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Clinical Profile of Deep Neck Space Infection

MEDICAL SCIENCE

KEYWORDS : ABCESS , ODONTOGENIC , DEEP NECK SPACE

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ABSTRACT

INTRODUCTION Deep neck space abscesses are relatively common in Otolaryngology and can result in significant morbidity with potential mortality. Deep neck space abscesses usually result from tonsillitis, odontogenic infection or foreign body

MATERIAL AND METHOD This study was conducted on patients attending E.N.T. OPD / Casualty Department / Inter Refral in Bharati Vidyapeeth Deemed University Medical College & Hospital, Sangli with deep neck space infection during November 2013 to may 2015.

Inclusion Criteria– Deep neck space infections on clinical and radiological evaluation.

Exclusion Criteria – Patient with toxic symptoms and compromised airway needing emergency management

Study Design–It is a prospective observational type of study.

Study Duration - 1 ½ year.

INTRODUCTION

Deep neck space abscesses are relatively common in Otolaryngology Head Neck surgery emergencies and can result in significant morbidity with potential mortality. Deep neck space abscesses usually result from tonsillitis, odontogenic infection, or foreign body.[2]Patients presenting with different systemic disease conditions such as diabetes, vascular disease, cancer and infections such as human immunodeficiency virus have increased chances of developing an infection.[3] In the modern era of antibiotics, most of the infections can be managed successfully without complications in the initial period but some can produce serious morbidity, life-threatening complications namely airway compromise, jugular vein thrombosis, mediastinal involvement, pericarditis, pneumonia, emphysema, arterial erosion, and extracranial and intracranial extensions may develop due to delay in diagnosis, even leading to death.[4-6] Neck line incision and drainage (I&D) with antibiotic is the treatment of choice.

MATERIAL AND METHODS

This study was conducted on patients attending E.N.T. Department in Bharati Vidyapeeth Deemed University Medical College & Hospital, Sangli with deep neck space infection during November 2013 to may 2015. Ethical clearance from the college and university committee was taken.

Inclusion Criteria – Deep neck space infections on clinical and radiological evaluation

Exclusion Criteria – Patient with toxic symptoms and compromised airway needing emergency management.

Patient with other coexisting pathologies like cyst or tumor of neck

Study Design–It is a prospective observational type of study.

To study the clinical profile of the patients presented in ENT department with deep neck infections in span of 1 ½ year.

Study Duration - 1 ½ year.

OBSERVATIONS AND RESULTS

Table 1: Age and Sex Distribution

Age	No Patients	Male	Female	%
0-15	6	6	0	20%
16-30	6	3	3	20%
31-45	7	4	3	23.3%
46-60	7	6	1	23.3%
>60	4	2	2	13.3%
Total	30	21	9	100%

We evaluated 30 indoor patients of deep neck space infection. In our study, the mean age of patients was 36.1 years with a minimum age of 5 months and a maximum of 70 years. Majority of patients were in age group of 46-60 years, followed by 31-45, 16-30, 1-15, >60. Out of total 30 patients, 21 patients (70%) were males and 9 patients (30%) were females with a male female ratio of 2.3:1

Table 2: Presenting sign and symptoms of deep neck abscess

Sign and Symptoms	No Patients	Percentage
Trismus	13	43.3%
Stridor	6	20%
Dysphagia or odynophagia	10	33.3%
Fever	10	33.3%
Raised floor of mouth	6	20%

Trismus was the most common symptom found in 13 patients (43.3%), followed by dysphagia or odynophagia and fever in 10 patients (23.3%) each, stridor in 6 patients(20%), floor of mouth was raised in 6 patients (20%) .

16 patients (53.3%) underwent ultrasound neck, in 14 patients (46.6%) computed tomography scan was done and 10 patients (33.3%) underwent ultrasound and computed tomography scans .In our study ,out of 30 patients 17 patients (56.6%) presented with stage of cellulitis and 13 patients (43.3%) presented with stage of abscess.

Table 3 : Spaces Involved

Space involved	No Patients	Percentage
Ludwigs angina	6	20%
Submandibular	11	36.6%
Parapharyngeal	3	10%

Submental	4	13.3%
Retropharyngeal	2	6.66%
Peritonsillar	4	13.3%
Total	30	100%

11 patients (36.6%) presented with Submandibular abscess and this was the most common clinical presentation of neck abscess in 30 deep neck space abscesses patients, followed by Ludwig's angina in 6 patients (20%), submental abscess in 4 patients(13.3%), peritonsillar abscess in 4 patients (13.3%) and parapharyngeal abscess in 3 patients (10%). retropharyngeal abscess in 2 patients (6.66%) .

Table 4: Source of Infection

Source	No Patients	%
Odontogenic	10	33.3%
Foreign Body	1	3.33%
Tonsilitis	2	6.66%
Cervical Lymphadenopathy	7	23.3%
Salivary Gland Infection	2	6.66%
Unknown	8	26.6%
Total	30	100%

In majority of the cases source of infection was odontogenic in origin 10patients (33.3%), followed by cervical lymphadenopathy (23.3%) ,tonsilitis and salivary gland infection (6.66%),foreign body(3.33%) . Source of infection was unknown in 8 patients (26.6%). Prevalence of odontogenic deep neck space infection was found as 33.3%.

