

Deep Neck Space Infections – Our Experience

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Abstract: Deep Neck Space infections pose a challenging task to otolaryngologist as the patient approaches a tertiary center quite late in the course of disease. A prospective study of incidence, etio-pathogenesis, management and outcome of neck space infections in 100 patients was carried out in Govt. ENT Hospital, Koti, Hyderabad.

Patients were investigated radiologically and culture and sensitivity of causative organism and managed medically/surgically. Data were recorded including outcomes and statistically analyzed.

Key Words: Neck space infections, culture and sensitivity, medical & surgical management.

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I. Introduction

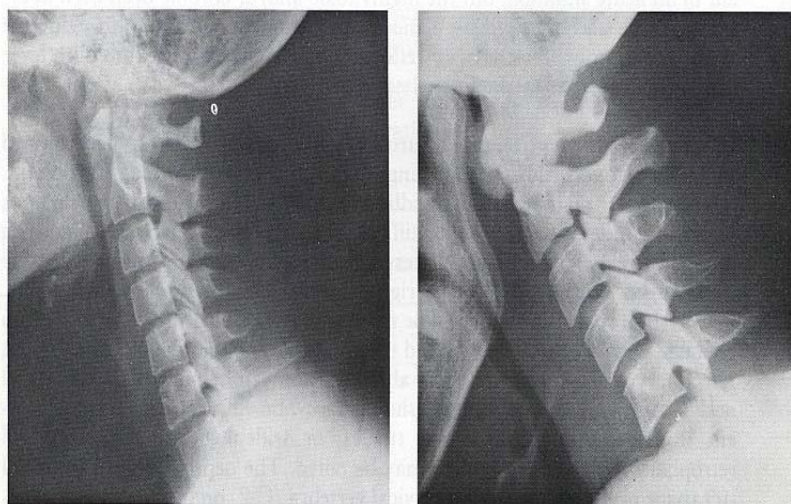
Deep neck space infections are dreadful infections and are still a potentially life threatening condition⁽¹⁾ with considerable mortality even in this era of modern medicine. This is due to delayed presentation of the patient to a tertiary centre and frequent association with fatal complications as a result of close proximity to aerodigestive tract and major vasculature of neck.

These are commonly seen in low socioeconomic group with poor oral hygiene and nutritional disorders. There is a rise in the recent past due to reemerging diseases like AIDS and Tuberculosis. With an insight into prevention of these dreadful infections, patient education, oral and dental hygiene has to be strengthened.

Management of these infections needs best understanding of neck fascia and anatomy of neck spaces⁽²⁾. But because of lack of universally accepted definition of fascia, there is much ambiguity regarding the anatomy.

Described by LEVITT as, "It is the terminology that is confusing, not the anatomy."

With the advent of new antibiotics and improved methods of managing critically ill patients, fatality due to neck space infections has come down. Still there is much scope for further work in this regard, to standardize the nomenclature of anatomy of neck spaces, to reduce incidences, for earlier diagnosis and better management.



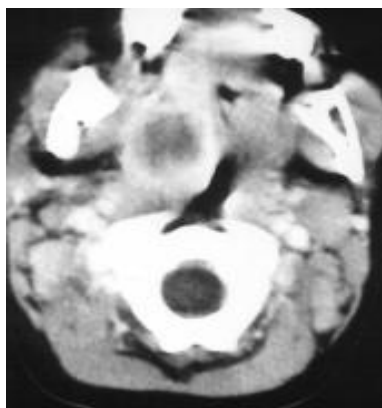
ULTRASOUND NECK ⁽¹¹⁾

It is an important diagnostic tool in neck space infections, being used since two decades. It is done with 10MHz transducer.

Role of ultrasound in neck space infections is ,it can find out deep seated loculi, which are the causes of repeated abscesses. It can also comment about displacement of major vessels, guiding the surgical management. It can differentiate an abscess from nearly enlarged lymph nodes in acute lymphadenitis. Comparing with CT and MRI it is economical, can be done in short time, can be repeated, and give valuable information if done in expert hands.

