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Deep neck abscesses-a diagnostic and therapeutic challenge

Aishwarya Ullal¹*, Arun P. Ajith²

¹Department of ENT, St. Marys Hospital, Thodupuzha, Thodupuzha, Kerala, India ²Department of Radiodiagnosis, Kottayam Medical College, Kottayam, Kerala, India

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*Correspondence: Dr. Aishwarya Ullal,

E-mail: casiopia1789@yahoo.co.in

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ABSTRACT

Background: Deep neck space infections pose a diagnostic challenge, as they traverse complex anatomy, these patients develop devastating complications if the diagnosis is not made early.

Methods: This was a case series over a period of one year, reporting unusual presentation of deep neck abscesses. Patients were subjected to detailed history and clinical examination. Routine investigations, were done. After taking high risk consent, intra oral drainage of abscesses was done.

Results: In the present study of 30 cases age group affected was 10 to 30 years with male predominance. Peritonsillar abscesses were seen in the adolescent age groups whereas retropharyngeal space infections—were seen more in the adult population. Tuberculosis was the most common predisposing factor followed by diabetes. Dysphagia was the most common presenting symptom, followed by neck swelling. Intraoral drainage was done in 23 patients, intraoral drainage and ultrasound guided aspiration was done in 6 patients and 3 patient required emergency tracheostomy for securing of the airway.

Conclusions: Deep cervical abscesses still occur in the antibiotic era and may cause life-threatening complications.

Keywords: Deep neck abscesses, Intraoral method of drainage, Traverse complex anatomy

INTRODUCTION

Deep neck space infections can pose an immediate life-threatening emergency, with potential for airway compromise and other catastrophic complications. With less access to health care and less availability of antibiotics, deep space infection is a more common complication of upper respiratory tract infections in the developing nations. Deep neck space infections pose a diagnostic challenge as they traverse complex anatomy, often clinically impossible to localize as overlying tissue structures are often unaffected. The increasing prevalence of patients with immunodeficiency or prior antibiotic treatment, often results in unusual clinical presentations and pathogens, making the clinical diagnosis and treatment difficult.

The early symptoms of DNSI often do not reflect the disease severity. Clinical manifestations depend on the spaces involved, and include pain, fever, malaise, fatigue, swelling, odynophagia, dysphagia, trismus, dysphonia, otalgia, and dyspnea. The complication risk depends on the extent and anatomical site and their spatial orientation like diseases that transgress fascial boundaries and spread along parapharyngeal, retropharyngeal, and paravertebral space have a higher risk of complication compared with those confined within a peritonsillar, sublingual, submandibular, parotid, and masticator space. Common and potentially life-threatening complications include airway obstruction, carotid aneurysm, jugular vein thrombosis, mediastinitis, pleural empyema, sepsis and disseminated intra- vascular coagulation.

Treatment includes antibiotic therapy, airway management and surgical intervention. Management is

traditionally based on early surgical drainage of the abscess followed by broad spectrum antibiotics or nonsurgical treatment using appropriate antibiotics in the case of cellulitis.⁴ Proper diagnosis and prompt management can effectively overcome the disease and provide a cure without complications.

This article focuses on the deep neck space infections and the complications associated with and explores the therapeutic advantage of intra oral drainage as a less morbid option in managing these conditions.

METHODS

The cross-sectional prevalence study was conducted on 30 patients with deep neck infections admitted into the emergency unit between January 2015 to April 2016 at our tertiary care hospital M. Y. hospital Indore, Madhya Pradesh, India. Sample size included patients with deep neck abscesses and those with superficial abscess such as isolated peritonsillar abscess, Ludwig's angina was not included in study. Data collection involved demographic profile, clinical presentation of the disease, causal association, the duration of hospital stays, laboratory examination, bacteriological studies, the treatment options and complications. Radiological investigations included X-ray soft tissue neck which was done routinely in all cases along with CECT scan of neck with chest was done. MRI was done in suspected case of complications.

Resuscitative measures were taken on emergency basis including correction of fluid and electrolyte imbalance, managing the underlying medical conditions such as diabetes mellitus. Routine blood investigations and laboratory investigations for renal and liver function obtained in all cases. After obtaining high risk consent and achieving local anaesthesia, with measures to secure airway by means of tracheostomy, intra oral drainage of abscess was done, intravenous antibiotics were given. In cases with foreign body ingestion rigid oesophagoscopy done. In required cases repeated ultrasonography guided aspiration of pus done from the neck swelling. The treatment plan was followed as per the culture and sensitivity report. In cases of patient with reports of tuberculosis anti-tubercular therapy initiated. Repeated intra oral drainage were considered along with radiological follow up.

Statistical analysis

Sample size was calculated using simple random sampling. This was a prevalence study and findings were represented in form of charts and graphs

RESULTS

In the present study of 30 cases, we saw that the maximum incidence of deep neck space infection was seen in the age group between 10-30 years with mean age of 20 years. Out of 30 cases 18 were male i.e. 60% and

12 were female i.e. 40% with a male to female ratio of 3:2. Most of the patients came from the rural areas (70%) with lack of proper medical facilities with delayed diagnosis of the condition and complications.

