

Complications of Neck Space Infection

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ABSTRACT:

Objectives: Neck Spaces are potential space created by cervical fascia. Neck space infections are life threatening and can even cause death. This study was done to identify the common complications of neck space infection. **Methods:** This cross sectional observational analytical study was carried out in the department of Otolaryngology and Head-Neck Surgery, Dhaka Medical College Hospital, Dhaka, during a period of July 2015 to June 2016 on 150 cases selected purposively. All parameters including age, gender, risk factors, presentation, site, bacteriology, complications and required interventions were studied.

Results: Mean age of the patients was 35±17 years. Majority of them were male (69.10%). More than half of the patients (53.30%) came from middle class. Thirty-eight patients suffered from diabetes, an important risk factor. Pain, neck swelling, dysphagia, fever, and trismus were common presentations. Submandibular space was mostly affected (41.3%). Complications were recorded in 55 (36.6%) patients. Most common was airway complications 40 (73%). Others were skin defect, necrotizing fasciitis, mediastinitis, marginal mandibular nerve palsy, septicemia and osteomyelitis. Mortality occurred in 17(11.33%) cases.

Conclusion: Neck space infections are more common in male patients in our study. Different complications were seen in nearly one-third of patients and diabetes mellitus was the commonest risk factors. Submandibular space was most commonly affected area. Common presentation was pain and swelling of the neck.

Key Words: Neck Space Infection, submandibular space, cervical fascia.

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INTRODUCTION:

Neck space is a potential space bounded by cervical fascia, which invest muscles and organs and prevent spread of infection. Cervical fascia has two layers, superficial and deep.¹ Neck space infection is very common in our country. Most common presentation is neck pain, fever, neck swelling, odynophagia and airway obstruction. Neck space infections are potentially life threatening condition and even death may occur despite wide spread use of antibiotics.¹ The side of the neck is quadrilateral.

The layers of cervical fascia create various potential spaces that can be involved by infection. At least 11 deep spaces are part of a complex structure formed by fascial planes providing possible infection sites.² Main cause of the neck space infections were odontogenic infection (31-49%), upper airway infection, tonsillar infection (7-20%), tubercular lymphadenitis, parotitis and sialadenitis; risk factors are diabetes mellitus, anaemia, liver diseases, malignancy and pregnancy.¹ Complications of neck space infections are airway compromise, skin defect, necrotizing fasciitis, mediastinitis, marginal mandibular nerve palsy, septicaemia and

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osteomyelitis. Treatment consist of antimicrobial therapy, surgical drainage and control of risk factors.¹

This study was done to identify the complications of neck space infections, to identify the risk factors, to observe common presentations and to assess the spaces which are most commonly affected by infection.

METHODS AND MATERIALS:

This is a cross sectional observational analytical study was done in 150 patients with neck space infection during June 2015 to June 2016, in the Department of Otolaryngology and Head-Neck Surgery, Dhaka Medical College Hospital. All the patients with neck space infections attended the hospital during this time were included in the study purposively and those who gave informed voluntary consent. The patients who did not give consent were excluded from the study. The detailed history, physical examination and appropriate investigations were done and recorded in a predesigned data collection forms. The data are analyzed using proper statistical methods using statistical software SPSS-18 for Windows. Ethical clearance was obtained from Institutional Review Board of DMCH

RESULTS:

Data were collected from 150 patients with neck space infection in Otolaryngology and Head-Neck Surgery department of Dhaka Medical College Hospital during a period of twelve months. Among them male was 104 (69.3%) and female- 46 (30.6%).

Table-I: Age group distribution of the patients (n=150)

| Age in years | Percentages |
|--------------|-------------|
| <20 | 21.70% |
| 21-30 | 23% |
| 31-40 | 21% |
| 41-50 | 14% |
| 51-60 | 11.80% |
| 61-70 | 8.60% |

Mean age of the patients was 35±17 years. Majority patients were 80 (53.3%) from middle class, 61 (40.8%) from lower class and only 9 (5.9%) were from upper class.

Table-II: Etiology of neck space infection (n=150)

| Etiology | Frequency | Percentage |
|--------------------------|-----------|------------|
| Odontogenic infection | 78 | 52% |
| Upper airway infection | 28 | 18.6% |
| Tonsillar infection | 9 | 6% |
| Tubercular lymphadenitis | 5 | 3.3% |
| Parotitis | 8 | 5.3% |
| Sialoadenitis | 6 | 4% |
| Foreign body | 2 | 1.3 |
| Unknown | 14 | 9.5% |

Table-III: Presentation of neck space infection (n=150).

| Presentation | Frequency | Percentage# |
|----------------------|-----------|-------------|
| Pain | 150 | 100% |
| Neck swelling | 145 | 96% |
| Fever | 145 | 96% |
| Dysphagia | 140 | 93% |
| Odynophagia | 95 | 63% |
| Sore throat | 95 | 63% |
| Salivation | 98 | 65% |
| Dental Caries | 78 | 56% |
| Swelling of tongue | 88 | 58% |
| Respiratory distress | 45 | 30% |

#Single patients had multiple presentation.

