ORIGINAL ARTICLE

Neck Abscess: Five Year Retrospective Review of Hospital University Kebangsaan Malaysia Experience

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Summary

We analyzed 36 patients who presented with neck abscess in our hospital from January 1999 to December 2003. The most commonly involved space was the parapharyngeal and superficial anterior triangle followed by submandibular, retropharyngeal, posterior triangle and submental spaces respectively. Thirty-three percent of patients had diabetes mellitus as a predisposing factor. More than half of them had no known aetiological cause for the neck abscess. We encountered one mortality in an elderly patient with diabetes who succumbed to overwhelming septicaemia despite early abscess drainage and intensive medical treatment.

Key Words: Neck abscess, Parapharyngeal space, Mortality

Introduction

Deep neck abscesses are less common today than in the past. In the present era of antibiotics most neck infection can be cured by medical treatment. However, some may still result in complications. Recent studies have shown that there are changing trends in the causes, bacteriologic findings, diagnosis and management of deep neck abscesses[1,2,3]. This paper describes the recent clinical trends, aetiology, microbiology and complications of deep neck abscesses in our hospital as compared elsewhere.

Materials and Methods

A retrospective review of operative records of patients who underwent incision and drainage for neck abscess by Otolaryngologists at HUKM between January 1999 and December 2003 were studied. The diagnosis of neck abscess in these patients was defined by the operating room finding of pus during incision and drainage. Patients with neck abscess who were treated by other surgical disciplinaries and those who did not undergo incision and drainage were excluded from our study. Demographic data, patient symptoms, predisposing factors, radiological findings, intervention for airway management and duration of hospital stay were recorded. Preoperative full blood count values were also recorded.

Results

Thirty six patient records were reviewed. Four patients had to be excluded from this study as their medical records could not be obtained. Out of the 36 files reviewed the patients were 22 (61%) male and 14 (39%) female. The age range of our patients was between 2 and 75 years old with the mean age was 34 years as shown in Figure 1. Of the thirty six patients, 24 (67%)

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were Malay, eight (22%) were Chinese and four (11%) were Indian which reflects our population distribution.

The location of the abscess was determined based on radiographic and intraoperative findings. Relative frequencies were as follows, superficial anterior triangle and parapharyngeal space were 11 cases each (31%), submandibular space six cases (17%), retropharyngeal and posterior triangle were three cases each (8%) and submental two cases (5%). Of those with parapharyngeal abscess, one had extension into the retropharyngeal space and another three had involvement of the submandibular space.

Predisposing factors identified in our patients were mainly diabetes mellitus in 12 patients (33%) whereby three of them were newly diagnosed on admission. Another three had underlying malignancy namely laryngeal carcinoma, multiple myeloma and renal carcinoma.

The signs and symptoms at presentation are shown in Table I. The most common symptoms were mainly neck swelling associated with pain and fever.

In this series four patients had significant airway compromise at initial assessment presenting with either dyspnoea or stridor. One of them was intubated and another had an emergency tracheostomy performed under local anesthesia. The intubated patient was diagnosed with retropharyngeal abscess with supraglottitis. Emergency awake tracheostomy was done for a case of parapharyngeal abscess with extensive facial cellulitis. Two other cases had their airway obstruction relieved after the incision and drainage of abscess. One of them had a retropharyngeal abscess and the other a neck abscess which was partially occluding his laryngectomee stoma.

Eleven (31%) of our patients did not have any radiological assessment done. These patients were those who presented with submandibular or superficial anterior triangle neck abscess with no complications clinically. The rest (69%) of our cases had a computerized tomography (CT) scan of the head, neck and/ or thorax. The CT scan reports correlated with intraoperative findings except in one case. In this case CT scan report stated a mass in the left hypopharynx suspicious of tumour with cervical lymphadenopathy which intraoperatively the surgeon found an abscess anterior to sternocleidomastoid muscle and direct laryngoscopy showed oedematous pyriform fossa and arytenoids. Biopsy was taken which showed no evidence of malignancy.

The aetiology of these neck abscess were unknown in the majority of cases, 25 (69%) patients. The documented causes for the rest of them are shown in Table II.

Of those patients with unknown cause, 48% of them were immmunocompromised; ten of them has diabetes mellitus and another two cases had underlying malignancy (laryngeal carcinoma and multiple myeloma). Both the cases of fish bone in the throat presented with retropharyngeal abscess.

All these patients underwent incision and drainage and were given broad spectrum intravenous antibiotics which were later tailored according to the culture and sensitivity results. The majority of the culture results 19 (53%) had no growth. This may due to the fact that most of our patients had received at least one course of antibiotics prescribed by their general practitioners before presenting to our hospital.

We encountered a few complications in our series. One of our patient who had diabetes had to undergo a second exploration of her neck abscess because of recurrence of collection in the parapharyngeal space. Another patient had to be readmitted two weeks after being treated for a submandibular abscess because she re-presented with pain and fever. An incision and drainage of her submandibular abscess was performed during her first admission. During her second admission a CT scan was done which showed a small left tonsillar abscess with soft tissue inflammation in the left parapharyngeal space. She improved with intravenous antibiotics and no re-exploration was needed.

