

Deep Neck Space Infections: A Study of 17 Cases

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ABSTRACT

Aim: To carry out a cross - sectional analysis of the infections of deep - neck space. And to analyse various aspect of the deep neck space infections including symptoms, aetiology, diagnostic investigations, threatening complications and management plan for each type of deep neck space infections.

Study design: cross sectional survey

Setting of study & duration: ENT unit-I Lahore General Hospital, Lahore from October 2017- March 2018.

Methods: Seventeen patients were included. A non purposive sampling technique was adopted. A total of seventeen patients presenting with different sites of deep neck space infection were selected after fulfilling the inclusion criteria. The mode of admission was through OPD and emergency.

Results: Our study included 17 patients, there were 5 belonging to female gender and rest 12 patients belonged to the male gender; the age of the patients in our study ranged from 25 years to 65 years. However the average mean age of patients in the study sorted around the fourth decade and was 42.8 years.

Conclusion: Deep Neck Space Infections are common emergencies in ENT practice and they require early detection and proper management plan to avoid drastic and fatal complications.

Keywords: Deep neck space, infection,

INTRODUCTION

The human neck has a layer of thick connective tissue lying below the skin. This Fascia divides the neck into multiple compartments/spaces, which derive their name according to the anatomical structures related to them. These are given the name of deep spaces in the neck. Deep Neck Space Infections (DNSI) in these potential spaces involve either abscess formation or cellulite infection. With the advancement of anti microbial drugs the incidence of DNSI has been brought down drastically¹. But still due to their anatomical location the deep neck space infections have high morbidity and mortality if remain untreated. The major aetiological factor for deep neck space infections is still dentation and palatine tonsils, other parameter for infection would include infection from salivary glands, tumors and obstructed foreign bodies. Meta analysis of the DNSI reveal Odontogenic infection as the commonest aetiology in developing countries². This recent shift from tonsils being the commonest source of infection in close to 70% of cases³ of DNSI to dental origin⁴ is mainly because of the recent advances in antimicrobial drugs. The commonest microbial agents responsible for DNSI are the Streptococci, and Staphylococcus aureus, species, it may include a few anaerobes^{5,6}. The Clinical manifestations of the disease depend on the anatomical site involved but the most common clinical symptoms include pain and swelling⁷. The deep neck space infections can be more challenging in patients with chronic diseases as diabetes and the results can be devastating in people with compromised⁸. There are significant morbid associations with deep neck space infections, with mortality ranging to 25% cases in a few of them^{9,10}. Deep neck space infections resulting in dreadful

complications such as mediastinitis and shock have presented with mortality rates upto 40-50^{11,12}. Life threatening complications such as pulmonary embolism and erosion of the carotid artery were also reported¹³. Non-surgical treatment using anti microbial drugs were given in cases of cellulite¹⁴. It is important to treat odontogenic infections surgically in order to remove the source¹⁵.

METHODS

This cross sectional survey was conducted in the Department of ENT, Lahore General Hoswpial, Lahore from October 2017 to March 2018. Seventeen patients were included. A non purposive sampling technique was adopted. A total of seventeen patients presenting with different sites of deep neck space infection were selected after fulfilling the inclusion criteria. The mode of admission was through OPD and emergency. They were investigated specifically by a detailed ENT examination. Radiological investigation including CT scan with intra venous contrast enhancement was carried out in the sample patients to assess the diagnosis of deep neck space infection.

RESULTS

Table 1: Gender distribution (n=17)

	Frequency	%age
Male	12	70.5
Female	05	29.5
Total	17	100

Table 2: Age distribution in the study population (n=17)

Age(years)	
Mean	+ 42.8
Min	25
Max	65

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Patients with deep neck space infections



Table 3: Prevalence of various aetiological factor in patients of deep neck space infection

Causes Of Deep Neck Space Infection	n	%age
Dental infection	11	64.7
Trauma	01	5.88
Infected lymphadenopathy	01	5.88
Unknown aetiology	04	23.5

Table 4: Frequency of associated symptoms in patients with deep neck space infections

Symptoms due to DNSI	n	%age
Swelling	15	88
Pain	15	88
Odynophagia	14	82
Airway obstruction	2	11.7
Trismus	2	11.7

Table 5: Site of involvement in deep neck space infections

Site of involvement	n	%age
Submandibular space	8	47
Para pharyngeal space	4	23.5
Peri tonsillar space	2	11.7
Retro pharyngeal space	2	11.7
Parotid space	1	5.8

