

## Retrospective Analysis of 298 Cases of Deep Neck Infections: Its Diagnosis and Management

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**Abstract-** Despite widespread use of antibiotics, the prevalence of deep neck abscesses has been diminished but these infections remain as a significant cause of morbimortality. Retrospective reviews of 298 patients were conducted who were diagnosed deep neck infections (DNI's). All the parameters including demographic data, anatomical position involved in neck infections, clinical trends, etiology, bacteriology, complications, management and preventive aspects of DNI's were analyzed. Major etiological factor in patients with DNI's was odontogenic in origin while Ludwig's angina was the most common clinical presentation. The treatment of DNI's includes antibiotic therapy, airway management and surgical intervention. Timely prevention and treatment of DNI's plays major role in decreasing the prevalence of DNI's.

**Keywords:** Deep Neck Infections (DNI's), Dental infection, Staphylococcus, Airway management incision and drainage, Prevention.

### Introduction

Infection in the potential spaces and fascial planes of head and neck, either formation of cellulitis or abscess is known as deep neck infections (DNI's)<sup>1,2</sup>. Today deep neck abscesses are less common than in the past. Despite widespread use of antibiotics, the prevalence of deep neck abscesses has been diminished but these infections remain as a significant cause of morbimortality. DNI's may be originating from different parts of the head and neck like paranasal sinuses, teeth, salivary glands, adenotonsillar tissue & pharynx<sup>3</sup>. Widespread use of antibiotics, improved diagnostic techniques and early surgical treatment, the morbimortality has been decreased significantly as compared to the previous studies<sup>1,2</sup>. However, the complications related to DNI's are still registered like mediastinitis, respiratory obstruction, pericarditis, pleural empyema, septic shock and jugular vein thrombosis.

The treatment of DNI's includes antibiotic therapy, airway management and surgical intervention. Timely prevention and treatment of DNI's play major role in decreasing the prevalence of DNI's<sup>4</sup>. Present researches have shown that there are changes in the etiology, bacteriology, clinical presentation and treatment of DNI's.

### Material and Methods

We carried out retrospective study, the operative record of 382 patients from June 2008 to May 2012 who were underwent incision and drainage for DNI's. 84 files were excluded due to lack of proper information and details. Remaining 298 patient's record files with DNI's were studied (182 males, 116 females with male to female ratio of 1.57: 1). Patients of all ages and either sex were included while iatrogenic and inhalant injuries causing abscesses were excluded. All the parameters including demographic data, anatomical position involved in neck infections, clinical trends, etiology, bacteriology, complications, management and preventive aspects of DNI's were analyzed and are compared elsewhere. Some searched literature databases are PUBMED, OVIDSP and KNOWLEDGEGENIE.

### Results

The age range of our patients was between 6 months to 78 years old with the mean age was 36.7 years as shown in figure 1. The most common symptom was neck swelling in 289 patients (96.97%) remaining nine patient had retropharyngeal abscess so that there was no swelling in the neck, followed by dysphagia in 267 patients (89.59%), fever in 183 patients (61.40%), toothache in 152 patients (51%), odynophagia in 131 patients (43.95%), trismus in 21 patients (7.04%) and change in voice in 18 patients (6.04%). The majority of etiological factor in patients with DNI's was odontogenic in origin (114 patients). The remaining documented causes are shown in Table No. 1.

52 patients (17.44%) had underlying systemic diseases. 32 were men and 20 were women. Their ages ranged from 30 to 78 years. 32 patients (10.73%) with diabetes mellitus (DM), 10 patients (3.35%) with uremia or chronic renal insufficiency, 08 patients (2.68%) with liver cirrhosis and two patients with gastric malignancy receiving chemotherapy treatment. Ludwig's angina was the most common clinical presentation of neck abscess in 78 patients (26.17 %) followed by peritonsillar abscess in 69 patients (23.15%) and the remaining presentation are shown in Table No.2.