There was one mortality in this series. It involved a 75 year old Chinese female who had underlying diabetes mellitus. She presented with retropharyngeal abscess and supraglotttis with airway compromise. She was immediately intubated and nursed in the intensive care unit (ICU). Despite having undergone an incision and drainage and aggressive intravenous antibiotics she succumbed to septicaemia after 13 days in the ICU.

The mean length of hospital stay for our patients was 10.6 days with a range of 3 to 35 days.

Table I: Presenting symptoms of patients with neck abscess

Patient symptoms	No of patients (%)
Neck swelling	35 (97)
Pain	28 (77)
Fever	22 (61)
Dysphagia	17 (47)
Anorexia	16 (44)
Airway compromise	4 (11)

Table II: Aetiological factors of the patients with neck abscess

Aetiology	No. of cases (%)
Unknown	25 (69)
Known	11 (31)
Dental caries	2
Fish bone in throat	2
Traumatic lip laceration	1
Acute pharyngitis	1
Tuberculous lymphadenitis	1
Post total laryngectomy surgery	1
Skin allergy with cervical lymphadenitis	1
Parotid sialolithiasis	1
Infected hair follicle	1

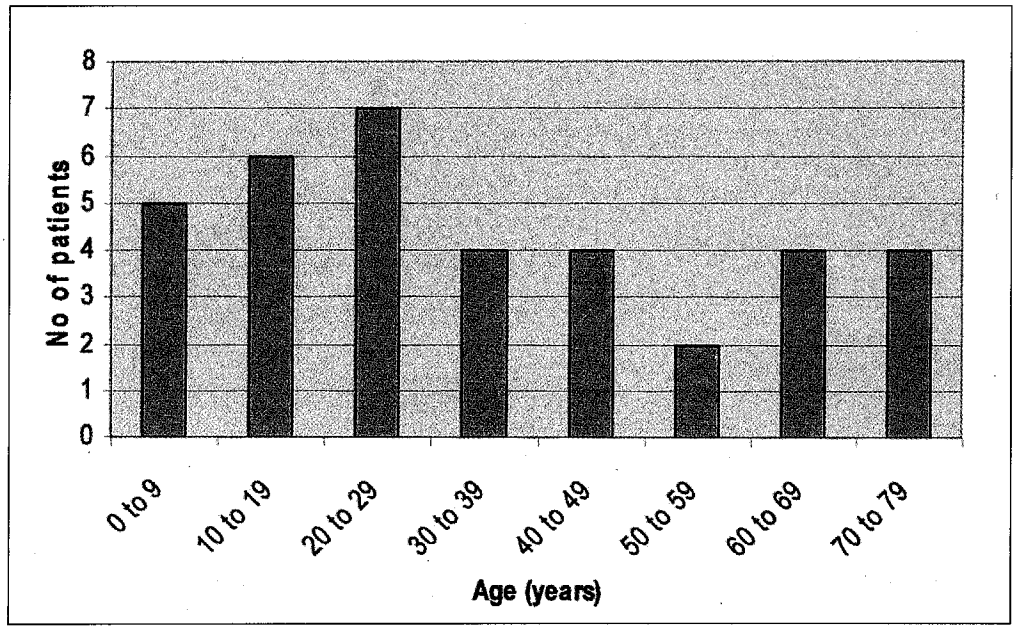

Fig. 1: Patient age distribution

Discussion

Neck abscesses occur in a wide range of age group as shown in this series. More than fifty percent of our patients were of the younger age group (below 40 years old). The ethnic distribution of our patients was consistent with that of Klang Valley.

The most common space involved in the neck abscess were the parapharyngeal and anterior triangle of the neck which constituted 31% of our cases, similar to results by Afshin and Gady when they reviewed 210 cases of deep neck abscess[2]. Another study noted that parapharyngeal and retropharyngeal spaces are commonly involved in neck abscesses[4]. In our series four out of eleven cases of parapharyngeal abscess had extension elsewhere namely the submandibular and retropharyngeal space. This is because the parapharyngeal space communicates with several neck spaces including the submandibular space, retropharyngeal space, the parotid space and the masticator space. The other spaces involved are submandibular, retropharyngeal and posterior triangle spaces in decreasing order in this study.

Fifteen (41%) of our patients were immunocompromised, 12 of them had diabetes mellitus and another three had underlying carcinoma. This would predispose them to infections which may lead to an abscess despite antibiotic treatment. A previous study showed significant positive statistical correlation between severity of neck abscess and patients with underlying disease such as diabetes mellitus, uraemia and cancer[3]. Patients who are immunocompromised are also prone to have Klebsiella pneumoniae. In all four cultures of Klebsiella sp. our patients had underlying diabetes mellitus. On the other hand other studies have quoted that Streptococcus, Staphylococcus and Bacteroides are the most common organism isolated in cases of neck abscess[5]. However, in our series the most commonly isolated organisms are Klebsiella, Acinetobacter, Staphylococcus and Pseudomonas. There was a rare case of neck abscess with Burkholeria Pseudomallei (Pseudomonas Pseudomallei) in a 49 year old man with diabetes and dental caries.