Peritonsillar abscesses with extension mostly into parapharyngeal spaces were seen in the adolescent age groups whereas retropharyngeal space infections were seen more in the adult population. Tuberculosis was the most common predisposing factor followed by diabetes in 10 i.e., 33.33% of cases and 6 i.e., 20% of cases respectively. Chronic kidney disease was associated with 12% of cases followed by malignancy in 10% of cases. Foreign body impaction in digestive tract was the culprit along with dental caries in 4 cases i.e., each whereas pharyngitis was present in 6 cases.

Table 1: Aetiology of deep neck abscesses.

Etiology	No. of cases
Peritonisillar abscess (Tonsillopharyngitis)	8
Odontogenic infection	6
Foreign body	4
Trauma	2
Salivary gland infection	3
Unknown	7

Dysphagia was the most common presenting symptom seen in almost all the cases i.e. (90%) followed by neck swelling in 70% of cases and throat pain in 60% of cases. fever was present in 80% of cases. On clinical examination 27 patients had a posterior pharyngeal wall bulge, followed by trismus in 6 cases and torticollis also present in 6 cases. Quadriparesis was present in 1 case.

The mean progression time of DNI was 8.51 days; the mean hospital stay was 13.3 days. Peritonsillar abscesses were the most common abscess in 8 cases, followed by retropharyngeal and submandibular space infection in 6 cases each and para pharyngeal abscesses in 4 cases.

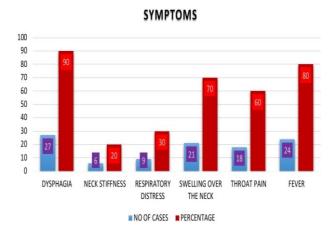


Figure 1: Symptoms of patients.

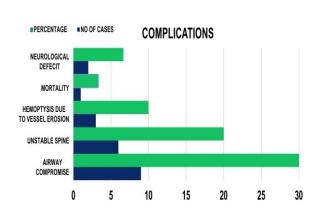


Figure 2: Complications.



Figure 3: MRI of 13 year old patient presented with dysphagia, change in voice with a posterior pharyngeal bulge shows an unilocular collection seen in retropharyngeal space extending from base of the clivus to C5 vertebrae level measuring 6.1×2.8×5.9 (CC×AP×Trans) and the collection communicating with a right paravertebral space collection measuring 3.1×1.5×1.9 (CC×AP×Trans), clivus and atlanto occipital joint, atlanto axial joint showed edema and erosion causing compression of cord at neural foramen. Intra oral drainage of pus done and patient was put on antitubercular regimen as per nucleic acid amplification results. Neurosurgical consultation done and SOMI cervical brace was advice for neck stabilization and absolute bed rest was advised.

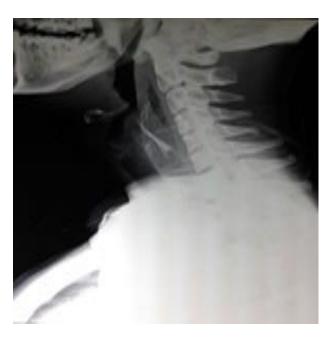


Figure 4: A 32-year-old mentally retarded male came with accidental ingestion of foreign body chicken bone presented odynophagia, difficulty in swallowing since then. X-ray revealed radiopaque shadow at the level of c3 to c5 with retropharyngeal abscess with straightening of cervical spine. Urgent rigid oesophagoscopy was done to remove the foreign body and intra oral drainage of abscess was done.



Figure 5: A 20 years old female presented with dysphagia, breathlessness and neck swelling with history of dental caries CT scan showing right retropharyngeal abscess extending from the base of the skull to 3rd dorsal vertebrae. Intra oral drainage of abscess was done under local anaesthesia and 60 ml pus was drained, pus culture was positive for tuberculosis and patient was started on antitubercular regime.



Figure 6: 50-year-old male had accidentally ingested foreign body fish bone, CT scan and X-ray soft tissue neck showed hyperdense foreign body along with retropharyngeal abscess, rigid oesophagoscopy was done to remove the foreign body and intraoral drainage of the retropharyngeal abscess was done.

Intraoral drainage was done in 23 patients, intraoral drainage and ultrasound guided aspiration was done in 6 patients and 3 patient required emergency tracheostomy for securing of the airway.

Airway compromise was the most dreaded complication present in 9 cases. Six patients presented with an unstable spine requiring stabilization using cervical traction. One of them had atlanto-occipital joint erosion and presented with quadriparesis and another had T3 vertebral erosion, both of them had tuberculosis as the causative factor.

DISCUSSION

Deep neck space infections pose life threatening complications if not diagnosed accurately and managed aggressively. In spite of rampant antibiotic use these infections still persists due immunocompromised state and antibiotic resistance.

