8)	

Abbreviations: CT, computed tomography; MRI, magnetic resonance imaging; USG, ultrasound sonography.
[a]Chi-squared test.

Regarding the relationship between the evaluated parameters and DNI, the gender factor on DNI had no significant influence ($p = .107$). When the presence of chronic disease, smoking habit, and oral hygiene were evaluated regarding the effect of predisposing factors on DNI development, there was a significant difference ($p < .001$, $p = .006$, and $p < .001$, respectively).

Among the patients, 33.3% ($n = 37$) had a history of chronic disease, with diabetes mellitus (DM) being the most common (27.03%, $n = 10$). Cultures were obtained during abscess drainage in some patients with DNI. Table 2 shows the most frequently growing microorganisms. The most common antibacterial treatment given to patients with DNI was ampicillin–sulbactam + metronidazole (81.1%, $p < .001$).

TABLE 2 Microorganisms grown in the culture of patients with a deep neck infection.

Microorganisms	*n*
Streptococcus constellatus	6
Streptococcus mitis	1
Pseudomonas aeruginosa	1
Streptococcus anginosus	11
Streptococcus pyogenes	3
Streptococcus intermedius	1
Actinomyces odontolyticus	1
Streptococcus species	3
Streptococcus vestibularis	1
Staphylococcus epidermidis	1
Mixed (*Lactobacillus* species, Coryneform species, *Staphylococcus* sp., *Neisseria cinerea*)	1
Eikenella corrodens	2
Total	32

The patient's average length of hospital stay was 9.05 ± 4.66 (3–30) days. Table 3 shows the average length of hospital stay based on the localization of abscesses. The effect of DNI on the average length of hospital stay by abscess sites was significant ($p = .003$), and patients with peritonsillar abscesses had a shorter length of hospital stay than those with other localizations.

A significant relationship was identified ($p < .001$) upon examining the effect of attitude toward oral hygiene on the localization of abscesses (Table 4). Dental localization was discovered in 97.6% of patients with poor oral hygiene habits. Peritonsillar localization was found in 54.4% of patients with good oral hygiene.

The relationship between the type of surgical intervention in DNI and the abscess site was statistically significant ($p < .001$, Table 5). Abscesses in the submandibular, neck midline, oral, and parotid regions required more intervention under general anesthesia. Under local anesthesia, the most common abscesses were dental and peritonsillar.

Table 6 summarizes increases in CRP, neutrophil, and leukocyte values, which are acute phase reactants, according to abscess localizations. There was no significant difference between abscess localizations regarding CRP, leukocyte $10^3/\mu L$, and neutrophil $10^3/\mu L$ values ($p = .062$, $p = .139$, and $p = .055$, respectively).

4 | DISCUSSION

DNIs remain a significant challenge in otolaryngology, with potentially life-threatening complications.[12] DNI, historically described by Hippocrates as *morbus strangulatorius*, *cynache*, and *angina maligna*, poses a significant challenge.[13] The anatomy of the cervical region is complex, and the fascia surrounds structures in the neck. The anatomical structures in the neck are divided into intertwined compartments by superficial and deep fascial formations, which surround the neurovascular and vital organs.[14] Neck infections can be deep or superficial, depending on where they occur in the neck. DNI, which occurs between the deep fascia of the neck, is the most common life-threatening ENT emergency.[13–16] When inflammation in the neck spreads to the potential spaces provided by the cervical fascia, severe complications, including mediastinitis, pleural–pericardial effusion, septic shock, cavernous sinus, and internal jugular vein thrombosis, may increase the risk of morbidity and mortality during DNI.[13,17] Many studies, including the present study, have found that male patients acquire DNI faster than female patients.[5,13,14,18] DNI is more common as people get older and have more comorbidities.

Some of the most commonly recognized risk factors for developing infections in the neck region are chronic medical conditions, smoking, and poor oral hygiene.[19] Smoking and chronic diseases make individuals more prone to DNI by weakening the immune system and overall health. Conditions such as diabetes and hypertension reduce the body's ability to fend off infections, increasing susceptibility to DNIs.[20–23] Furthermore, smoking is associated with compromised immune function and impaired wound healing. Exposure to cigarette smoke can also harm the integrity of the oral and pharyngeal mucosa, making it easier for pathogens to infiltrate and increasing the risk of infections like DNIs, as discussed in the research papers.[20,23] These factors create an environment where bacteria can thrive and cause infections in the deep neck spaces, highlighting the importance of early diagnosis and proper management to prevent complications and ensure successful treatment outcomes.

It is well documented that smoking has a deleterious effect on the immune system, thereby compromising both oral and respiratory health. Such impairment creates an environment conducive to infection. It is, therefore, imperative that smoking cessation programs are implemented as a preventative healthcare measure, given the substantial evidence demonstrating the harmful impact of smoking on oral and respiratory health.