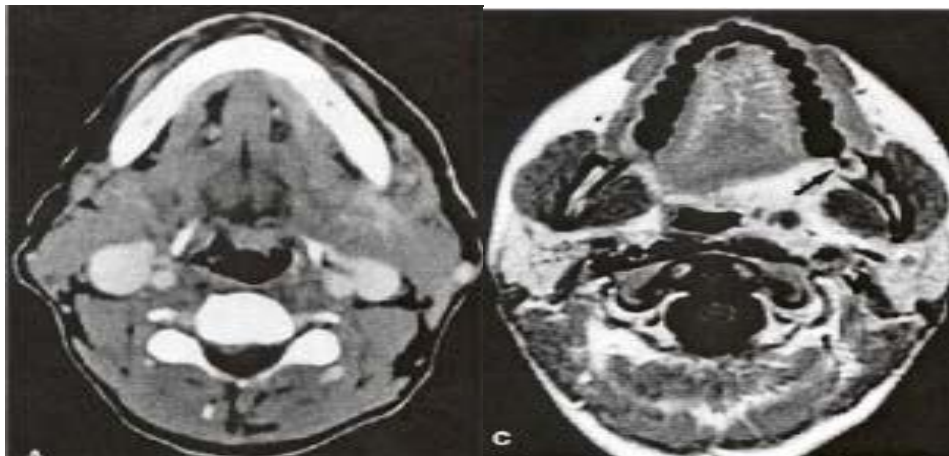
COMPUTERISED TOMOGRAPHY(CT)⁽³⁾

These are quite helpful for evaluation of deep neck infections because physical examination alone can misidentify the involved space. CT scans with intravenous contrast provide excellent visualization of most bony and soft tissue structures. The intravenous contrast allows visualization of the great neck vessels and enhancement of areas of inflammation. CT scans are valuable in determining whether the infection is contained within the lymph nodes or has spread beyond into the fascial planes of the neck. Although CT is excellent for identifying the presence of deep neck infection, it cannot reliably differentiate between the generalized edema of phlegmon versus purulent abscess because both commonly appear as hypodense collections with peripheral enhancement.



MAGNETIC RESONANCE IMAGING:

It is not routinely used for suspected deep neck infections, but should be considered in select circumstances when it is superior to CT. In addition, MRI scanning is time consuming and less likely to be tolerated by a patient who is in pain or is having trouble swallowing or maintaining an airway while supine. MRI scans may provide additional detail to CT in infections involving the intracranial cavity, parotid, and prevertebral space.



All the above varieties were encountered in our study.

AIM OF STUDY

Deep neck space infections is a neglected entity due to ambiguity of nomenclature of anatomy of neck spaces. This study aims at understanding the changing trends in etiology ,bacteriology and different modalities of imaging in neck space infections.

Culture and sensitivity tests aims at knowing the variations in susceptibility to antibiotics and to show a better regimen of antibiotics^{4,5,6,7,8}. It also aims at knowing the best ways of diagnostic methods for applying conservative management and timely surgical intervention so as to prevent complications.^{9,10,11,12}

II. Materials And Methods

A prospective study of deep neck space infections was done during the period June 2010 to October 2011 i.e 17 months who attended the outpatient and were admitted as inpatient in our govt. ENT Hospital Koti, Hyderabad.

100 Cases were included in the study.

42 cases were male including 12 male children

58 cases were female including 15 female children.

The clinical characteristics recorded include age, sex, aetiology, symptoms, organisms cultured, diagnostic methods, & type of management.

Investigations included complete blood tests, complete urine Examination, HIV, HbSAG, RBS, Blood Urea, S.Creatinine.

Pus was sent for culture & sensitivity.

X-ray soft tissue neck in AP & LATERAL VIEW, Ultrasound, CT SCAN & MRI were done.

Management included Medical & surgical treatment.



