

Aetiological and pathological factors for deep neck infections - a study in a tertiary hospital.

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Abstract

Background: Deep neck infections are mostly caused by odontogenic and upper airway infections. Delays in diagnosis and treatment as well as immunosuppression may lead to life threatening complications. **Aims of the study:** To evaluate the aetiological and pathological factors responsible for different deep neck space infections. **Methods:** This is a cross sectional observational study. All consecutive 100 admitted cases (male 62, female 38) of ENT ward of Chittagong Medical College Hospital from January 2015 to June 2015 (six months) were selected for this study. **Results:** Male patients were predominant and male-female ratio was 1.63:1. Maximum number of patients were within 21 to 50 years of age (68%). Most of the patients (43%) were from poor socioeconomic class, followed by lower middle class (27%), and only 2% patients belong to upper class group. In this study submandibular abscess was found in 38% patient and second common infection was peritonsillar abscess (24%), in addition Ludwig's angina was 21% and tubercular abscess 11%. Most frequent source was odontogenic infection (44%), then pharyngitis & tonsillitis (25%) and tuberculosis (11%). Diabetes mellitus was found as main risk factor (25%) and malnutrition contributed 15%. Pus culture showed no growth of organism in 68 subjects, E.coli for 11 subjects, Klebsiella for 9 subjects, Staphylococcus aureus for 6 subjects. **Conclusion:** The results in this study are comparable with the current published data and demonstrate that male are more affected by deep neck space infections. Most of the patients are from low socioeconomic class and rural areas. Odontogenic infection and pharyngotonsillitis are the important etiological factors. Diabetes is the major associated disease and malnutrition is an important risk factor. Life threatening complications can occur due to inadequate treatment. Variable organisms, both aerobic and anaerobic, are responsible for deep neck space infections. Proper dental and oral health care, control of diabetes and early intervention may change the morbidity and mortality.

Key words: Deep neck space infection, Ludwig's angina, odontogenic infection.

J Cox Med coll 2018;4(1): 21-25

Introduction

Deep neck space infections are defined as collection of pus contained within the fascial planes and spaces of the head neck region. The common infections are submandibular abscess, Ludwig's angina, retropharyngeal abscess, parapharyngeal abscess, peritonsillar abscess and tubercular abscess

(cold abscess).^{1,2,3} Delays in diagnosis and treatment as well as immunosuppression may lead to life threatening complications^{4,5}.

Most of the deep neck infections are caused by odontogenic and upper airway infections^{5,6}. Other common causes are acute tonsillitis, pharyngitis, salivary gland infection, foreign body in digestive tract, surgical procedures in aerodigestive tract, cervical lymphadenitis, infected thyroglossal cyst, dermoid cyst and branchial cyst, tuberculosis, skin furuncle and necrotizing fasciitis⁷. Microbiology of deep neck infections reveal mixed aerobic and anaerobic organisms often with a predominance of oral flora^{8,9}.

Despite their lower frequency, deep neck space infections are associated with significant morbidity and mortality rates as well as serious potential complications, such as airway obstruction, jugular vein thrombosis, carotid artery aneurysm or rupture, descending necrotizing mediastinitis and sepsis^{10,11,12}. According to the literature, immunity-

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debilitating diseases like diabetes mellitus and acquired immunodeficiency syndrome play an important role in the development of deep neck infection^{13,14}.

Deep neck space infections are not uncommon in our country due to poor oral hygiene, malnutrition, lack of health education and treatment. Tuberculosis is also a major health problem in developing countries particularly in south east Asia^{15,16,17}.

These infections remain potentially lethal if not detected early and treated properly. Proper dental and oral health care, control of diabetes and early intervention may change the morbidity and mortality^{18,19}.

Materials and Method

This is a cross-sectional observational study. All consecutive 100 (One hundred) admitted cases in ENT ward of Chittagong Medical College Hospital were selected for this study from January 2015 to June 2015 (Six months)

a) Inclusion criteria

1. All patients with various types of deep neck space infection.
2. Both sex.
3. All age group

b) Exclusion criteria

1. Patient who refused to be included in this study.
2. Swelling other than infections, e.g. haematoma, oedema, necrotizing metastatic neck nodes.