Chronic diseases, especially diabetes, significantly impact the management and outcomes of DNIs. Recent studies have demonstrated that patients with diabetes are more prone to severe DNIs, requiring aggressive treatment approaches. For instance, diabetes is associated with an increased frequency of complications, longer hospital stays, and a higher necessity for surgical interventions to mitigate these risks.[24,25] Furthermore, effective blood glucose control is critical in managing these infections, as poor glycemic control exacerbates the severity of DNIs.[24] Moreover, comorbidities in DNI patients necessitate more aggressive treatments, including surgical interventions, to enhance outcomes and mitigate complications.[21] Addressing diabetes and other chronic conditions through appropriate management can, therefore, plays a crucial role in improving patient outcomes and reducing the burden of DNIs.

Kauffmann et al.[18] found that 58.7% of 63 patients with DNI were male, the most common symptoms were sore throat and neck swelling, and the most common comorbidities were cardiopulmonary diseases and DM. Jicman et al.[14] found that 89.71% of 107 patients with DNI had a concomitant disease, and 56.07% smoked. While analyzing the medical history of our patients, we found that 33.3%

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TABLE 3 The average length of hospital stay of patients with deep neck infection according to the localization of abscesses.

Site of abscess	Average length of hospital stay (days)	*p* value[a]
Dental	9.83 ± 6.049 8 (4–30)[c,b]	.003
Submandibular	8.18 ± 3.89 8 (3–15)[c,b]	
SCM anterior	12.25 ± 4.99 12.5 (7–17)[b]	
Peritonsillar	7.11 ± 2.31 7 (4–13)[c]	
Neck midline	10.75 ± 3.88 12 (5–15)[b]	
Parotid	13.25 ± 3.94 12.5(10–18)[b]	
Posterior triangle of the neck	10.75 ± 2.98 11 (7–14)[b]	

Note: The difference between the averages shown with the same letter (shown as letters c and b) in the column is statistically insignificant ($p > .05$).

[a]Kruskal–Wallis Test, pairwise comparisons of groups with significant differences resulting from the Kruskal–Wallis test were performed using the Mann–Whitney *U* test and evaluated using the Bonferroni correction (0.05/number of groups).

(37) had a comorbid condition, with DM and hypertension being the most common. Among the patients, 36.9% (41) smoked. We demonstrated a statistically significant correlation between the development of chronic diseases and DNI ($p < .001$), with DM being the most prevalent chronic disease among the patients in question (27.03%). It has been demonstrated that individuals with chronic diseases, particularly diabetes, exhibit impaired immune system function, rendering them more susceptible to infection. This highlights the importance of rigorous observation and proactive administration of chronic disease treatments to prevent diabetes-associated infections.

The increased risk of DNI in people who smoke and have chronic diseases highlights the need for targeted interventions and education. Smoking cessation programs, improved oral hygiene awareness, and chronic disease management are essential for the prevention of DNI. Early diagnosis and prompt treatment are necessary to prevent severe complications of DNI. Regular health screening of high-risk individuals and rapid response to infection symptoms are also required to manage DNI effectively.

Kara et al.[5] evaluated patients with DNI. They found that more patients came with this diagnosis during the winter season, with pain and swelling being the most prevalent symptoms at admission. Regarding the seasonal factor, we found that, while more of our patients presented in the winter, DNI could be observed at approximately the same rate in all four seasons. The most common reasons for admission with a DNI are pain in the neck and throat and pain and difficulty swallowing.[13] While pathogens such as bacteria, fungi, and viruses can cause DNI in 50% of patients, the aetiology is unknown.[16] Before administering antibiotics, the most common source of DNI was the pharyngeal region. However, antibiotics have shifted the frequency priority to dental inflammatory conditions.[26] Because the peritonsillar region is not considered a possible deep neck space, studies have recognized peritonsillar abscesses as a component of DNI.[27] Although it can develop at any age, it is most common between the ages of 20 and 40, with some studies indicating that it is the most common deep infection of the head and neck region. Peritonsillar abscesses are considered to develop because of inflammation of the Weber glands, also known as the minor salivary glands, located in the soft palate near the upper pole of the tonsils. Periodontal disease and smoking are also considered as other clinical variables.[28]

Chi et al.[13] found that odontogenic, tonsillar infections, and sialadenitis were the most common causes of DNI in patients. DNI has been reported to occur occasionally because of infections caused by congenital cystic lesions such as branchial cysts, thyroglossal duct cysts, or cystic hygroma.[16] Matoušek et al.[26] found that poor oral and dental hygiene was the primary cause of DNI in nearly half of 544 tonsillar and dental localization patients. Similar to the results of this study, the most common localization of DNI in our 111 patients was dental region in 41 (36.9%) patients and peritonsillar region in 38 (34.2%) patients. Meanwhile, the remaining cases were from other neck regions.