X-ray lateral view of the Neck in a Patient with Neck abscess

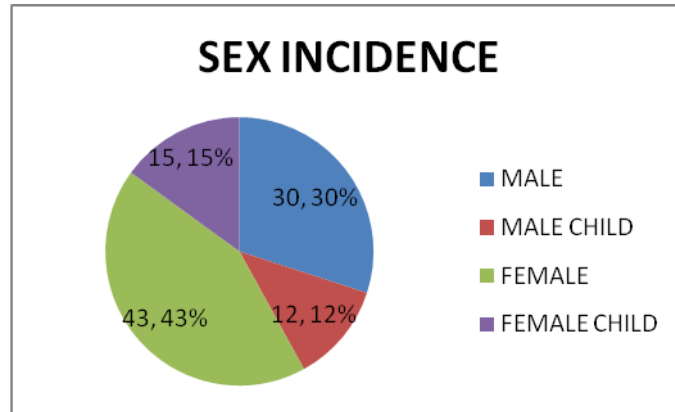


III. Observations And Results

Our study consists a total of 100 cases.

Sex Incidence:

Out of these 42 cases were male including 12 male children and 58 cases were female including 15 female children. The ratio of male to female being 1 : 1.38 .

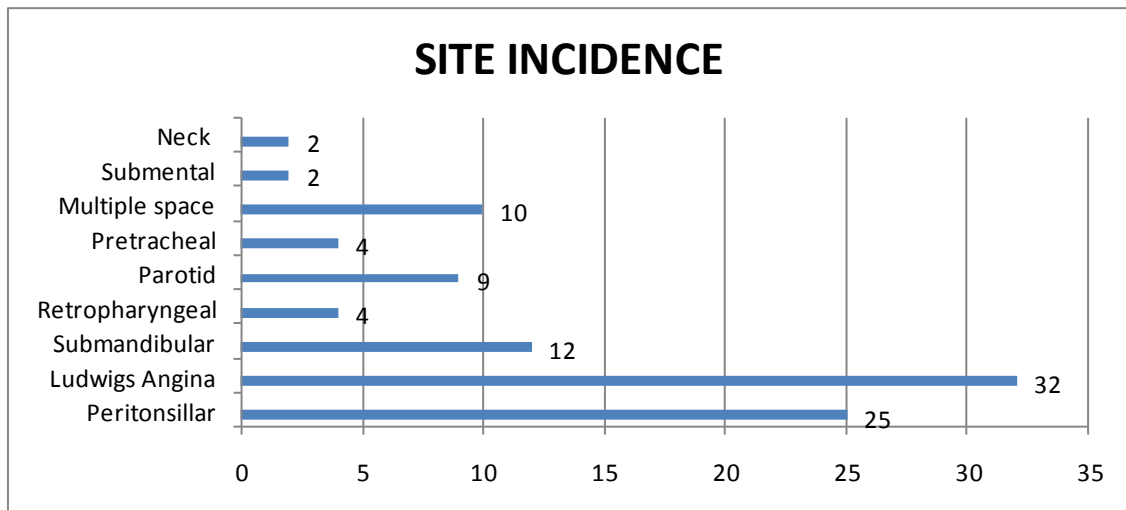


Age Incidence:

In common to all infections, the age incidence ranges from 2 years child of Left parotid abscess to 72 years with Ludwigs angina. The highest incidence of neck space infections were noted in the age group of 11 – 20 years accounting for 28% cases.

Site Incidence:

Of all the deep neck space infections, Ludwigs angina was found to be the highest with 32 cases, next common was 25 cases of Peritonsillar space infections.



Etiological factors:

Out of 100 cases only 23 cases (23%) have shown a proper etiological agent. Rest all were idiopathic without any striking etiological agent. Of these 23 cases, 17 cases (73.9%) were Ludwigs angina and all showed dental infection as etiological agent.

The other etiological agents noted were parotitis for one case, foreign body for one case, trauma for one case, TB for one case, malignancy for one case & chronic otitis media for one case.

The inference of these observations was most of the times deep neck space infections (DNSIs) were idiopathic or due to local suppurative causes.

Most of the patients (nearly 80%) belonged to low socioeconomic group which may be because of poor nutritional status, poor oral & dental hygiene.

Observations in specific to each space infection:

Ludwigs Angina:

Out of 100 cases 32 cases of Ludwigs angina were noted, which was highest in our series. Of these 32 cases the highest number of cases, a total of 13 cases were noted in the common age of incidence 10 to 20 years i.e a percentage of 40.6%.

In the total of 32 cases of Ludwigs angina, 16(50%) were subsided by surgical management and 16cases (50%) subsided by conservative management. The inference of this finding is nearly half of the cases of Ludwigs can be treated by medical management.