A majority of our patients had no known cause for the abscess. However, knowledge of the predilection sites involved in odontogenic deep neck space infection is important as it gives us a clue of possible underlying or hidden odontogenic source which needs to be removed without delay. The parapharyngeal, submandibular and masticator spaces were statistically more frequently involved in odontogenic than in nonodontogenic deep neck space infection[6]. Therefore proper dental examination is warranted in these patients. Retropharyngeal abscess is usually commoner in children. In both of our cases of adult retropharyngeal abscess, fish bone in the throat is the known aetiological factor. A study done by Hari Shankar *et al*[7] noted that upper respiratory tract infection and trauma by fish bone are predisposing factors for retropharnygeal abscess in older children and adults differing from classical text book description of tuberculosis of cervical spine being the main aetiological cause[7].

The common symptoms of neck abscess are neck swelling associated with pain and fever. Dysphagia and an elevated white blood cell count were less common. This is because most of our patients were partially treated by oral antibiotics prescribed by their general practitioners. In the pre-antibiotic era more deep neck infections resulted in complications. We should note that the presentation of neck abscess is different in children of very young age. A previous study showed that children younger than four years of age with deep neck abscess more frequently presented with agitation, cough, drooling, lethargy, respiratory distress, rhinorrhea and stridor and less frequently have positive physical signs on orpharyngeal examination and trismus compared with patients four years and older[8].

Airway management is a crucial part of management of patients with neck abscess. Emergency tracheostomy was required in one of our patients. The one patient who had an awake tracheostomy performed had parapharyngeal abscess with extensive facial cellulitis and was in acute respiratory distress. We did not report any cases of Ludwig's angina where the incidence of airway compromise needing intervention is higher. Other potential complications of neck abscess are jugular vein thrombosis, carotid artery rupture and mediastinitis. A retrospective analysis of 196 patients with deep neck infections noted a statistically significant correlation between female patients with neck swelling and patients with respiratory difficulties to develop complications[9].

Contrast enhanced CT scan is the radiological investigation of choice in the evaluation of deep neck infections. It has been shown to have a sensitivity of 100% in determining the presence and location of an infectious process and a sensitivity between 88% and 95% in the ability to differentiate a cellulitic process

from an abscess[10]. An abscess is distinguishable from soft tissue inflammation or cellulitis by a homogenous area of low density surrounded by ring enhancement of contrast. This will alter the treatment planning, both medical and surgical treatment. It is also valuable in locating the relative position of the major vessels. These cannot be elicited on lateral neck radiographs films alone. Lateral neck radiographs are technique dependent and there are changes in prevertebral soft tissue thickness as a result of positioning, respiration, crying and swallowing which makes them difficult to interpret. Furthermore it cannot differentiate a cellulitic process from an abscess and cannot accurately localize the infection. A false negative rate of 17% was found in a recent study[11]. The role for magnetic resonance imaging (MRI) is debatable. MRI was shown to be superior to CT in demonstrating disease extension, the spaces involved and source of infection because it was less degraded by artifacts. However, it can only be used in selected cases in which there is no airway compromise as it is time consuming. It is also more expensive and in 1- 3% of patients claustrophobia may preclude the examination[12].

All our patients in these series underwent incision and drainage under general anaesthesia. The incisions made were external neck incision along the skin crease. This provides a wide access to surgically drain the abscess and complete surgical control of the major neck vessels. A retrospective review comparing between intraoral and external drainage of parapharyngeal abscess has been done previously and concluded that intraoral drainage of parapharyngeal abscess is a safe and effective procedure provided that a CT obtained preoperatively shows the abscess to be medial to the great vessels of the neck. They also noted that patients who had undergone intraoral drainage had reduced duration of general anaesthesia and hospital stay[13]. In centres with experienced interventional radiologists an ultrasound guided needle aspiration or catheter drainage of uniloculated neck abscess with liquefied pus content can prove successful in 87% of cases[14].

Conclusion

Patients who present with signs and symptoms of deep neck infections should be treated urgently. Airway management should always be part of our primary assessment as some of these patients do present with acute or imminent airway obstruction that needs to be attended to initially.

In selected cases contrast enhanced CT scan is helpful to confirm our diagnosis and assess the extent of the disease. Clinically it may be difficult to distinguish between cellulitic changes or abscess formation in the deep tissues. Therefore CT scan can assist in making the proper treatment choice that is medical or surgical. In superficial neck abscess a sound clinical judgement should be made that there is no underlying complications. If there is suspicion of complication a CT scan is advisable.

The ground rule is that an abscess needs to be drained and patients should be started on antibiotics. A wide spectrum antibiotics is initially advocated and changed accordingly. By making an early diagnosis and treatment and addressing the patient's underlying disease we can then avoid complications and reduce the mortality rate of neck abscess.

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