In our case series we saw that maximum incidence was seen in the age group between 10 to 30 years which was varying with the different studies. According to Meher et al and Parischar et al 50% to 60% patients were in the third and fourth decade of life, respectively. Male to female ratio was 3:2 consistent with similar studies. Tuberculosis along with diabetes mellitus were the most common predisposing factor in our case series, followed by malignancy and chronic kidney disease. Pharyngitis was the most common etiological factor followed by odontogenic infections. In adolescent age group odontogenic cause was the most common cause this was similar to varies studies conducted in the adolescent

population. Compromised immunity led to the flare up of pharyngeal and dental infections leading to deep neck abscesses. Neglect of oral health, and an increase in the incidence of perichondritis of wisdom teeth led to odontogenic infections. Huang et al and lee et al indicated that old patients with DM were susceptible to deep neck infection.^{7,8}

An impairment of neutrophil phagocytosis in elderly population and thus reduced bactericidal ability may contribute to increased susceptibility to bacterial infections in this age group. Also in these patients, hyperglycemia may impair several mechanisms of humoral host defence, such as varied neutrophil functions: adhesion, chemotaxis and phagocytosis and result in predisposition to infection. Dysphagia was the most common symptom followed by neck swelling, throat pain, neck stiffness and breathing difficulty. In our series posterior pharyngeal wall bulge was the most common finding followed by trismus and torticollis.

Imaging in deep neck infection has an important role in delineating the exact anatomical extent of the involved spaces and the detection of impending complication so timely surgical intervention can be taken. 9 CT scans with contrast enhancement can differentiate cellulitis from abscesses and is quite helpful for marking abscesses by the rim enhancement due to associated inflammation, the extent and dimension of spaces involvement, and complications. Therefore, we consider CT scans with contrast enhancement as routine investigation of deep neck infection. Six cases of peritonsillar abscesses were the deepest neck space infection seen in the adolescent age group owing to the dental caries, and throat infection and retropharyngeal abscesses were seen in the adult age group mostly associated with a history of foreign body ingestion. Immunocompromised patients had multiple spaces involved.

Management comprises broad spectrum antibiotic administration with anaerobic coverage, timely surgical intervention, treatment of underlying systemic illness, management of complications and supportive treatment.

In our case series fluid management, empirical third generation cephalosporin's, metronidazole, intravenous clindamycin was started, predisposing systemic illness like diabetes, odontogenic infections treated and impacted foreign bodies were removed rigid oesophagoscopy. Mathew et al preferred potassium amoxicillin with clavulanate metronidazole for initial antibiotic therapy. 10 Wang et al and Bakir et al however, preferred penicillin and metronidazole for initial antibiotic therapy, and clindamycin for severe deep-neck infection. 11,12 In their studies, second- or third-generation cephalosporin's were reserved for poor clinical response or if complications had developed With regard to the duration of antibiotic treatment, we continued antibiotic therapy until apparent resolution of the underlying medical condition and control of local of infection as suggested by resolution of fever, symptoms or signs of dyspnoea and dysphagia, and laboratory evidence of normalized WBC count. As per recent studies on deep neck space infections potentially life-threatening complications have been reported to occur at a rate of 10-20%, even in recent literature on DNSI cases. ¹³ Santos et al suggested the intravenous antibiotic therapy should be used for 2 to 3 weeks, whereas Kirse et al suggested antibiotic therapy should be employed until drug-resistant bacteria develop. ^{14,15} We employed antibiotic therapy until apparent resolution of the underlying medical condition and location of infection.

After initial antibiotic management all the 30 cases under went incision and drainage of the abscesses. The 23 patients were managed with intraoral drainage of abscesses, 6 patients with combined intraoral and ultrasound guided aspiration one patient underwent external drainage. Most deep neck abscesses in the retropharyngeal or in the lateral pharyngeal space are medial to the great vessels. General anaesthesia is difficult to achieve in these patients as they present with a posterior pharyngeal wall bulge and unstable spine. Therefore, most can be managed successfully with intraoral drainage under local anaesthesia rather than external drainage. External approaches are better reserved for those abscesses that are lateral to the great vessels or that involve multiple spaces and multiple loculi. 16

Compared with external drainage, advantages of intraoral drainage better cosmetic outcome, easier postoperative care, and no risk of injury to adjacent vital structures of neck. safety and efficacy of an intraoral approach have been confirmed by Amar and Manoukian as well as Choi et al in their studies of patients whose parapharyngeal abscesses were drained successfully in this way. ^{17,18}

Limitations

The main limitation of the study was that the patient didn't turn for follow up once they were relieved of their symptoms, also external methods of deep cervical neck abscess were not explored.

CONCLUSION

Deep cervical abscesses still occur in the antibiotic era and may cause life-threatening complications. Clinical diagnosis should be supplemented by the appropriate imaging procedure including plain x-ray films, ultrasonography, CT scan, and MRI. Intra oral drainage should be performed whenever possible to relieve the patient of compressive symptoms such as airway compromise, sparing the vital structures of the neck. Though some cases of parapharyngeal abscess necessitate an external approach intra oral drainage is less cumbersome than external approach and does not involve vital structures with better post operative outcome.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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