



Bacteriology Study of Deep Neck Space Infections in Surgeon's View: Case Series

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Abstract

Deep neck space infections (DNSIs) are defined as infections in the fascial planes and potential spaces of the neck, either with cellulites or abscess formation.

The published data about DNSI in India is less.

Objectives

To analyze the causative bacteria and study the clinical picture and risk factors among patients with DNSIs.

Methods

This prospective study was conducted at a tertiary care centre on 15 patients who had deep neck space infections, diagnosed clinically.

Results

Most of the patients belonged to 4th and 5th decades of life, females. The common causative organism was staphylococcus aureus. The most common clinical diagnosis was Ludwig's angina. The most common symptom was pain followed by swelling.

Conclusion

Deep neck infections could be prevented by making people aware of dental and oral hygiene, regular check-ups for dental infections, good glycemic control for diabetics, and good nutritional status

Keywords

Abscess, Bacteriology, Cellulitis, Deep neck

space infections, Tonsillitis

Introduction

Deep neck space infections (DNSIs) are defined as infections in the fascial planes and potential spaces of the neck, either with cellulitis or abscess formation^[1]. The complicated framework of the neck makes diagnosis a tedious task. So, clinical suspicion is required during the diagnosis as various DNSIs are not evident on palpation^[2]. DNSI can progress to inflammation or fulminant abscess with a purulent fluid collection if not treated on time. Tonsillitis is the most common cause in children and dental infections, caries, and impacted foreign bodies in the posterior pharyngeal wall are the most common causes among adults^[3]. DNSI is classified into peritonsillar, retropharyngeal, pterygopalatine maxillary, masseteric, parapharyngeal, parotid submandibular, and floor of mouth abscesses^[4]. Common bacterial species that cause DNSI include Streptococci, Staphylococcus aureus, and anaerobes^[5,6]. Clinical features include pain, fever, fatigue, malaise, dysphagia, odynophagia, dysphonia, trismus, otalgia, and dyspnea^[7]. The incidence of bacterial infections was relatively more before the advent of antibiotics, which needs prompt recognition and intervention.^[8] To counter DNSIs, otorhinolaryngologists should have proper knowledge of presentation, investigation, and reliable medical and surgical interventions. Till now, the published data about DNSI in India is less.

Results

Clinical diagnosis: Most of the patients were diagnosed to have Ludwig's angina, followed by peritonsillar abscess and retropharyngeal abscess.

Hence the current study was conducted at our tertiary care centre.

Objectives

- To analyze the causative bacteria in patients with DNSIs
- To assess various risk factors in patients suffering from DNSIs.

Materials and Methods

Study site: Alluri Sita Ramaraju Academy of Medical Sciences, Eluru, Andhra Pradesh, Study duration: 6 months from January 2022 to June 2022.

Type of study: Prospective study conducted in the department of otorhinolaryngology & head and neck surgery at our tertiary care center.

Sample size: 15 patients with deep neck space infections.

Inclusion Criteria

1. All patients who presented with neck pain, neck swelling, neck tenderness, odynophagia and dyspnea.
2. Cases suspected as DNSIs and confirmed with an imaging study were included in this study.
3. Patients who have given written consent.
4. Age 11-60 years.
5. Both males and females

Exclusion Criteria

Patients with superficial neck infections, infections associated with trauma and tumor of the neck.

| DNSIs | Frequency | Percentage |
|-------------------------|-----------|-------------|
| Peritonsillar abscess | 3 | 20% |
| Parapharyngeal abscess | 1 | 7% |
| Ludwig’s angina | 6 | 39% |
| Retropharyngeal abscess | 3 | 20% |
| Submental abscess | 1 | 7% |
| Parotid abscess | 1 | 7% |
| Total | 15 | 100% |

Table 1: Clinical diagnosis of deep neck space infections

Gender distribution of clinical diagnosis: Ludwig’s angina and peritonsillar abscess were more commonly seen among females compared to males. Retropharyngeal and parapharyngeal abscesses were more commonly seen among males. DNSIs were seen among 7 males and 8 females.

