



A COMPREHENSIVE STUDY ON DEEP NECK SPACE INFECTIONS –TREATMENT & OUTCOME AT TERTIARY CARE CENTER.

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ABSTRACT

To review the clinical findings in deep neck infections and identification of predisposing factors and complications. In this study, 30 patients with deep neck infections were studied. This Study is conducted in the Department of Ear, Nose and Throat, ASRAM hospital, Eluru, West Godavari dist, Andhra Pradesh. The most common symptoms were neck swelling and pain, followed by odynophagia. Submandibular space and parapharyngeal space involvement were more common in odontogenic DNSI. Bacteriology reveals streptococcus species as the most common organism. Minimum duration of hospital stay was 14 days. Immediate active intervention is required to prevent progress of the disease. Early stage of cellulitis needs intravenous antibiotics with control of secondary co-morbid conditions like diabetes mellitus, immunocompromised states. CECT scan of neck is useful to know the extent of disease. Surgical intervention in the form of incision and drainage is required followed by medical management. Tracheostomy is required if airway is compromised.

KEYWORDS

Deep neck space infection, Incision and drainage, Odontogenic infections, Tracheostomy

INTRODUCTION

The deep neck spaces that run the entire length of the neck include the retropharyngeal space, the danger space, the prevertebral space and the visceral vascular space. The spaces limited to above the hyoid include the submandibular space, the parapharyngeal space, the peritonsillar space, the masticator space, the temporal space and the parotid space. The only potential space limited to below the hyoid is the anterior visceral space. This area is enclosed by the middle layer of the deep cervical fascia and contains the thyroid gland, esophagus and trachea.1,2,3,4.

DNSI refers to an infection in the potential spaces and fascial planes of the neck, either with abscess formation or cellulitis.5 DNSI are bacterial infections originating from the upper aero-digestive tract and involving the deep neck spaces6. The most common primary sources of DNSI are the dental caries, tonsils, salivary glands and retained foreign bodies. Previously, before the advent of antibiotics, tonsillar and peritonsillar infections were the source of infection in 70% cases of DNSI7; but now the most common cause is considered to be odontogenic in origin8. DNSI are usually polymicrobial in nature. Streptococci, Peptostreptococcus species, Staphylococcus aureus, and anaerobes are the most commonly cultured organisms from DNSI.9,10 Although the incidence of Deep Neck Space Infections (DNSI) was much higher in the pre-antibiotic era, it still continues to be a health problem where it causes significant morbidity and mortality.

Compared with infections elsewhere in the body, deep neck space infections pose complicated problems, due to the numerous portals of entry of infection and proximity to vital structures.

The increasing prevalence of patients with immunodeficiency or prior antibiotic treatment may result in unusual clinical presentations and pathogens, making the clinical diagnosis and treatment difficult.

INCLUSION CRITERIA:-

Only patients with proven deep cervical neck spaces infections were included.

EXCLUSION CRITERIA:-

Patients with superficial infections of external neck wounds (surgical or traumatic), were excluded.

MATERIALS AND METHODS

Patients treated for deep neck abscesses In Dept of ENT & Head & Neck Surgery at ASRAM Hospital, Eluru between September 2017 and august 2019 were studied.

Patients of all age groups and both genders were included.

All parameters including co-morbidities, symptoms, site involved, culture growth, type of intervention required, complications, and outcome were studied.

Routine hematological investigations like CBC, RBS, Serum Creatinine were done, in few cases specific investigations like Montoux test or histopathological testing of granulations or fine needle aspiration cytology.

Ultrasonography, X-rays & CECT NECK were done as a imaging studies.

Patients were subjected to incision and drainage under local / general anaesthesia.

X-ray neck (soft tissue) lateral view was taken in all patients.

In 5 patients with suspected dental infection, orthomopantomogram was taken to localize the source of infection.

CECT scan was taken in patients with suspected parapharyngeal space/retropharyngeal space involvement.

Few patients underwent neck exploration for drainage of the abscesses and pus was sent for microbiological examination.

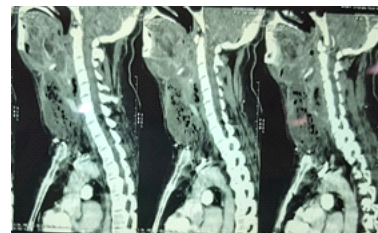


Fig 1: sagittal section of CECT neck showing abscess in the anterior part of neck and extending into mediastinum

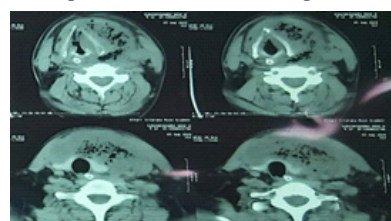


Fig 2: Axial section of CECT showing abscess in the left side of

neck with gas shadow and tracheal shift towards right side.

METHODOLOGY

Once patients were admitted, the most widely used antibiotic was cefepime plus sulbactam (19patients) with metronidazole. Next were third-generation cephalosporins (5 patients) and piperacillin with tazobactam (5 patients) in critically ill patients.

