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Deep neck space infection: an iceberg

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ABSTRACT

Background: The aim of the study was to review pre-disposing factors and clinical features in deep neck space infections so as to avoid life threatening complications associated with it. Assessment and management of 55 cases of deep neck space infection.
Methods: Retrospective study of 55 cases of deep neck space infection from January 2010 to June 2017.
Results: Submandibular space/Ludwig's angina is most commonly occurring neck space infection. Dental caries and poor oral hygiene is major contributing factor for infection. Parapharyngeal lymphadenitis followed by abscess formation is second most reason for neck space infection.
Conclusions: 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 and dental caries. Ultrasound of neck and CT scan of neck is useful to know the extent of disease. Surgical intervention in the form of incision and drainage is required if abscess is detected either clinically or radiologically. Tracheostomy is required if airway is compromised.

Keywords: Deep neck infection, Poor oral hygiene, Neck swelling, Abscess, Cellulitis lymphadenitis

INTRODUCTION

Deep neck space infection present like an iceberg, wherein severe infection is seated deep in neck with very little clinical signs superficially. Incidence of neck infection has dramatically reduced due to good oral hygiene and availability of medical facilities and antibiotics everywhere.[1] Neck space infection still persists in third worldwide countries because of poor oral hygiene and improper use of antibiotics. Complications associated with neck space infection like stridor, neck swelling, odynophagia, jugular vein thrombosis, septic embolism and carotid artery erosion are present in most of the patients when they present to tertiary care centre.[2]

Objective of study was to review pre-disposing factors and clinical features in deep neck space infections, its assessment and management so as to avoid life threatening complications.

METHODS

This Study was a retrospective observational study of 55cases conducted in department of otorhinolaryngology, B.L.D.E.U's Shri B.M. Patil Medical College and Hospital, Vijayapur, Karnataka from January 2010 to June 2017 to review pre-disposing factors and clinical features in deep neck space infections, its assessment and management so as to avoid life threatening complications.

Inclusion criteria

Patients presenting with deep neck space infections were included in the study.

Exclusion criteria

Superficial skin infections and patients presenting as furuncle, infected sebaceous cyst, skin lesions like boil, vesicles were excluded from the study.

Data collected involved demography age, sex, habitus, history of smoking and tobacco consumption, alcohol and associated disease like diabetes mellitus. All patients have undergone Ultrasound of neck. CT scan was done if required for detail assessment and further surgical intervention such as incision drainage, tracheostomy was done if needed.

All characteristics were summarized descriptively. For categorical data, the number and percentage were used in the data summaries. Data were analysed using SPSS software V.23.0 and Microsoft office.

RESULTS

There were 38 male patients and 17 female patients. M: F 2.2:1. Age group varied from 1 to 60 years (Figure 1).

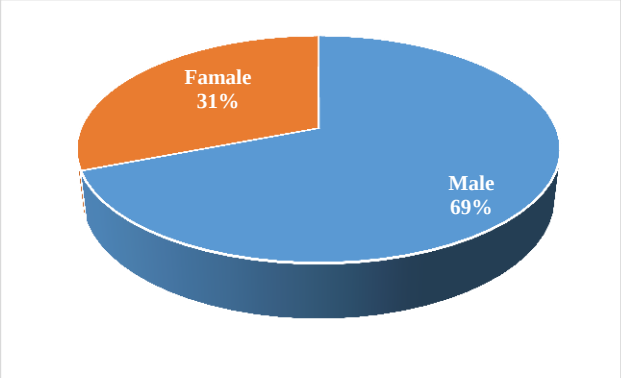

Figure 1: Sex ratio.

Commonest age group involved was in 3 decade of life followed in children less than 10 years, less than 20 years, then in 40-50 years age group (Table 1).

Table 1: Age distribution.

Age group	Number
0-10 years	11
10-20 years	8
20-30 years	10
30-40 years	14
40-50 years	9
50-60 years	8

Submandibular space infection was most commonly involved space followed by parapharyngeal and peritonsilar space. Other neck space infection such Tubercular, parotid abscess are less frequently seen. One case each of acute retropharyngeal and thyriod abscess in children were included in the study (Table 2).

Table 2: Site of deep neck space infections.

Site	Number
Submandibular abscess	21
Parapharyngeal abscess	17
Peritonsillar abscess	12
Tubercular abscess	4
Parotid abscess	4
Thyroid abscess	1
Retropharyngeal abscess	1

Most common presentation is swelling in neck region in 55 patients, fever in 51 patients, odynophagia in 16 patients, dysphagia in 8 patients, and difficulty in breathing 6 patients. Physical examination revealed oedema with localised tenderness in 56 patients with skin necrosis in 2 patients, dental pain in 13 patients, peritonsillar infection in 12 patients, trismus in 22 patients. Patients presenting with stridor underwent tracheostomy followed by surgical intervention. Fibre optic intubation was done in 10 patients. (Table 3)

Table 3: Causes of deep neck space infections.