Written informed consent from the patient is obtained. Finally ethical clearance from ethical committee of CMCH for this study was obtained. A structured data collection sheet was developed containing all the variables of interest. Data were collected by history, clinical examination, investigation reports.

Result

The patients of both sexes and different ages were included. Among 100 patients, 62 were male and 38 were female with male-female ratio of 1.63:1.

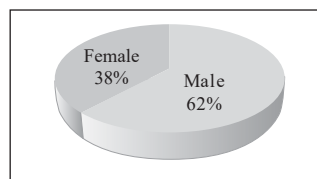


Figure 1 : Sex distribution of patients with deep neck space infections (n=100)

The age of the patients varies from below 1 year to 72 year. The number of patients in different age group is stated in Table I.

Table -I: Age distribution of the study subject (n=100)

Age	Total	Percentage
<10	7	7%
10-20	14	14%
21-30	21	21%
31-40	25	25%
41-50	20	20%
>50	13	13%
Total	100	100

Mean (\pm SD) age of total study subject was 33.81 (\pm 15.82). Maximum patients from poor socioeconomic class and lower middle class which were 43% and 27% respectively, only 2% came from upper class group. 61% patients from rural area and 39% resided in urban region

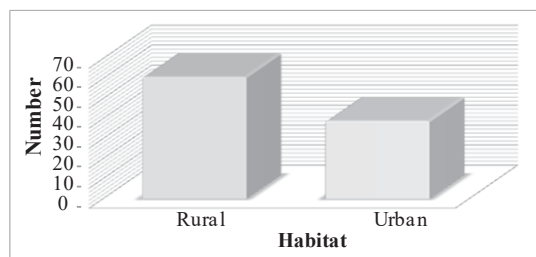


Figure 2 : Habitat of patient (n=100)

Table -II Distribution of socioeconomic classes of patient (n=100)

Socioeconomic class	Male	Percentage	Female	Percentage	Total	Percentage
Poor	26	41.93	17	44.73	43	43
Lower Middle	16	25.80	11	28.94	27	27
Middle	14	22.58	6	15.75	20	20
Upper Middle	5	8	3	7.89	8	8
Upper	1	1.61	1	2.63	2	2
Total	62	100	38	100	100	100

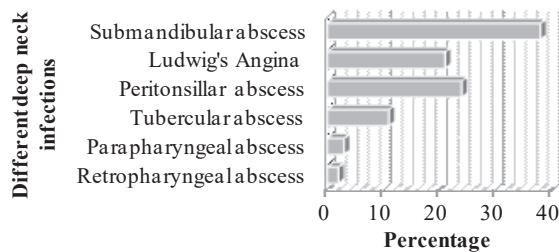


Figure 3 : Frequency of different types of deep neck infections (n=100)

38% patient was suffering from submandibular abscess and second common infection was peritonsillar abscess (24%).

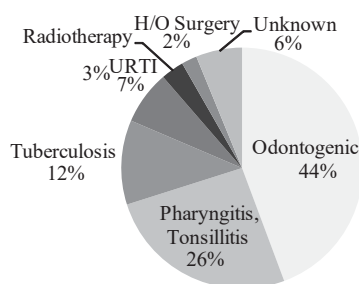


Figure 4: Aetiology of deep neck space infections (n=100)

Odontogenic infection contributes 44%, pharyngitis and tonsillitis 25% and tuberculosis was the cause of 11% deep neck infections.

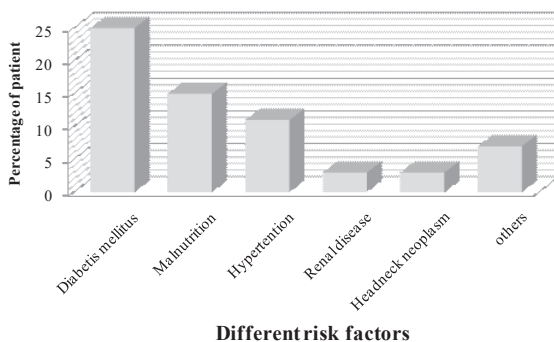


Figure 5 : Different risk factors and associated diseases (n=100)

Diabetes was found as associated disease in 25% patients, where malnutrition contributed 15% as a risk factor. 68% culture sensitivity showed no growth of bacteria, 11% showed growth of E.Coli and 9% Klebsiella (Table-III).