While most patients with DNI and dental localization have poor oral hygiene, this study found that DNI most commonly developed in the peritonsillar and submandibular regions despite good oral hygiene. While oral hygiene status is a risk factor, it is not an absolute negative variable regarding localization status. Treviño-Gonzalez et al.[15] examined the etiology of 75 patients with DNI and found that 65.3% had odontogenic origins and 34.6% had DM. The average length of hospital stay was 9.13 ± 7.2 days. *Streptococcus* sp. (46%) was the culture's most often isolated bacterium. Both anaerobic and aerobic microorganisms can cause peritonsillar abscesses. While *Streptococcus* species are the most prevalent aerobes, *Fusobacterium* species have been identified as the most common anaerobic causative agents.[28] Although the coexistence of head and neck cancers and DNI has rarely been reported, studies recommend that a histopathological examination be performed on patients who are suspected as a result of detailed examinations and treatments to avoid missing the cancer diagnosis, which is critical.[16] According to Wang et al.,[16] 7 out of 301 patients with DNI were diagnosed with head and neck cancer. Our study found malignant histopathology in 2 of the 111 patients. Hasegawa et al.[17] reported that 17 of 65 patients with DNI had DM, and *Streptococcus* species were recorded in 13 of 40 patient cultures.

The treatment regimen for DNIs typically involves the administration of broad-spectrum antibiotics, supplemented by surgical drainage if indicated.[27] Because the culture studies of the disease contain polymicrobial factors, dual antibiotherapies influential against both aerobes and anaerobes are recommended. Penicillin derivatives, broad-spectrum beta-lactams, third-generation cephalosporins, clindamycin, and metronidazole group medications are the most often prescribed antibiotherapies.[28] Ampicillin–sulbactam combined with metronidazole was the most commonly used antibiotherapy protocol

TABLE 4 The relationship between attitude toward oral hygiene and abscess localizations.

Site of abscess	Attitude toward oral hygiene: Poor, $n = 41$	Moderate, $n = 2$	Good, $n = 68$	p value[a]
Submental	0 (0.0%)	0 (0.0%)	1 (1.5%)	<.001
Dental	40 (97.6%)	1 (50.0%)	0 (0.0%)	
Submandibular	1 (2.4%)	0 (0.0%)	10 (14.7%)	
Anterior sternocleidomastoid	0 (0.0%)	0 (0.0%)	4 (5.9%)	
Peritonsillar	0 (0.0%)	1 (50.0%)	37 (54.4%)	
Neck midline	0 (0.0%)	0 (0.0%)	8 (11.8%)	
Parotid	0 (0.0%)	0 (0.0%)	4 (5.9%)	
Posterior triangle of the neck	0 (0.0%)	0 (0.0%)	4 (5.9%)	

[a]Fisher–Freeman–Halton exact test.

TABLE 5 Relationship between abscess site and type of surgical intervention.

Site of abscess	Type of surgical intervention: General anesthesia, $n = 21$	Local anesthesia, $n = 90$	p value[a]
Submental	1 (4.8%)	0 (0.0%)	<.001
Dental	4 (19.0%)	37 (41.1%)	
Submandibular	4 (19.0%)	7 (7.8%)	
Anterior sternocleidomastoid	1 (4.8%)	3 (3.3%)	
Peritonsillar	3 (14.3%)	35 (38.9%)	
Neck midline	4 (19.0%)	4 (4.4%)	
Parotid	4 (19.0%)	0 (0.0%)	
Posterior triangle of the neck	0 (0.0%)	4 (4.4%)	

[a]Fisher–Freeman–Halton exact test.

TABLE 6 Changes in acute phase reactants CRP, neutrophil, and leukocyte values according to abscess sites.

Site of abscess	CRP	Leukocyte $10^3/\mu L$	Neutrophil $10^3/\mu L$
Dental	103.29 ± 99.33 72.33 (4.0–485.0)	12.96 ± 5.80 12.27 (1.52–36.97)	9.54 ± 5.34 8.64 (1.12–33.97)
Submandibular	68.10 ± 93.41 36.7 (1.0–326.0)	9.94 ± 3.65 9.87 (3.68–16.93)	6.36 ± 3.26 5.95 (1.55–13.37)
Anterior sternocleidomastoid	31.72 ± 21.05 31.05 (11.0–54.0)	8.84 ± 1.99 8.68 (6.79–11.21)	5.72 ± 1.87 5.84 (3.65–7.57)
Peritonsillar	74.11 ± 56.00 75.60 (4.0–257.0)	11.86 ± 4.13 11.88 (5.37–26.91)	8.39 ± 3.78 8.25 (2.55–23.93)
Neck midline	44.82 ± 36.87 47.28 (2.0–96.0)	10.77 ± 3.06 10.63 (6.62–16.39)	7.44 ± 3.32 6.98 (3.40–14.34)
Parotid	73.87 ± 76.11 55.05 (6.0–180.0)	14.12 ± 7.27 12.45 (7.2–24.38)	10.57 ± 6.95 9.31 (3.52–20.17)
Posterior triangle of the neck	21.22 ± 29.63 7.68 (4.0–65.0)	9.01 ± 0.54 8.88 (8.51–9.78)	5.92 ± 0.67 6.04 (5.09–6.51)
p value[a]	.062	.139	.055