GENDER	NUMBER	PERCENTAGE
MALE	07	21.8%
MALE CHILDREN	06	18.5%
FEMALE	17	53%
FEMALE CHILDREN	02	6.25%

The incidence of Ludwigs Angina gradually decreases with increasing age & maximum age incidence in our study was 11 to 20 years age group (40.6%).Incidence in females was slightly higher than males carrying not much significance. All cases were bilateral stressing the frequent bilateral nature of the disease. Apart from 32 cases ,10 cases of multiple space infections were also found with Ludwigs angina being associated with Parapharyngeal abscess in 9 cases & one case with Parotid abscess.

Peritonsillar space infections:

This was the second highest common type of infection in our study with a total of 25 cases out of 100 cases, with slightly higher incidence in males(14).High incidence was seen in age group 21 to 30 years(8) & next age group was 11 to 20 years.Out of 25 cases,11 cases (44%) were cured with medical management & 14 cases (56%) needed Incision and Drainage.

SEX/GENDER	NUMBER	PERCENTAGE
MALE	13	52%
MALE CHILDREN	01	4%
FEMALE	08	32%
FEMALE CHILDREN	03	12%

Parotid abscess:

Out of 100 cases only 9 cases were noted in our study.6 cases needed surgical management and 3 cases were cured by medical management.

Retropharyngeal Abscess:

Out of 100 cases only 4 cases were noted in our study. One case had foreign body as etiology & one case had Tuberculosis of cervical spine. Two cases were managed conservatively and two cases were surgically managed.

Submandibular abscess:

Out of 100 cases 12 cases were found to have submandibular abscess.Females incidence (8) was more than male cases(4) .All cases were surgically managed.

Number of days of hospital stay:

In our study an average hospital stay of 7.7 days was noted with maximum number of days of 30 days by Jaleel aged 30 years male,a case of Ludwigs angina with left parapharyngeal abscess and associated Diabetes.

Mortality rate:

In our study there were no deaths.Out of 100 cases one case of ludwigs angina needed tracheostomy (1%) which was successfully decanulated after 12 days.

These observations are showing a decreasing trend of low mortality and low incidence of cases undergoing tracheostomy.

Other associated chronic diseases:

Out of 100 cases, 23 cases were found to be with other diseases. 15 cases had diabetes, 3 cases had anaemia,2 cases had Hepatitis-B,1 Case had Tuberculosis spine,1 case had Malignancy and 1 case had Chronic otitis media.

Culture reports and Organisms isolated:

Out of 100 cases, only 66 cases underwent Incision and Drainage due to abscess formation.Of the 66 cases,we could subject pus for culture and sensitivity for 45 cases,due to reasons like emergency admission and drainage in duty hours,non availability at our hospital, due to acute conditions and distress and some patients were not affordable.

The results of 45 cases of pus for culture and sensitivity are

- Sterile - 22 (48%)
- Streptococcus - 10 (22%)
- Staphylococcus - 8 (17%)
- Pseudomonas - 2 (5%)
- E.Coli - 2 (5%)

Klebseilla□ - 1(3%)

The observations of the above results shows that 48% were sterile with no growth. This can be due to antibiotic usage prior to admission given by local doctors as our hospital is a Tertiary hospital and are being referred from them and also due to trail of conservative treatment including antibiotics prior to incision and drainage at the time of admission.

The remaining results showed highest incidence of streptococcus viridans (22%) followed by staphylococcus aureus (17%).

Multiple space infections with diabetes was associated in 2 cases with E.Coli organisms.