Table 5: Percentage of Patients Associated Disease with Co morbidity

Diseased Comorbidity	No Patients	Percentage
Diabetes	9	30%
Chronic renal failure	2	6.66%
Anemia	7	23.3%
Tuberculosis	1	3.33%

Out of 30 patients, 9 patients (30%) were having diabetes mellitus, 2 patients (6.66%) had chronic renal failure 7 patients (23.3%) were anemic,1 patient had (3.33%)tuberculosis.

Table 6 : Type of management

Management	No Patient	Percentage
Conservative	8	26.6%
Surgical +Intravenous antibiotics	22	73.4%
Total	30	100%

Out of 30 patients, 22 patients (73.3%) underwent intervention incision and drainage and pus specimen of all these patients were sent for culture and sensitivity.

Table 7: Organisms isolated from 22 patients with deep neck space infection

Microorganism	No Patients	Percentage
Streptococcus	8	36.6 %
Staphylococcus	4	18.1 %
Bacteroides	4	18.1 %
Peptostreptococcus	1	4.5 %
Haemophilus Influenzae	1	4.5 %
Klebisella	1	4.5 %
Enterobaceria	1	4.5 %
Gram positive cocci	1	4.5 %
Mycobacterium	1	4.5 %
Total	22	100%

The most common organism cultured were Streptococcus 8(36.6%),staphylococcus 4(18.1%), bacteroides 4(18.1%), peptostreptococcus 1(4.5%), haemophilus influenzae 1(4.5%), klebsiella 1(4.5%), enterobacteria 1(4.5%), gram positive cocci 1(4.5%), mycobacterium 1(4.5%).

DISCUSSION

The anatomic spaces involved in deep neck infections are formed by three different layers of deep cervical fascia and the spread of infection into neck from oropharynx follows the fascial anatomy.[1] Although wide use of antibiotics has decreased the incidence of deep neck space infection, it is still a fairly common problem. The management and diagnosis of the deep neck space infection is still a challenge for Otorhinolaryngologists. In this study, 30 patients of deep neck space infection were included and the common source of infection with the common causative organisms of deep neck space infection was analyzed.

In our study, the mean age of patients was 36.1 years with a minimum age of 5 months and a maximum of 70 years. These findings correlate well with Sethi et al reports. [8]

Out of these 30 cases, majority of affected were males with a male: female ratio of 2.3:1. In our study male preponderance was seen which is comparable with Sethi et al[8], Mumtaz et al[9], Khode et al[10], Meher et al[11] and Parischar et al[12]; all showing male preponderance. Deep neck space infection can occur at any age.

Contrast CT scan is the most appropriate imaging tool not only for the diagnosis of deep neck space infections, but it also shows the extension of disease. Ultrasound plays an equally important role in detection of abscess formation. [13,14] In addition an ultrasonography guided needle aspiration could be of therapeutic value if you have a small abscess deep and close to vital structures of neck i.e. major blood vessels. In such cases needle aspiration with intravenous antibiotic cover would be adequate .In our study, 16 patients (53.3%) underwent ultrasound neck, in 14 patients (46.6%) computed tomography scan was done and 10 patients (33.3%) underwent ultrasound and computed tomography scans .

Commonest presentation of deep neck space abscess in our study was submandibular abscess 11 patients (36.6%), followed by Ludwig's angina 6 patients (20%), submental abscess in 4 patients (13.3%), peritonsillar abscess in 4 patients (13.3%) and parapharyngeal abscess in 3 patients (10%), retropharyngeal abscess in 2 patients (6.66%). Our study correlates with study of Zamiri et al[15], Meher et al[11], and Rega et al[7] . In these studies submandibular space abscess is the most common presentation in 32%, 37% and 30% deep neck space abscess patients respectively.

33.33%. i.e. of 30 cases of deep neck space infection- 10 patients were of odontogenic origin. This may indicate that men pay less attention to their oral hygiene than women and do not visit a dentist because of their preoccupations. In a study by Tschiassny et al [16], 70% of deep neck space infection were odontogenic in origin. In a retrospective study of Parhiscar et al[12] , odontogenic infections were declared as the most common cause of deep neck space infection (42%). Bottin et al[17] also showed the same results as in Parhiscar et al[12] study with 42% deep neck space infection due to odontogenic origin. In a study by Zamiri et al[15], prevalence of odontogenic deep neck space infection was found 34.30%. Huang et al[17], Marioni et al[18] and Eftekharian et al[19], reported that odontogenic problem was the most common causative factor for causing deep neck space infection with 42%, 38.8% and 49% cases, respectively. Study of Sethi et al.[8] and Har-El G et al.[20] also showed the major cause of deep neck space infection as dental origin. Our study results correlates with all these studies. Our study and the various other studies both conclude that odontogenic infections are the most common source of infections of deep neck spaces.