[a]Kruskal–Wallis test.

in our treatments. The treatment was adequate throughout our follow-ups. The combination effectively treats DNI, but antibiotic resistance requires ongoing surveillance and potential treatment adjustments. Infections commonly occur in the dental and peritonsillar regions, and Streptococcus species are often identified as the causative agents.[29] Cultures were extracted from 73 (65.7%) of the 111 patients for microbiological analysis, and 32 (28.8%) tested positive. *Streptococcus* species ($n = 26$) were the most commonly isolated microorganisms in culture, with results similar to those reported in the literature. DNIs originating in the peritonsillar region may cause more severe complications than those of dental origin.[26] Our patients had no severe complications, and no tracheotomy was required. The poor prognosis caused by late diagnosis, high rates of complications, and inadequate medical and surgical treatments have contributed to the DNI diagnosis and treatment algorithm's lower effectiveness in the past than it is now.

Acute phase reactants, particularly CRP, neutrophil count, and leukocyte levels play a pivotal role in the assessment of DNI. Elevated CRP levels are strongly correlated with increased disease severity, the likelihood of complications, and extended durations of hospitalization in patients with DNI.[30,31] It is important to note that although there were no significant differences in CRP, leukocyte, and neutrophil levels between abscess locations in our study, these markers are still crucial for monitoring infection severity and response to treatment. Regular measurement of these markers may aid in the early detection and management of DNI, helping to guide treatment decisions and monitor patient progress.

Advancements in diagnostic imaging, effective antibiotic combinations, and appropriate surgical techniques have significantly improved DNI diagnosis and treatment. Contrast-enhanced head and neck CT is the most effective imaging technique for diagnosing DNI in patients with no contrast allergy and normal kidney function. Depending on the disease and treatment process, ultrasound sonography (USG), magnetic resonance imaging (MRI), and other imaging techniques may be required in neck infections.[5,11,27,32,33] Furthermore, the diagnosis of DNI is based on clinical evaluation, and imaging should be prioritized because inspection and palpation alone will not be adequate to evaluate the severity of the disease. Imaging is critical for understanding the disease anatomy and identifying complications. Imaging-guided abscess drainage is recommended as a less invasive alternative to surgery for instances when surgery is not indicated.[11,32,33] The most common request from our patients was for a CT scan. Thus, it was requested by 93 (83.8%) patients. While USG and MRI were performed on some of the remaining patients, the records of six patients showed no request for imaging.

Regardless of the aetiology, inflammatory conditions in deep cervical potential spaces must be diagnosed and treated immediately. Early diagnosis and prompt intervention are essential to prevent the development of complications such as mediastinitis.[12] The severity of symptoms and the progression of examination results may worsen the prognosis, resulting in severe, life-threatening complications.[14] Because our patients arrived early, we could quickly apply the appropriate treatment algorithm. Most patients did not have a chronic disease, smoked infrequently, and had peritonsillar and dental abscesses; the success of surgical interventions improved the effectiveness of medical treatment, and there was no need for additional invasive surgeries such as tracheotomy by ensuring a sequela-free recovery. Effective management of DNIs requires a multidisciplinary approach and strict adherence to evidence-based guidelines.[34] The retrospective and single-center nature of the study are limitations of the study.

5 | CONCLUSION

Longer-term follow-ups for chronic diseases have evolved as human life expectancy has grown. However, recently, DNIs have become common because of persistent smoking, the presence of chronic diseases, the compromised immune system secondary to this, and a lack of attention to oral hygiene. DNIs continue to occur today despite the use of antibiotics and proper dental and oral hygiene. Because inflammation develops in the anatomical spaces of the neck, it can cause severe complications and sequelae as it progressively spreads to risky spaces. DNI must be prevented or treated immediately. Moreover, the algorithm should be fully complied with without delay, and a multidisciplinary management approach is necessary.

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CONFLICT OF INTEREST STATEMENT

The authors have no relevant financial or non-financial interests to disclose.

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