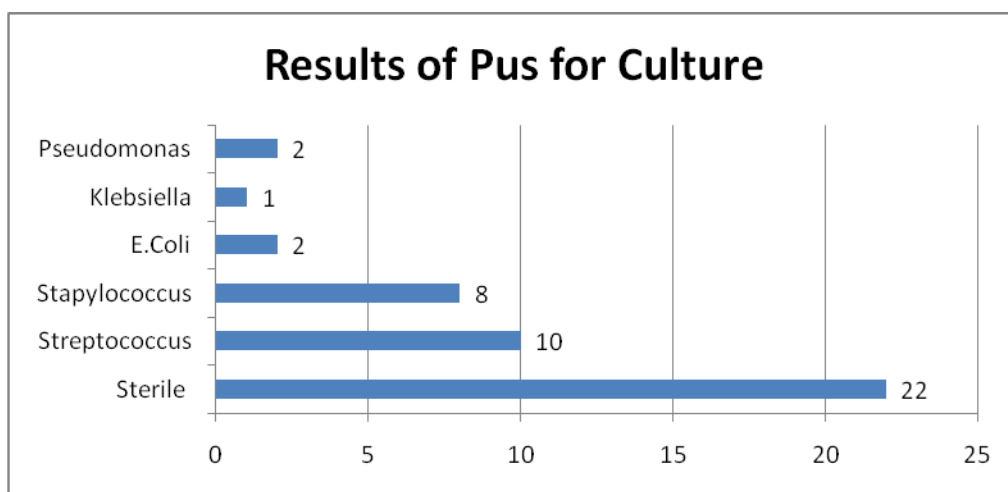
The inference of the above findings was that the commonest organism to cause deep neck space infections is Streptococcus viridans as described by standard text books.

The anaerobic culture could not be done due to non availability of facilities.

Antibiotics:

In our study the commonly opted regimen was Ceftriaxone +Amikicin+Metronidazole in most cases and in few cases Ceftriaxone was replaced with Cefixime/Ciprofloxacin/Ampicillin. Most of the cases responded positively except in one cases where Peptaz was used.

Drug sensitivity shown by different organism to commonly used antibiotics



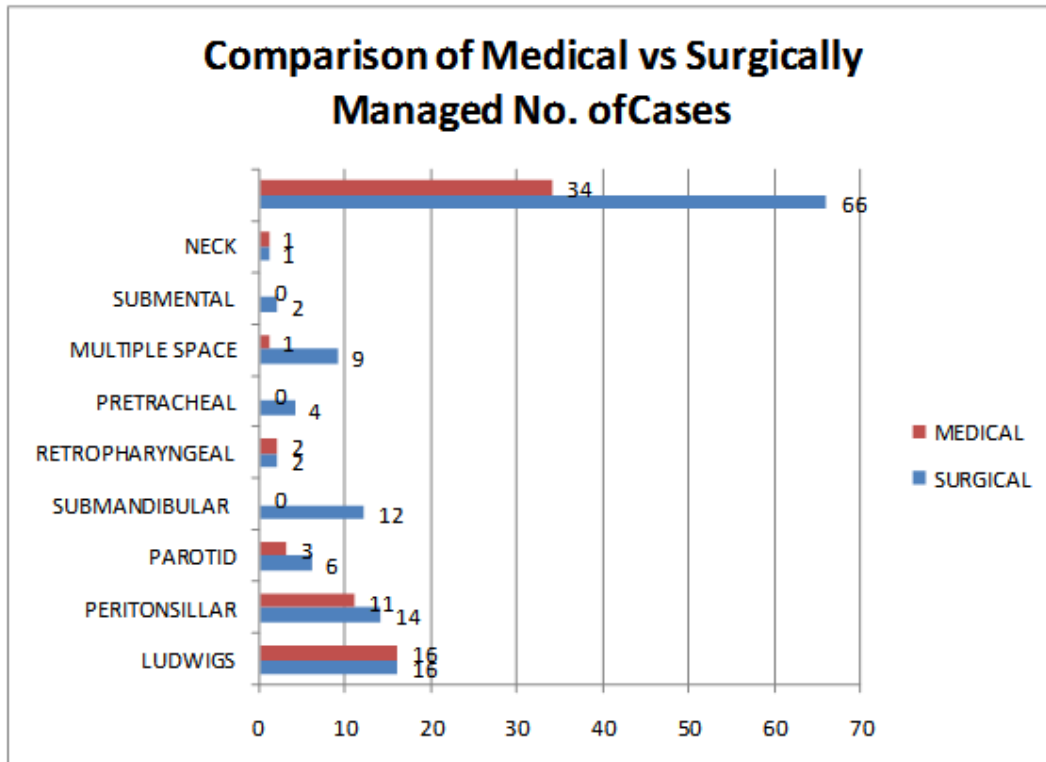
	Strepto	Staphylo	Pseudo	E.coli	Klebsi
Ceftriaxone	82.4%	65%	50%	50%	50%
Cefotaxim	72.8%	50%	50%	50%	50%
Amikicin	55%	40%	50%	0%	0%
Ampicillin	45%	40%	0%	0%	0%
Ciprofloxacin	48%	35%	50%	0%	0%
Gentamicin	40%	43%	0%	0%	0%