There were 180 (60.40%) bacterial cultures which were positive. Among positive cultures, staphylococcus was the most significant pathogen (87 cases, 29.19%), Streptococcus was in second rank (30 cases, 10.06%) and then Klebsiella (23 cases, 7.71%) as well as Pseudomonas (20 cases, 6.71%), Proteus (9 cases, 3.02%), E.Coli (6 cases, 2.01%), H.Influenza (2 cases, 0.67%) and finally Candida (fungus) (3 cases, 1.00%). The majority of bacterial culture (118 cases, 39.59%) report had no growth. This may be due to fact that before presenting to our hospital most of our patients had received at least one course of antibiotics prescribed by their general practitioners.

All these patients underwent incision and drainage and were given broad spectrum intravenous antibiotics which were later switch over to other antibiotics according to the culture and sensitivity. Emergency tracheostomy was required in two patients. First patient had parapharyngeal abscess with extensive facial cellulitis and was in acute respiratory distress. Another patient had extensive retropharyngeal abscess which extended to mediastinum with stridor that also underwent tracheostomy.

We came across few complications in our series. 8 patients developed mediastinitis, three lands up in sepsis, 7 patients had skin defect and 5 patients developed internal jugular vein thrombosis. Upper gastrointestinal bleeding occurred in 9 patients during admission, 4 patients died because of other systemic complications. The mean length of hospital stay for our patients was 12.6 days with a range of 4 to 33 days.

## Discussion

In this retrospective analysis, we discovered that most of the patients were referred to our hospital below 40 years of age group which is consistent with that of study of A Mazita et al<sup>5</sup>. Most common symptoms were neck swelling followed by dysphagia, fever, toothache and odynophagia. Bottins et al<sup>6</sup> has been reported that neck swelling followed by pain, odynophagia and dysphagia were the most common symptoms. Some study noted that pain was the most common symptoms followed by dysphagia and trismus<sup>7,8</sup>. Major etiological factor was odontogenic infection in our study which is consistent with other studies<sup>1,2,9</sup>. Commonest space involved in DNI's were ludwig's angina, peritonsillar abscess and neck abscess (anterior triangle) constituted approximately 60% of our cases, similar to results of Afshin and Gady when they reviewed 210 cases of deep neck abscesses<sup>10</sup>. Parapharyngeal was the most common followed by ludwig's angina and submandibular were the next noted in study conducted by Parhiscar et al and Har-El G et al<sup>2,9</sup>.

Although the incidence of DIN's has been reduced dramatically during this antibiotic era still it continue to be a major cause of morbimortality. As the tuberculosis is very common in our country (India), there is no significant contribution of tuberculosis in our series of DNI's. It also noticed that tubercular cervical lymphadenopathy is very common but tubercular abscess is very rare. In all, the contribution of odontogenic infection in DNI's has increased and it is the number one predisposing factor for the deep neck infections.

## Conclusions

The result of this research of 298 patient of DNI's conclude that understanding the complex topography of head and neck is important in evaluating the origin, extent of DNI's, its potential complications and defines surgical treatment options. Those patients present with signs and symptoms of DNI's should be treated on emergency basis. It is very important to attention to the high risk groups patients like diabetic, old age, underlying systemic disease, etc because they may progress to life threatening complications.

An abscess needs to be drained on urgent basis and patient should be started with intravenous antibiotics and fluids. A wide spectrum of antibiotics is initially started and changed according to culture and sensitivity report. An early diagnosis and treatment and addressing the patients underlying systemic disease, we can lower the incidence of complications and hence reduce the morbimortality.

The changing trends in clinical presentation, etiology, management of DNI's are highlighted in our study which is compared with past as well as recent literature. The issue of preventions has been arises. Additionally, in developing country, because of lack of adequate nutrition, poor oral hygiene, and habituation of tobacco, beetle nut chewing and smoking has been leads to increased prevalence of dental and periodontal diseases. So that prevention can be largely achieved by making population aware of dental and oral hygiene, regular treatment and correct dental infections. Also by conducting regular school dental check up camps, organizing the lectures and demonstration for primary health centre doctor, health worker, multipurpose worker and anganwadi worker by trained dentist from district hospital. Ultimately, this message will spread to the population in cascade like manner and the incidence of DNI's will be reduced.