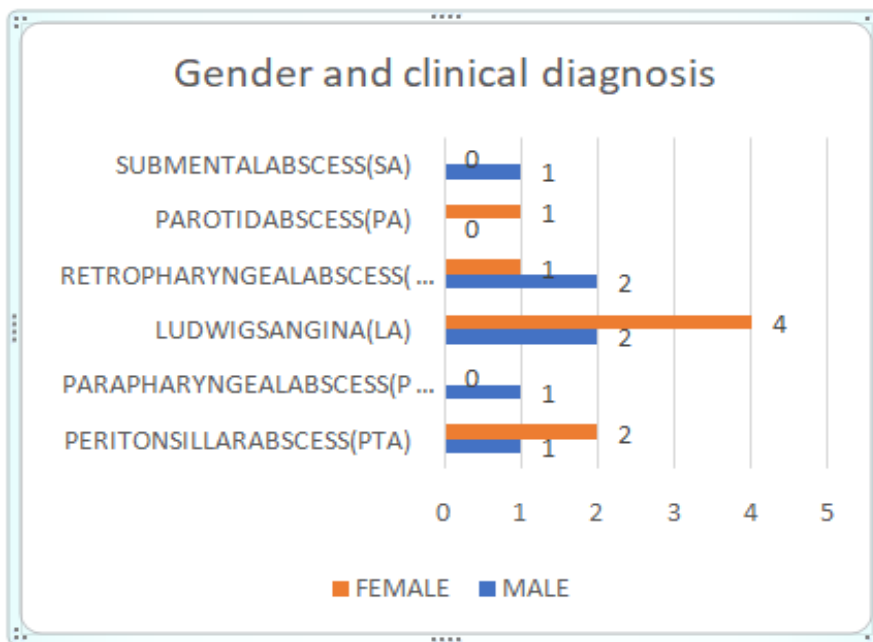


Figure 1: Gender and clinical diagnosis

Age distribution: More patients with deep neck space infections belonged to the age groups 41 to 50 years and 51 to 60 years. This indicates that DNSIs are common during 4th and 5th decades of life.

| Age | PTA | PPA | LA | RPA | PA |
|-------|-----|-----|----|-----|----|
| 11-20 | 1 | 0 | 0 | 0 | 0 |
| 21-30 | 2 | 0 | 0 | 0 | 0 |
| 31-40 | 0 | 1 | 1 | 1 | 0 |
| 41-50 | 0 | 0 | 3 | 1 | 0 |
| 51-60 | 0 | 0 | 2 | 1 | 1 |

Table 3: Age distribution of patients with DNSIs

Clinical features: Most of the patients presented with pain followed by swelling and fever in the current study.

| Clinical feature | PTA | PPA | LA | RPA | PA | SA |
|------------------|-----|-----|----|-----|----|----|
| Pain | 3 | 1 | 6 | 3 | 1 | 1 |
| Fever | 2 | 0 | 3 | 1 | 1 | 1 |
| Swelling | 2 | 0 | 6 | 0 | 1 | 1 |
| Dysphagia | 2 | 0 | 1 | 1 | 1 | 0 |
| Drooling | 0 | 0 | 2 | 0 | 0 | 1 |
| Dyspnea | 0 | 0 | 2 | 1 | 0 | 0 |
| Hoarseness | 0 | 0 | 1 | 1 | 0 | 0 |
| Trismus | 0 | 1 | 3 | 1 | 1 | 0 |
| Ear pain | 1 | 0 | 0 | 0 | 1 | 1 |

Table 4: Clinical features seen among patients with DNSIs

Causative organism: The most common causative organism for DNSIs is staphylococcus aureus, followed by Group A Beta hemolytic streptococcus.

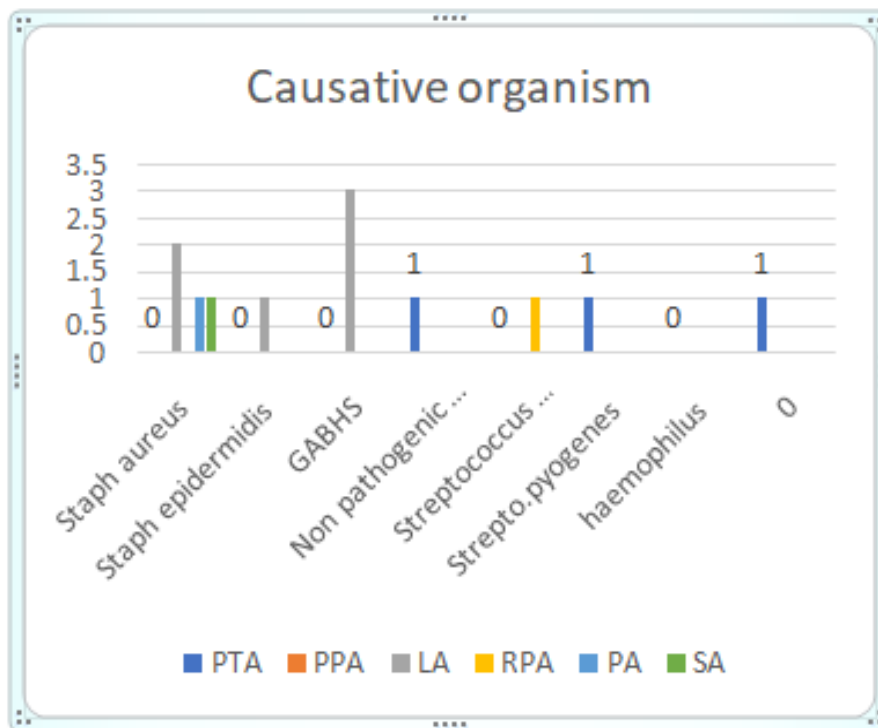


Figure 2: Organism responsible for DNSIs

Risk factors: The main risk factor for DNSIs in the current study was diabetes mellitus

| Risk factors | PTA | PPA | LA | RPA | PA | SA |
|--------------|-----|-----|----|-----|----|----|
| Obesity | 0 | 0 | 2 | 0 | 0 | 0 |
| Diabetes | 0 | 1 | 5 | 2 | 1 | 1 |
| Hypertension | 0 | 0 | 1 | 0 | 0 | 0 |
| Smoking | 0 | 0 | 5 | 0 | 0 | 0 |