Table 6: Treatment protocol offered to the patients

Treatment offered	n	%age
Medical/conservative	4	23.5
Surgical	13	76.4

Table 7: Bacteriology profile in patients with deep neck space infection

Micro organism	n	%age
Staphylococcus aureus	3	17.6
Streptococcus pyogenes	2	11.7
Streptococcus viridance	3	17.6
Pseudomonas aeruginosa	2	11.7
Bacteroides	2	11.7
Klebsiella pneumonia	2	11.7
Negative culture	3	17.6

DISCUSSION

Our study results are very similar with the studies conducted all around the world. The average age in our study was 42.8 years. This was very close to the index of mean age in other narrated studies showing mean age ranging between minimum of 36 years and maximum of 57 years^{4,16}. The study we conducted showed male predominance twice to that for females. The ratio ranging between 12 males: 5 females. This ratio is also reported by many authors^{17,18}. The most commonly associated habits brought forth in personal history were tobacco chewing and alcohol consumption. The commonest co morbid disease was diabetes in the study (41%) comparing to other literature review showing incidence of 38%¹⁸. The various clinical presentations in our study have been swelling in the neck, un ability to open mouth (trismus),pain during swallowing (odynophagia). This is standardized with other research in literature[19]. DNSI's primary source varies from sites such as teeth, salivary glands, lymphoid tissue, and tonsil from head and neck. The aetiology of deep neck space in our study showed dental origin as the commonest cause (65%) of deep neck space infections followed by causes of pharyngeal and oral cavity diseases as the second most important aetiology. This is standardized by literature compared to other studies reporting 31-80 percent dental infection and 1.5-3.4 percent tonsillary origin^{20,21}. The paedriatic age group with deep neck space infection have tonsils as their primary aetiology^{22,23}. The other eitiological reasons for the deep neck space infections in our study was trauma of the mandible in one case, 2 had suppuration of lymph node.

The study by Tung et al⁶ and Gerd²⁴ reported the parapharyngeal space as the most commonest site for DNSI , it was highlighted in 71cases (38.4 %) and 138 cases (59%) respectively in both the studies. However in our study the commonest potential site for DNSI was the Submandibular space (11 patients),but only 2 patients had parapharyngeal space as primary site for DNSI. The study by Stafors et al²⁵ has close association with the study of

Tung et al, but it describes the parapharyngeal space and submandibular space both to be the potential site of involvement in DNSI. Our results of the submandibular being the commonest site is also established by the study of Meher et al²⁶. The microbial culture of our study revealed 12 cultures, with majority showing Klebsiella present in (46%), the second most common microbial agent was Staphylococcus (15.3%) and Streptococcus (15.3%) respectively. This research of microbial spectrum is similar in literature with research of Jurgen et al²⁴ Bakir and et al⁹. Only one patient each in our study had MRSA and Enterococcus (7.6%).

Computed tomographic scans are vital in establishing the DNSI²⁵. DNSI with greater involvement of cellulite respond well to conservative medical treatment, however Surgery is limited to cases with abscess formation as seen on computed tomographic scans²⁷. Thirteen patients (76.4%) were scanned with CT in our study. The orthodox treatment of abscess is surgical drainage using an external approach^{2,28}. Studies by Mayor et al and Bakir et al⁹. This is agreeable only in only lesser forms of DNSI with cellulite and no abscess formation. Computed tomographic scans showing abscess evidence requires surgical intervention. Our study had similar results showing surgical intervention in 13 patients with DNSI (76.4%), while the remaining four patients were treated conservatively with intravenous antibiotics²⁹. Airway obstruction in DNSI is due to trismus, laryngeal edema and swelling in floor of mouth, so multiple measures to manage the airway can be undertaken. Study conducted by Parhiscar et al⁴ reports a need for tracheostomy in 44% of cases in his sample size of 210 patients with DNSI. Our study with DNSI required tracheostomy in just 1 patient (5.8 %).

CONCLUSION

Deep Neck Space Infections are common emergencies in ENT practice and they require early detection and proper management plan to avoid drastic and fatal complications.

REFERENCES:

- Wang LF, Kuo WR, Tsai SM, Huang KJ (2003) Characterizations of life threatening deep cervical space infections: A review of one hundred ninety six cases. *American J Otolaryngol* 24: 111-117.
- Wong TY (1999) A nationwide survey of deaths from oral and maxillofacial infections: The Taiwanese experience. *J Oral MaxillofacSurg* 57: 1297-1299.
- Weed H, Forest L (1998) Deep neck infection. *J Otolaryngol Head Neck Surg* 3: 2515-2524.
- Parhiscar A, Harel G (2001) Deep neck abscess: A retrospective review of 210 cases. *Ann OtolRhinolLaryngol* 110: 1051-1054.
- Ungkanont K, Yellon RF, Weissman JL, Casselbrant ML, Gonzalez VH, et al. (1995) Head and neck space infections in infant and children. *Otolaryngol Head Neck Surg* 112: 375.
- Huang TT, Liu TC, Chen PR, Tseng FY, Yeh TH, et al. (2004) Deep neck infection: Analysis of 185 cases. *J Otolaryngol Head Neck Surg* 26: 854-860.
- Hasegawa J, Hidaka H, Tateda M (2011) An analysis of clinical risk factors of deep neck infection. *AurisNasus Larynx* 38: 101-107.
- Vieira F, Allen SM, Stocks RSM, Thompson JW (2008) Deep neck infections. *OtolaryngolClin N Am* 12: 459-483.
- Bakir S, Tanriverdi MH, Gun R (2012) Deep neck space infections: A retrospective review of 173 cases. *American J Otolaryngol* 33: 56-63.
- Boscolo RP, Stellin M, Muzzi E (2012) Deep neck space infections: A study of 365 cases highlighting recommendations for management and treatment. *Eur Arch Otorhinolaryngol* 269: 1241-1249.
- Chen MK, Wen YS, Chang CC, Huang MT, Hsiao HC (1998) Predisposing factors of life-threatening deep neck infection: Logistic regression analysis of 214 cases. *J Otolaryngol* 27: 141-144.
- Chen MK, Wen YS, Chang CC, Lee HS, Huang MT, et al. (2000) Deep neck infections in diabetic patients. *Am J Otolaryngol* 21: 169-173.
- Blomquistk, Bayer AS (1988) Life-threatening deep fascial space infections of the head and neck. *Infect Dis Clin North Am* 2: 237-264.
- Mayor GP, Millán JMS, Martínez VA (2001) Is conservative treatment of deep neck space infections appropriate? *Head And Neck* 23: 126-133.
- Morton H, Richard G (2002) Oral and Maxillofacial Infections. In: Topacian RG, Goldberg MH, Hupp JR, editor. New York, St. Louis WB Saunders, United States pp: 158-186.
- Bahu SJ, Shibuya TY, Meleca RJ, Mathog RH, Yoo GH, et al. (2001) Craniocervical necrotizing fasciitis: An 11-year experience. *Otolaryngol Head Neck Surg* 125: 245-252.
- Sakaguchi M, Sato S, Ishiyama T, Katsuno S, Taguchi K (1997) Characterization and management of deep neck infections. *Int J Oral Max Surg* 26: 131-134.
- Sethi DS, Stanley RE (1994) Deep neck abscesses--changing trends. *J LaryngolOtol* 108: 138-143.
- Levitt GW (1971) The surgical treatment of deep neck infections. *Laryngoscope* 81: 403-411.
- Estrera AS, Landay MJ, Grisham JM, Sinn DP, Platt MR (1983) Descending necrotizing mediastinitis. *SurgGynecolObstet* 157: 545-552.
- Furst IM, Ersil P, Caminiti M (2001) A rare complication of tooth abscess-ludwigs angina and mediastinitis. *J Can Dent Assoc* 67: 324-327.
- Choi SS, Vezina LG, Grundfast KM (1997) Relative incidence and alternative approaches for surgical drainage of different types of deep neck abscesses in children. *Arch Otolaryngol Head Neck Surg* 123: 1271-1275.
- Cmejrek RC, Cotichia JM, Arnold JE (2002) Presentation, diagnosis, and management of deep-neck abscesses in infants. *Arch Otolaryngol Head Neck Surg* 128: 1361-1364.
- Ridder GJ, Technau-Ihling K, Sander A, Boedeker CC (2005) Spectrum and management of deep neck space infections: an 8-year experience of 234 cases. *Otolaryngol Head Neck Surg* 133: 709-714.
- Stalfors J, Adielsson A, Ebenfelt A, Nethander G, Westin T (2004) Deep neck space infections remain a surgical challenge. A study of 72 patients. *Acta Oto-Laryngologica* 124: 1191-1196.
- Meher R, Jain A, Sabharwal A, Gupta B, Singh I (2005) Deep neck abscess: A prospective study of 54 cases. *J Laryngol and Otolology* 119: 299-302.
- Smith II JL, Hsu JM, Chang J (2006) Predicting deep neck space abscess using computed tomography. *Am J Otolaryngol* 27: 244-247.
- Bottin R, Marioni G, Rinaldi R, Boninsegna M, Salvadori L, et al. (2003) Deep neck infection: A present day complication. A retrospective review of 83 cases. *Eur Arch Otorhinolaryngol* 260: 576-579.
- Eftekharian A, Roozbahany NA, Vaezeafshar R, Narimani N (2009) Deep neck infections: A retrospective review of 112 cases. *Eur Arch Otorhinolaryngol* 266: 273-277.