Clarithromycin was used in outpatient treatment for the patients who were allergic to penicillin, which was replaced most often by quinolones (ciprofloxacin/ levofloxacin).

For submandibular abscesses, injectables were maintained throughout the hospital stay, followed by outpatient oral treatment until completing 10 days.

In the remaining DNSI, intravenous treatment was maintained until the resolution of symptoms (clinical improvement, afebrile, analytical normality, negative blood cultures, etc.).

When the symptoms did not improve despite antibiotic treatment, we proceeded to use surgery and place a drain, which helped to evacuate purulent material and made it possible for us to clean the wound periodically with antiseptic solution and hydrogen peroxide.

We performed ultrasound scans and CECT of neck was done for abscess greater than 1.5-2 cm in diameter.

Logically, the anaesthesia used for DNSI drainage depended on the infection location and type of patient.

However, 18 patients required sedation and 2 of them even required general anaesthesia. These patients were noncompliant or suffered a concomitant illness.

RESULTS

The study group included 30 patients, 11(36.66%) male and 19 (63.33%) female patients.

Male : female sex ratio =1:2 in our study.

Majority of patients were seen in 5th decade of life (33.33%) which is followed by 6th decade (26.66%). While we found that there were slight increase in occurrence was seen in 7th decade of life also.

Table 1: Age Distribution

AGE (YRS)	NUMBER OF PATIENTS	PERCENTAGE
0-10	1	3.33%
11-20	0	0%
21-30	3	10%
31-40	3	10%
41-50	10	33.33%
51-60	8	26.66%
61-70	3	10%
70 above	2	6.66%
Total	30	100%

The mode of presentation of the abscesses is summarized in Table

Table 2: SYMPTOMS OF DNSI PATIENTS

SYMPTOMS	NO OF PATIENTS
Neck pain	19
Neck swelling	15
Dysphagia	14
Fever	11
Odynophagia	7
Toothache	5
Airway difficulty	5
Trismus	7
Torticollis	0

Most common symptom is pain and neck swelling followed by dysphagia.

Table 3: Physical Examination

FINDING	NO OF PATIENTS
Swelling in neck	15/30
Oropharyngeal abnormalities	12/30
Trismus	7/30
Dental abnormalities	12/30



Fig 3: showing swelling of left side of the neck

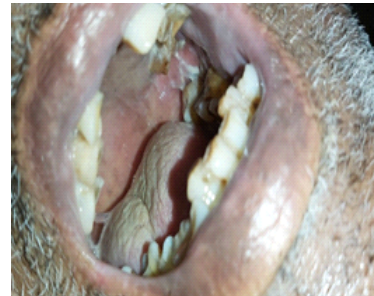


Fig 4: showing dental abnormality

Table 4: AETIOLOGY OF NECK ABSCESSSES

AETIOLOGY	NO OF PATIENTS
Odontogenic	12
Tonsil /pharynx infection	4
Foreign body [fish/meat bone]	5
Salivary gland infection/parotid gland infection	4
Infected Lymphadenopathy	5
Total	30

LOCATION OF THE ABSCESS

Submandibular space infection is the most common presentations amongst all DNSI and is seen in 46.66% of patients. This is followed by retropharyngeal abscess (16.66%).

Table 5: Location Of The Abscess

LOCATION	NO OF PATIENTS	PERCENT %
Submandibular space	14	46.6
Retropharyngeal space	5	16.66
Submental abscess	2	6.66
Parotid	3	10
Parapharyngeal space	2	6.66
Peritonsillar	4	13.33
Total	30	100

Table 6: Bacteria isolated from neck abscess

Anaerobes		Aerobes	
Ecoli	1	Streptococcus	11
Proteus	1	Staphylococcus	7

	Mycobacterium	4
	Pseudomonas	2
	Klebsiella	1

Table 7: Predisposing Factors

Addictions/Disorders	Number of patients	Percentage
Diabetes	13	43.33%
Chronic smoker	10	33.33%
Chronic alcoholic	8	26.66%
Chronic tobacco chewer	2	6.66%
Hypertension	12	40%
Cardio pulmonary diseases	8	26.66%

Amongst major associated illnesses diabetes mellitus was the most common and is found in 43.33% of patients.

Table 8: Treatment in patients with DNSI

TREATMENT	NUMBER OF PATIENTS	PERCENTAGE
Incision and drainage followed by daily debridement	17	56.66%
tooth extraction	10	
Tracheostomy	4	
Medical Management	13	43.33%



Fig 5: showing I&D done with tracheostomy

Table 9: COMPLICATIONS AND MORTALITY

COMPLICATIONS	NO OF PATIENTS
Sepsis	6
Mediastinitis	3
Jugular vein thrombosis	0
Necrotising fasciitis	0
Pneumonia	0
Cranial nerve paralysis	0
Tracheostomy	4
Deaths	1

DISCUSSION

In our study, the majority of patients were seen in their 5th and 6th decade. This correlates with the studies by Parischar et al8 and Meher et al11. In which 50% and 60% patients were in the fourth and fifth decade of life, respectively.