"Pus in the neck calls for surgeon's best judgment, his best skill and often for all his courage"- Mosher.

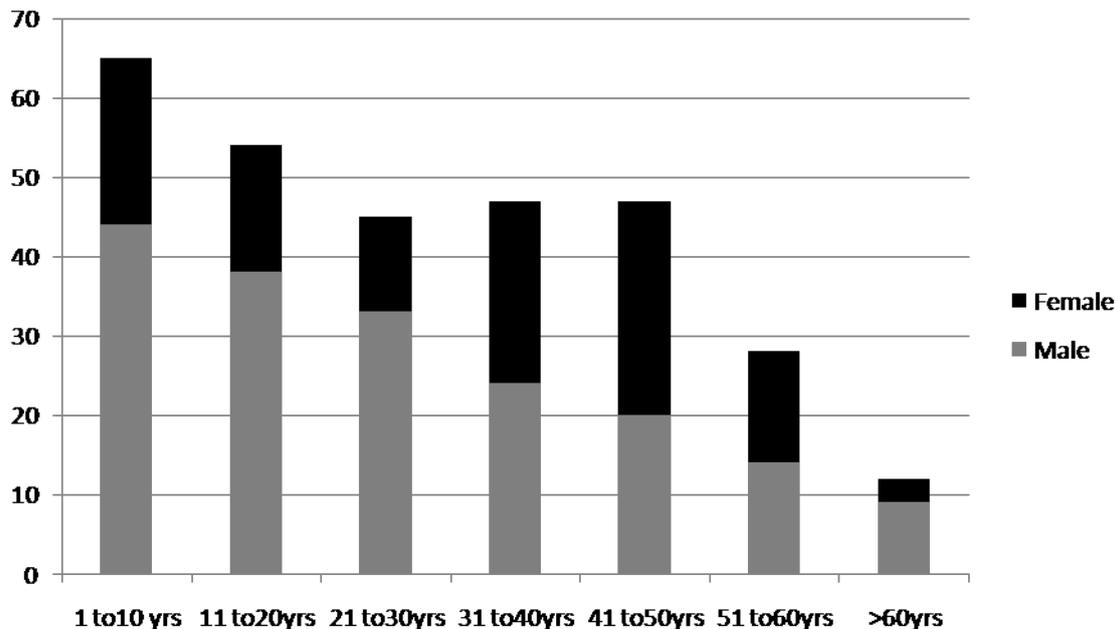
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**Figure 1: Age and Sexwise distribution of 298 patients with DNI's.**



**Table 1: Etiological factors in patients with DNI's.**

Sr. No.	Etiology	No. of patients
01	Odontogenic	114
02	Tonsillar	60
03	Infected L'pathy	30
04	Foreign body	8
05	Mastoid abscess	11
06	Furunculosis	8
07	Inferior Branchial cyst	6
08	Inferior Thyroglossal cyst	3
09	Unknown	58
<b>Total</b>		<b>298</b>

**Table 2:** Clinical presentation of neck abscess.

<b>Sr. No.</b>	<b>Location</b>	<b>No. of Cases</b>	<b>Percentage (%)</b>
01	Ludwig's angina	78	26.17%
02	Peritonsillar abscess	69	23.15%
03	Neck abscess (anterior triangle)	35	11.74%
04	Masticator abscess	27	9.06%
05	Submandibular abscess	48	16.10%
06	Para pharyngeal abscess	18	6.04%
07	Retro pharyngeal abscess	9	3.02%
08	Parotid abscess	4	1.34%
09	Submental abscess	10	3.35%
<b>TOTAL</b>		<b>298</b>	<b>100%</b>