Source of infection, in the study undertaken by us was unknown in 8 patients (26.6%). The cause of infection remains unknown

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in one fourth of cases, despite of detail history, physical and radiological examination. The initial focus of infection in the oropharynx and may have been resolved by the time of presentation.

Deep neck space infections are usually managed with early surgical drainage of purulent abscesses via an intraoral or an external incision.[17,19,21] In our study ,patients were started on intravenous antibiotic therapy with Amoxicillin, Clavulanic acid and Metronidazole. As ours is a tertiary referral centre, many of the patients who are referred to our department for further management have already received oral and intravenous antibiotics with little or no results. Hence, we follow a protocol of starting all our patients with intravenous antibiotics and this combination of Amoxicillin Clavulanic acid with Metrogyl given intravenously has showed good results as far as infection control is concerned. The line of treatment is further modified based on the culture and sensitivity report. In case of significant discovered abscess on computed tomography scan, prompt open surgical drainage is the most suitable technique of treating deep neck space infection. In our study, surgical intervention was carried out in 73.3% patients of deep neck space abscesses which correlates with study of Mumtaz et al[9] Eftekharian et al,[19] Parhiscar et al[12] and Har-El et al[20] with approximately 78%, 79%, 100% and 90% undergone surgical intervention. Rest 8 patients of deep neck space infection were managed conservatively.

Surgical incision and drainage should be performed without delay for cases not responding to medical treatment or if there is any evidence of abscess formation.

Out of 30 patients, 9 patients (30%) had diabetes mellitus, 2 patients (6.66%) had chronic renal failure, 7 patients (23.3%) were anaemic, 1 patient (3.33%) had tuberculosis. Diabetes mellitus is widely recognized as a risk factor for serious life threatening infections. Careful attention must be paid to these patients regarding fluid status, acid- base balance and electrolyte and glucose levels.

Streptococcus species were the most common cultured organism in deep neck space abscesses patients which correlates with study of Ridder et al,[22] Parischar et al[12] and Mumtaz et al.[9]

Airway management is challenging in patients with deep neck space infection. In our study, surgical drainage was done in 22 cases. All cases where operated under general anesthesia and it was administered by experienced consultant anesthetist. 13 patients had trismus on presentation, the anesthetists were successful in intubating 18 patients while 4 patients required tracheostomy. In Ludwig's angina and deep neck space infections, the trismus is secondary to muscle spasm and pain. If the technique of initial deep inhalation anesthesia is followed, the spasm is relieved and pain is inhibited and therefore, the mouth can be opened wider thus allowing better visualization of vocal cords.

Blind nasal intubation may be indicated in some cases and is best carried out by an experienced anesthetist. In patients with involvement of lateral pharyngeal and retropharyngeal space, during blind intubation attempts, pus may be extruded and escape into the lungs due to inadvertent force. Further, there may also be damage caused to pharynx and larynx. In such difficult circumstances it is best to resort to the use of fibreoptic laryngoscope guided intubation. In all cases where airway is compressed and tracheostomy indicated, the initial procedure is to carry out the tracheostomy and to establish a good airway safely. Cricothyroidotomy has been proposed as an alternative as it has been reported that in some series, following tracheostomy, the complications of tracheal stenosis are in about 20% of cases.

In patients with severe glottic oedema, pharyngeal oedema , swollen neck, grossly elevated base of tongue and severe trismus, elective tracheostomy must be done under local anaesthesia . Allen et al[23] recommended tracheostomy or cricothyroidotomy in the management of airway in patients with increasing neck swelling with associated deep neck space infections or Ludwig's angina. In our study, tracheostomy was done in 4 patients 13.3% cases of deep neck space abscess. Published reports that indicated airway obstruction of sufficient degree to warrent tracheostomy for airway support is present in 12-16 % of patients with deep neck abscesses.[21]

CONCLUSION

1. Clinical evidence with radiological evaluation provides precious information in determining the origin and extension of the disease. It also increases the accuracy of diagnosis.
2. Computed tomography scan helps to find out exact extension of deep neck abscess.
3. Poor oral hygiene, tobacco chewing, smoking and beetle nut chewing has led to increased prevalence of dental and periodontal diseases which is a common primary cause of deep neck infections.
4. Common organisms associated with deep neck infection are gram positive cocci like streptococci, staphylococci.
5. All patients should be started primarily with Amoxicillin-Clavulanic acid intravenous antibiotic therapy which may be later on changed as per culture and sensitivity report.
6. Infections in the deep neck spaces may result in mortality if they are not diagnosed early and treated aggressively in the high risk groups like diabetics, old age and patients with underlying systemic diseases as they may progress to life threatening complications.
7. Tracheostomy should be considered if airway protection is needed.
8. Patients with deep neck space abscess needs incision drainage under the cover of intravenous antibiotics once the extent of abscess is confirmed on computed tomography.

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