Discussion

In this study there was a male predominance giving a male : female ratio was 1.63:1. The finding was quite close to study of Lee YQ & Kanagalingam J. where among 131 patients, 64.9% were male and 35.1% were female¹. The mean age of the patients was 33.81(±15.82) years where mean age for male

Table -III Growth of organism in pus culture (n=100)

Organism	%
E.Coli	11
Klebsiella	9
Staphylococcus Aureus	6
Streptococcus Pyogens	2
Coliform	3
Acinetobacter	1
No growth of bacteria	68

patient was 35.87(±17.36) and female patient was 30.21(±12.52). Highest frequency (25%) was within 31- 40 years of age followed by 41-50 years. Therefore the peak incidence of the disease is in the 3rd decade of life, which is close to the work of Mazita A³. The youngest patient was 1 year and the oldest was 72 years old.

In the current study, most of the patient were from low socioeconomic group called poor class (43%). 27% patients from lower middle class and 20% from middle class. Only 2% subjects from upper class found in this study. This result is consistent with study of Agarwal AK and his colleagues¹².

Regarding habitat 61% subject came from rural area and remaining 39% from urban. This fact was well supported by other study¹².

In this study submandibular abscess was found as frequent deep neck infection which was 38%. Peritonsillar abscess was the second frequent infection and it was 24% followed by Ludwig's angina (21%). Tubercular abscess was 11%, retropharyngeal abscess and parapharyngeal abscess was 3% in each. This value are nearly similar with other studies. The parapharyngeal space(23.7%) and submandibular space(19.1%) were most commonly involve in the study of Lee YQ et al¹. Another study conducted by Mazita A and colleagues where anterior triangle & parapharyngeal space (31%), submandibular space (17%), retropharyngeal space (8%) and posterior triangle were involved frequently³. Common aetiology of deep neck space infections was odontogenic infection (44%) followed by pharyngitis and tonsillitis (25%). Tuberculosis contributed 11%, upper respiratory tract infection 7%, foreign body impaction 2%, radiotherapy for primary tumor 3% and infection followed by neck surgery 2%. Cause of infection was unknown for 6%. These observation was similar with study of Stalfors J and colleagues where main aetiology was odontogenic 49%²⁸. But in the study of Songu M and colleagues showed first cause was pharyngotonsillitis and second cause was odontogenic⁷.

The microbiology of this study revealed no growth

of organism for 68% case and remaining cases showed variation of organisms. Most common organism was E.coli (11%) followed by Klebsiella which was 9%. Staphylococcus Aureus found in 6% case, Coliform bacteria in 3% case, Straptococcus Pyogens in 2% and only in 1% case growth of Acinetobacter was found. Here majority cases showed no growth may be due to wide spread use of antibiotics before collection of pus. This result is supported by study of Lee YQ and Kanagalingam¹⁶. Among the risk factors Diabetes mellitus found in 25% patient, malnutrition in 15% ,hypertention in 11%, renal disease and head neck neoplasm in 3% in each. Others risk factors which includes veneral disease, AIDS and other immunosuppressive disease found in 6% case. Lee YQ et al. found 45% had underlying systemic disease or were on immunosuppressive therapy and most common systemic disease was diabetes mellitus (91.5%).¹

The present study was conducted in a very short period of time with small sample size. The study population was selected from single selected hospital in Chittagong. So that the result of the study may not reflect the exact picture of the country.

Conclusion

The results in this study are comparable with the current published data and demonstrate male are more affected by deep neck space infections, most of the patients from low socioeconomic class and rural area, odontogenic infection and pharyngotonsillitis are the important etiological factors, diabetes is the major associated disease and malnutrition is an important risk factor. Life threatening complications can occur due to inadequate treatment. Variable organisms both aerobic and aenerobic are responsible for deep neck space infections. Proper dental and oral health care, control of diabetes and early intervention may change the morbidity and mortality.

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