Neck pain was the most common symptom similar to the Gaurav Kataria et al12 study found in 68 patients (89.47%), followed by neck swelling in 65 patients (85.52%)

Streptococcus species were the most common cultured organism in our study, which is consistent with the studies of Ridder et al13. Parischar et al8. Mumtaz et al14. and Gidley et al3.

Common and potentially life-threatening complications include airway obstruction, descending mediastinitis, pleural empyema, sepsis, respiratory distress4

Management of DNSI is traditionally based on prompt surgical drainage of the abscess followed by antibiotics or nonsurgical treatment using appropriate antibiotics in the case of cellulitis15.

DNSI remains a common and challenging disease for clinicians, and should be treated on emergency basis.

It is also very important to give special attention to high-risk groups such as diabetics, the elderly, and patients with underlying systemic diseases as the condition may progress to life-threatening complications.

CONCLUSION

DNSI remains a common and challenging disease for otorhinolaryngologists, and should be treated on emergency basis. In developing countries, lack of adequate nutrition, poor oral hygiene, tobacco chewing, smoking and beetle nut chewing has led to an increased prevalence of dental and periodontal diseases. In present study, Odontogenic infections were the most common etiological factor for DNSI. Therefore, prevention of DNSI can be achieved by making the population aware of dental and oral hygiene and encouraging regular checkups for dental infections. It is also very important to give special attention to high-risk groups such as diabetics, the elderly, and patients with underlying systemic diseases as the condition may progress to life-threatening complications. Early diagnosis and treatment is essential, thus, all patients should be initiated on treatment with empirical intravenous antibiotic therapy, which should be change over later according to the culture and sensitivity report. Tracheotomy should be considered if airway protection is needed and surgical drainage is the standard treatment of DNSI.

REFERENCES

- Levitt G.W. Cervical fascia and deep neck infections. *Laryngoscope*. 1970;80:40935. [PubMed] [Google Scholar]
- Panoessa D.F, Goldstein J.C. Anatomy and physiology of head and neck infections (with emphasis on the fascia of the head and neck) *Otolaryngol Clin N Am*. 1976;9:561-580. [PubMed] [Google Scholar]
- Gidley P.W., Stiernberg C.M. Deep neck space infections. In: Johnson J.T., Yu V.L., editors. *Infectious Diseases and Antimicrobial Therapy of the Ears, Nose and Throat*. Saunders Company; Philadelphia, WB: 1997. pp. 500-509. [Google Scholar]
- Vieira F., Allen S.M., Stocks R.S.M., Thompson J.W. Deep neck infections. *Otolaryngol Clin N Am*. 2008;12:459-483. [PubMed] [Google Scholar]
- Wang L.F., Kuo W.R., Tsai S.M., Huang K.J. Characterizations of life threatening deep cervical space infections: a review of one hundred ninety six cases. *Am J Otolaryngol*. 2003;24:111-117. [PubMed] [Google Scholar]
- Durazzo M., Pinto F., Loures M. Deep neck space infections. *Rev Ass Med Brasil*. 1997;43:119-126. [Google Scholar]
- Weed H., Forest L. Deep neck infection. *J Otolaryngol Head Neck Surg*. 1998;3:2515-2524. [Google Scholar]
- Parhiscar A., Harel G. Deep neck abscess: a retrospective review of 210 cases. *Ann Otol Rhinol Laryngol*. 2001;110:1051-1054. [PubMed] [Google Scholar]
- Ungkanont K., Yellon R.F., Weissman J.L., Casselbrant M.L., Gonzalez V.H., Bluestone C.D. Head and neck space infections in infant and children. *Otolaryngol Head Neck Surg*. 1995;112:375-382. [PubMed] [Google Scholar]
- Huang T.T., Liu T.C., Chen P.R., Tseng F.Y., Yeh T.H., Chen Y.S. Deep neck infection: analysis of 185 cases. *J Otolaryngol Head Neck Surg*. 2004;26:854-860. [PubMed] [Google Scholar]
- Meher R., Jain A., Sabharwal A., Gupta B., Singh I., Agarwal I. Deep neck abscess: a prospective study of 54 cases. *J Laryngol Otol*. 2005;119:299-302. [PubMed] [Google Scholar]
- Gaurav Kataria1, Aditi Saxena2, Sanjeev Bhagat3, Baldev Singh3, Manpreet Kaur3, Gurpreet Kaur3 -Deep Neck Space Infections: A Study of 76 Cases
- Ridder G.J, Technau IK, Sander A, Boedeker CC. Spectrum and management of deep neck space infections: 8 year experience of 234 cases. *J Otolaryngol Head Neck Surg* 2005;133:709-14.
- Mumtaz RM, Arain AA, Suhail A, Rajput SA, Mohammad A, Nabeel H. Deep neck space infections: Retrospective review of 46 patients. *J Cranio Max Dis* 2014;3(1):21 5.
- Mayor GP, Millan JMS, Martinez VA. Is conservative treatment of deep neck space infections appropriate? *J Head and Neck* 2001; 23(2): 126-33.