Table 5: Risk factors for various DNSIs

Type of surgical drainage done:

Most of the patients underwent external surgical drainage as treatment for DNSIs.

| Infection type | external | internal |
|-------------------------|----------|----------|
| Peritonsillar abscess | 0 | 3 |
| Parapharyngeal abscess | 1 | 0 |
| Ludwigsangina | 6 | 0 |
| Retropharyngeal abscess | 0 | 3 |
| Parotid abscess | 1 | 0 |
| Submental abscess | 1 | 0 |

Table 6: Type of surgical drainage for DNSI treatment

Antibiotic sensitivity profile: All samples were sent to culture and sensitivity and it was found that Metronidazole followed by levofloxacin and clindamycin to be sensitive in most of the cases.

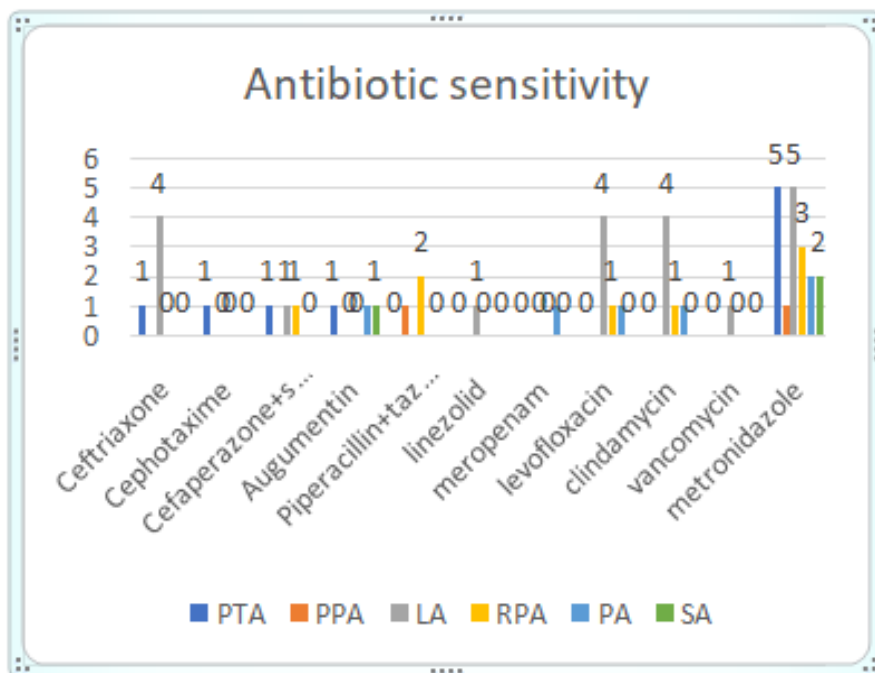


Figure 3: Antibiotic sensitivity pattern

Discussion

In the study done by Priyamvada et al.^[9] DNSIs were commonly found in 2nd and 3rd decades of life, while in the current study, they were commonly seen in 4th and 5th decades. Males are commonly involved, while in the current study, they were commonly seen among females. Diabetes was the most common comorbidity associated with DNSIs, similar to the current study.

In the study of Almutaira et al.^[10] streptococcus was identified to be the most common microorganism followed by Staphylococcus aureus, while in the current study, the commonest organism was staphylococcus followed by streptococcus. Diabetes was the most common associated disorder similar to the current study. The most common symptom was pain, similar to the current study.

In the study of Bottin et al.^[11] also, the most common symptom was neck pain.

In the study of Rahman et al.^[12] vancomycin and gentamicin were found to be more sensitive for organisms causing DNSIs.

Conclusion

The widespread use of antibiotics lowered the incidence of these life-threatening deep neck space infections. Dental infections were identified as the common aetiology in Ludwig's angina and tonsillitis was the most common aetiology in a peritonsillar abscess. Deep neck infections could be prevented by making people aware of dental and oral hygiene, regular check-ups for dental infections, good glycemic control for diabetics, and good nutritional status. History and clinical examination are of great importance in diagnosis, supported by x-rays, and CT scan to assess the disease spread and airway

compromise and complications. As an otolaryngologist, clinical evaluation of deep neck infections should be focused mainly on the early diagnosis of impending airway compromise and planning treatment strategy.

The study is self-sponsored.

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