Management:

In our study of the 100 cases,66 cases were managed surgically and the rest 34 cases were medically managed. In surgical drainage, Betadine gauze wick was kept in the wound after incision and drainage.

MANAGEMENT METHOD	NUMBER	PERCENTAGE
SURGICAL	66	66%
MEDICAL	34	34%

SITE/SPACE	MEDICAL-34%	%	SURGICAL-66%	%
LUDWIGS	16	50%	16	50%
PERITONSILLAR	11	44%	14	56%
PAROTID	03	33.3%	06	66.7%
SUBMANDIBULAR	00	0	12	100%
RETROPHARYNGEAL	02	50%	02	50%
PRETRACHEAL	00	0	04	100%
MULTIPLE	01	10%	09	90%
NECK	01	50%	01	50%
SUBMENTAL	00	0	02	100%



Complications:

Most of the complications described in the standard text books were not seen and the common complications we have observed in a few cases of our study was Neck contractures due to healing by secondary intension at incisional sites with residual dysphagia for few days.

IV. Discussion

In our setup Ludwigs angina is the most common Deep Neck space infection, with high incidence in females ,of young to middle age⁽¹⁾. Most of them show no growth on culture media and for sensitivity. They are relieved of the symptoms and disease ,either by medical or surgical management according the need.

There is no mortality when they are treated with antibiotics and surgical incision and drainages whenever required.

Next common disease in our setup is peritonsillar abscess.,More common in the young males often requiring incision and drainage. Parotid abscess required incision and drainage for relieving the symptoms in half of the cases, and decrease the infection with simultaneous antibiotics.

Retropharyngeal abscess management depends upon the aetiology and the progression of the disease⁽²⁾. Abscesses secondary to foreign body or the chronic infections have to be treated with aspiration and foreign body removal., and decrease the sepsis with appropriate antibiotics.

Submandibular space infection always reqired incision and drainage along with parenteral antibiotics.

Prompt diagnosis of the disease along with appropriate antibiotics (as per clinical condition/ culture and sensitivity report), will reduce the infection, pain, duration of stay of the patient in the hospital and reduce the complications.

V. Summary

The present Clinical Study of Deep Neck Space Infections was carried out on 100 cases in Govt. ENT Hospital , Koti , Hyderabad over a period of 17 months i.e from June 2010 to October 2011.

In this study 42 cases were male and 58 cases were female with a male to female ratio being 1 : 1.38 . The youngest case in our study was 2 years and the oldest case was 72 years old and the commonest age group was 10 – 20 years (28%).

The commonest site was Ludwigs angina with 32 cases (32%) followed by Peritonsillar space infections with 25 cases (25%) which were treated both by medical and surgically.

In our study 45 cases under went culture tests and 22 cases (48%) were sterile and 10 cases showed Streptococcus group (22%) followed by 8 cases with Staphylococcus group (17%). All cases responed to ceftriaxone,cefixime,amikacin and metronidazole combinations.

In our study 34 cases were managed medically and the rest 66 cases by incision and drainage . Only one case of ludwigs which presented late with swelling and stridor underwent Tracheostomy an incidence of only 1% in our study. There were no deaths in our series.

Diabetes was associated in 15 cases (15%) and the next common disease was Dental infections in 17 cases (17%).Diabetes was associated with multiple space infections and longer stay in the hospital. The significantly less incidence of complications can possibly be atteibuted to early identification of causative or organizers and their sensitivity.

VI. Conclusion

This prospective study of deep neck space infections done during June 2010 to October 2011 (17 months) at Government ENT hospital, Koti, Hyderabad revealed.