Causes	Number
Dental caries	16
Tonsillar	12
Cervical lymphadenitis	8
Tubercular	4
Parotid	4
Fish bone throat	1
Post traumatic	1
Unknown	14

After stabilisation of patient, surgical intervention was done in where abscess formation is seen in ultrasound/CT Scan. CT scan was done in patient in whom spread of infection was suspected superiorly to base of skull and inferiorly into mediastinum and upper thorax.

Patient was put on intravenous antibiotics, analgesics, IV fluids. Diabetes and other co morbid conditions were treated accordingly.

Majority of neck space infection were treated by incision and drainage via cervical approach. Peritonsilar abscess was drained orally followed by interval tonsillectomy. 15 patients who were in early stage of infection without abscess formation were treated conservatively with intravenous antibiotics (Table 4).

Table 4: Following surgical intervention for neck space infection.

Surgical intervention	Number
Cervical incision and drainage	25
Abscess drainage followed by tonsillectomy	12
Needle aspiration	3
Cervical incision and drainage with tracheostomy	3
Endoscopic fish bone extraction	1
Thyroid abscess drainage	1
Retropharyngeal abscess drainage	1
Conservative	15

Commonest organisms isolated in deep neck space infection were *Staphylococcus aureus* 47% of cases followed by *Streptococcus pyogenes* 14% of the cases. Due to start of antibiotics at periphery 14% cases culture were sterile (Table 5).

Table 5: Commonest organisms isolated.

Microorganism	N	Percentage (%)
Staphylococcus aureus	26	47
Streptococcus pyogenes	08	14
Streptococcus viridans	05	09
Pseudomonas aeruginosa	04	07
Klebsiella pneumonia	03	05
Bacteroids	01	01
Sterile	08	14

Complications seen in our study were upper airway obstruction and stridor: 10 cases, mediastinitis: 1 case, toxaemia: 6 cases.

DISCUSSION

Deep neck space infection is commonly seen in males and in age group 3rd to 5th decade of life.[3-6] Results of our study is similar to literature.

Associate co-morbidity which leads to neck space infection such as poor dental hygiene, diabetic, tobacco chewing, immunocompromised states like Diabetes mellitus were present in 23 patients and tuberculosis in 4 patients. Smoking and alcohol consumption were most commonly associated social habits.

Commonest presentation of DNI were swelling neck region associated with fever odynophagia and trismus.[6] Four of our children of age less than 1year presented with symptoms of lethargy, drooling of saliva, excessive cry, fever and cough.[7] Signs of toxaemia like tachycardia, tachypnea, raised temperature was seen in 2 children.

Most common organism isolated were *S. aureus*, *Str. viridians*, *Klebsiella* and *Pseudomonas*. [3-6] Some cultures showed no growth due to usage of antibiotics prior to presentation. *Klebsiella* species were seen in both diabetic and non-diabetics. Other authors have mentioned about cultures being polymicrobial in nature. Our study did not demonstrate any culture being mixed.

Commonest neck space infection was submental and submandibular space, others include parapharygeal extending to submandibular and parotid spaces were also seen.[8,9] Retropharyngeal and posterior triangle neck space infections are seen in decreasing order compared to other spaces.

10 of our patients presented with stridor, 2 patients needed emergency tracheostomy, out of these one had Ludwig's angina with severe trismus and other one was a case of extensive cellulitis of neck with stridor. Airway is secured first in patients presenting with severe trismus and oedema tongue with fibre optic intubation or tracheostomy prior to drainage of abscess.[10-12.]

Contrast enhanced CT scan is investigation of choice with sensitivity of 100% in evaluation of deep neck space infections.[13] CT scan is also very sensitive in detection of known complications like mediastinitis, jugular vein thrombosis. CT or USG guided aspirations of abscess are successful in prior studies. [14]

Early recognition and treatment of deep neck space infections has better prognosis. Hence it reduces complications and mortality rate associated with it.[15]

CONCLUSION

Patients presenting with deep neck space infection should be treated on emergency basis as they have tendency to compromise airway. Tracheostomy is indicated if signs of airway obstruction noted.

Contrast enhanced CT scans is helpful in confirming and extent of disease where clinically difficult to assess underlying abscess formation.

Broad spectrum antibiotics are started initially and changed accordingly after culture. Any abscess formation has to be drained surgically after initial stabilisation.

Prompt early recognition and drainage avoids life threatening complications.

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