Table-IV: Culture and isolation of the microorganisms from patient's pus (n=150)

| Microorganism | Frequency | Percentage |
|----------------|-----------|------------|
| Streptococcus | 78 | 51.34% |
| Staphylococcus | 28 | 18.6% |
| Pseudomonas | 12 | 8.06% |
| Klebsiella | 15 | 6.68% |
| Others | 5 | 3.33% |
| Multiorganism | 12 | 7.48% |

Table-V: Distribution of involved spaces (n=150)

| Spaces | Percentages |
|-------------------------|-------------|
| Submandibular space | 41.30% |
| Ludwig's angina | 18.66% |
| Parapharyngeal space | 4% |
| Peritonsillar space | 4% |
| Parotid space | 4.60% |
| Retropharyngeal space | 6% |
| Pretracheal space | 13.30% |
| Posterior neck space | 2% |
| Multi space involvement | 6% |

Table-VI: Risk factors of neck space infection (n=150).

| Risk factors | Percentage |
|-------------------|------------|
| Diabetes Mellitus | 74.50% |
| Severe Anaemia | 3.92% |
| Liver disease | 5.88% |
| Malignancy | 9.80% |
| Pregnancy | 5.88% |

Table VII: Complications of neck space infection(n=150).

| Complications | Frequency | Percentage |
|---------------------------------|-----------|-------------|
| Airway Compromise | 40 | 73% |
| Skin defect | 5 | 9.09% |
| Necrotizing fasciitis | 4 | 7.27% |
| Mediastinitis | 2 | 3.64% |
| Marginal mandibular nerve palsy | 2 | 3.64% |
| Septicaemia | 1 | 1.82% |
| Osteomyelitis | 1 | 1.82% |
| Total | 55 | 100% |

DISCUSSION:

Neck space infections are life threatening condition and may even cause death. These infections remain an important health problem with significant risk of morbidity and mortality. So evaluation of the

variables relating to this life threatening disease is very important for better understanding and management.

In our study, we included 150 patients who were admitted to the hospital for the treatment of neck space infection. Age ranges of the patients were from 2-70 years, whereas mean age was 35±17 years. This finding correlates with two other studies by Kataria and Suebera, where the age ranges were 31-50 years and 2 months to 94 years (mean age 37.1 year) respectively.^{3,4} Male predominance was seen. Here male: female ratio was 2.2:1, similar to the study of Kalsotra, where male: female ratio was 1.66:1.⁵ More than half of the patents came from middle class.

The causes of neck infection were identified in 134(90.5%) out of 150 patients in this study, unclear in 16(9.5%) cases, which is similar near to the studies of Suebera (25%) and Kalsotra (18.64%).^{4,5} Among them 78(52%) patients were due to odontogenic, upper airway infection 28(18.6%) which is similar to the study of Suebera.⁴ In a study of Huang, significant association of neck space infection was found with odontogenic and upper airway infection(53.2% and 30.5% respectively).⁶ In our study, others causes were tonsillar infection in 9(6%), tubercular lymphadenitis in 5(3.5%) and parotitis in 8(5.3%) cases. About 14(9.5%) cases found no clear etiology.

Common symptoms were pain (100%) and neck swelling (96%), which were consistent with two other studies where pain was 100%, neck swelling 66.01%.^{3,5} Other symptoms were fever (96%), dysphagia (93%) and trismus (46%). Although the frequency of dyspnea is not common than other symptoms, the presence of dyspnea may be a sign of serious complication.⁵

The most common organism cultured was streptococcus (51.34%) followed by staphylococcus (18.60%), Klebsiella (9.68%), Multi-organism (7.48%) and Pseudomonas (8.06%). The result showed consistence with the result of other studies.^{3,5,6}

Neck space infection originated from a variety of sites in head and neck. In our study submandibular

space (41.30%) was commonly affected. Ludwig's angina was found among 18.66% patients which is near to the study of Kataria (28.94%).³ Submandibular space, Ludwig's angina and pre-tracheal space covered about 74% of neck space infection.

Patient came with comorbid conditions like diabetes mellitus was found in 112 (74.50%) cases, which is quite low percentage, compared to a previous study of Kataria (88.9%).³ In diabetes, decreased immune function, increased vascular complication and episodes of infection, may contribute to increased incidence of neck space infection. Other systemic diseases were anemia, liver diseases, malignancy and pregnancy.

In this study, 55 patients had complications and some individual patients had multiple complications (Table-VII). Mortality rate was 11.33% which is almost similar to the study of Suebera (11.25%).⁴ This is also similar to the study of Lee et. al., in which 42 patients developed complications among 131 patients.⁷ Forty patients out of 55, had upper airway complications. Of them 17 patient needed tracheostomy. Other complications include skin defect, necrotizing fasciitis, mediastinitis, marginal mandibular nerve palsy, septicaemia and osteomyelitis. These result are nearly similar to the study of Huang TT.⁶ Another study of Kalsotra showed 7 patients developed complications, among them 6 patients developed upper airway distress and needed temporary tracheostomy.⁵ These findings were similar to our study.

CONCLUSIONS:

Neck space infections are more common in male patients in our study. Different complications were seen in nearly one-third of patients and diabetes mellitus was the commonest risk factors. Submandibular space was most commonly affected area. Common presentation was pain and swelling of the neck.

This is a single center study with a limited number of patients.

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