1. Due to advent of antibiotics, deep neck space infections are in decreasing trend with admission rate accounting to 3% of total inpatients in our hospital.
2. The common age group found to be affected is 10-20years (28%).
3. These infections had female sex predominance due to high female Outpatient in our hospital showing a ratio of 1.38 : 1 .
4. Out of all deep neck space infections, Ludwigs infections was common(32%)followed by peritonsillar infections (25%).
5. Irrespective of space involved common symptom was DYSPHAGIA.
6. Most neck space infections were IDIOPATHIC followed by Dental infections as aetiological factors for Ludwigs & Submandibular infections.
7. Contrary to common belief, these DNSI affect all people with more severity in people with Diabetes, increasing the hospital stay and possibility for complications.
8. History & clinical examination are of great importance in diagnosis supported by x-rays, which still have major role in diagnosis and management. Ultrasound is an upcoming tool and only few cases needed CT SCAN (4 cases) & 2 cases had undergone MRI.
9. Commonest organism isolated is streptococcus (viridians and pyogenes) followed by staphylococcus aureus which responed to Ceftriaxone, Cefotaxime Ampicillin, Metronidazole & Amikacin.
10. Medical treatment is also important in deep neck space infections(34 cases) thus avoiding traumatic painful surgical management.
11. Incision and Drainage is the mainstay of surgical treatment with wide exposure and use of Betadine solution impregnated gauze for placement in the wound.
12. Patient education regarding Oral & Dental hygiene has to bestressed to prevent most of deep neck space infections.
13. Complication rate is very low with proper antibiotic coverage and timely surgical intervention. The common complication is fibrotic contractures of neck and residual dysphagia in I & D patients.

Bibliography

- [1]. Chow AW. Life-threatening infections of the head, neck, and upper respiratory tract. In: Principles of Critical Care, Hall JB, Schmidt GA, Wood LD (Eds), McGraw-Hill, New York 1998. p.887.
- [2]. Grodinsky, M. Ludwig's angina, retropharyngeal abscess, and other deep abscesses of the head and neck. JAMA 1940; 114:18.
- [3]. C M Glasier, JE Stroke RF Jacob, P.Mancias , RE Leitheierser, RW Seiwert, JJ Seiwert; CT and Ultrasound imaging of the Retropharyngeal Abscesses in children: American journal of neuroradiology 1992 13: 1191-1195
- [4]. Tanner A, Stillman N. Oral and dental infections with anaerobic bacteria: clinical features, predominant pathogens, and treatment. Clin Infect Dis 1993; 16 Suppl 4:S304.
- [5]. Roscoe DL, Chow AW. Normal flora and mucosal immunity of the head and neck. Infect Dis Clin North Am 1988; 2:1.
- [6]. Rega AJ, Aziz SR, Ziccardi VB. Microbiology and antibiotic sensitivities of head and neck space infections of odontogenic origin. J Oral Maxillofac Surg 2006; 64:1377.
- [7]. Huang TT, Tseng FY, Yeh TH, et al. Factors affecting the bacteriology of deep neck infection: a retrospective study of 128 patients. Acta Otolaryngol 2006; 126:396.
- [8]. Parhiscar A, Har-El G. Deep neck abscess: a retrospective review of 210 cases. Ann Otol Rhinol Laryngol 2001; 110:1051.
- [9]. Brook I. Anaerobic bacteria in upper respiratory tract and other head and neck infections. Ann Otol Rhinol Laryngol 2002; 111:430.
- [10]. Huang TT, Liu TC, Chen PR, et al. Deep neck infection: analysis of 185 cases. Head Neck 2004; 26:854.
- [11]. Lin HT, Tsai CS, Chen YL, Liang JG. Influence of diabetes mellitus on deep neck infection. J Laryngol Otol 2006; 120:650.
- [12]. M.Panduranga KAmath, Ashok B Shetty, Mahesh Chandra Hegde, Suja Sreedharan, Kiran Bhajiwai, K.Padmanabham, Saurabh Agarwal, Manoj Mathew, M.Rajeev Kumar. Presentation and Management of Deep Neck Space Space; Indian Journal of Otolaryngology and Head and Neck Surgery, 2003,55 (v) 270-275.

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