

Original Article

Life-threatening Sequelae of Odontogenic Infections- A Systematic Review

¹DR. ASNANI PIYUSH S., ²DR. ALI SHIREEN M , ³DR. ODEDRA SIMA P, ⁴DR. NAMRATA JAYASHEEL

Department of Oral and Maxillofacial Pathology and Oral Microbiology, Government Dental College and Hospital,
Ahmedabad, Gujarat, India.

Corresponding author : DR. ALI SHIREEN M

Abstract:

Aim: To extract of the prevalence of various severe complications of odontogenic infections in different continents, age groups and gender and to check its association with Quadrants if any exists.

Method: PubMed and Google Scholar databases were searched for the relevant case reports published between years 2002 to 2022 and data was extracted according to PRISMA guidelines and a Systematic Review was done.

Results: 68 case reports were analysed out of which 65 were of Males, 53 were of age group 41-80 years and 64 were from the infections of the lower jaw. Overall from the 68 case reports most common reported complication was Cervicofacial Necrotizing Fasciitis.

Conclusion: Males were more affected than females. Population of age group more than 40 was more affected. Odontogenic infections of lower jaw more frequently developed complications than the upper jaw.

Key-words: Odontogenic infections, Complications, Necrotizing Fasciitis, Cavernous Sinus Thrombosis, Ludwig's angina, Orbital abscess, Brain abscess.

INTRODUCTION:

Odontogenic infections neglected, misdiagnosed or maltreated may lead to severe complications by spreading through the potential spaces in the head and neck region. Though with the newer antibiotics, incidence of these complications have been reduced but in immunocompromised hosts, long standing infections, severity and extent of the infections may lead to serious consequences which can become difficult to manage at that stages.¹

Potential spaces existing in and between the fascia of head and neck region may behave as runway for the severe odontogenic infections to spread to the distant sites and involve underlying and overlying tissues and worsening the condition.²

Airway obstruction as in Ludwig's Angina, necrosis of fascial, subcutaneous tissue and muscles in Necrotizing fasciitis, lower airway involvement in Descending Mediastinitis, Orbital complications and Brain complications are commonly reported, rare complications of the Odontogenic infections.^{3,4,5}

MATERIAL AND METHOD:

PubMed and Google scholar databases were searched for the published relevant case reports from 2002 to 2022 years. Keywords searched were 'Odontogenic infections', 'Complications', 'Ludwig's Angina', 'Cervical Necrotizing Fasciitis', 'Cavernous sinus thrombosis', 'Brain abscess' and 'Orbital abscess'. A total of 343 records were screened out of which 68 case reports were found to be most relevant after applying the inclusion and exclusion criteria, and these 68 case reports were then included in the systematic review. Statistical analysis

of data was done by cross tabulation method in SPSS software version 25. Figure 1 shows the PRISMA FLOW diagram of the screening of the records.

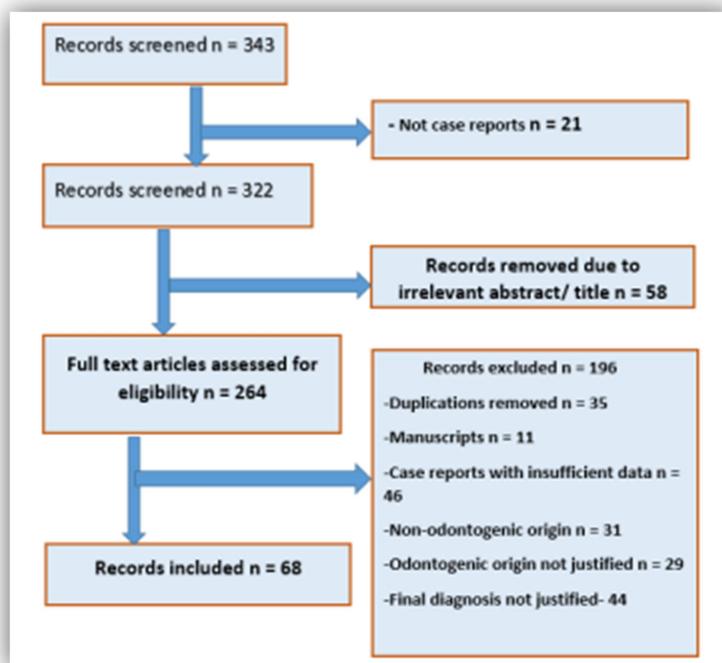


Figure 1- PRSIMA flow diagram of the Systematic review

RESULTS:

- Out of 68 case reports 44 (65%) were of males and 24 (35%) were of females. All the complications were more common in males, Except Cavernous Sinus Thrombosis, of which 3 out of 4 case reports were of female (75%).
- In males most reported complications i.e. out of 44 cases reports, (25%) were of Descending Mediastinitis, (23%) were of Cervicofacial Necrotizing Fasciitis and (23%) were of Orbital abscess. In females most reported complications i.e. out of 24 cases reports, (25%) were of Descending Mediastinitis, (23%) were of Cervico-facial Necrotizing Fasciitis and (23%) were of Orbital abscess.

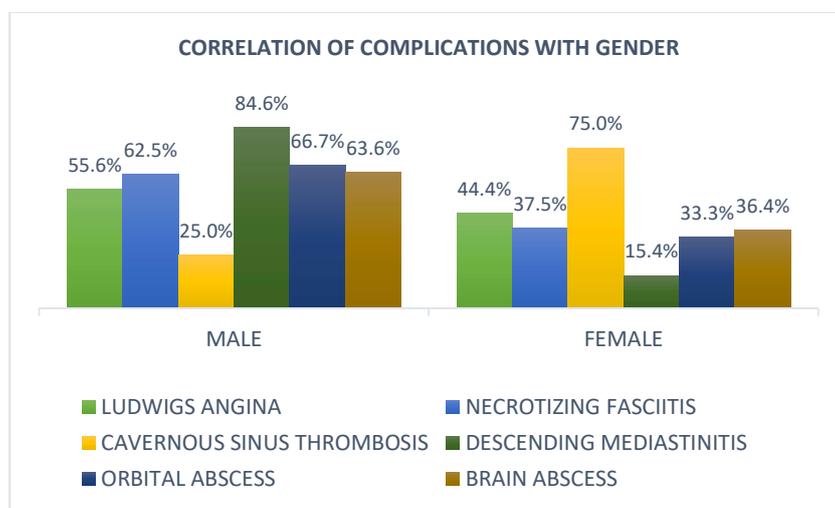


Figure 2- Correlation of complications with gender.

- **Most case reports** were of age group **41-80 years (53%)**. Out of **9** case reports of age group 1-20 years, **6 (66%)** were of **Orbital Abscess**. Out of **11** case reports of Brain Abscess, **9(82%)** were of age group **41-80 years**.

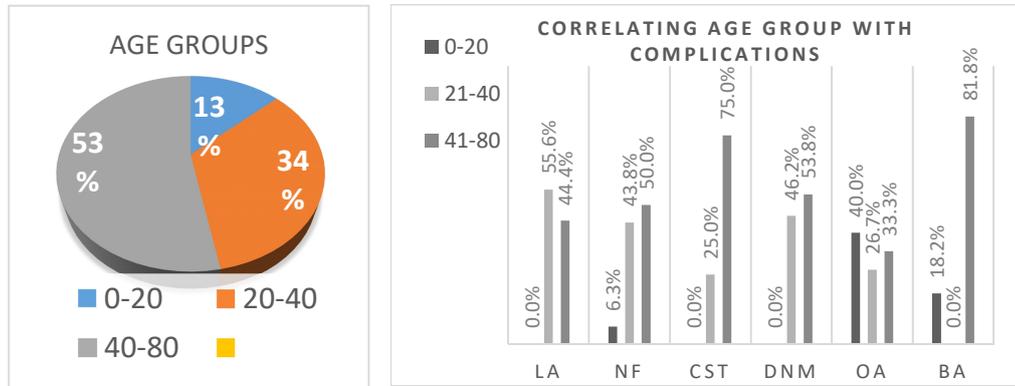


Figure 3- Distribution of age groups. Figure 4- Correlation of age group and complications.

- Overall **Lower Quadrants(64%)** were associated more with the **complications** than Upper Quadrants. The **most common** quadrant associated was **Lower Left quadrant(30%)**. Out of **10** case reports of the complications from the **upper Right quadrant, (70%)** were of **Orbital Abscess**.

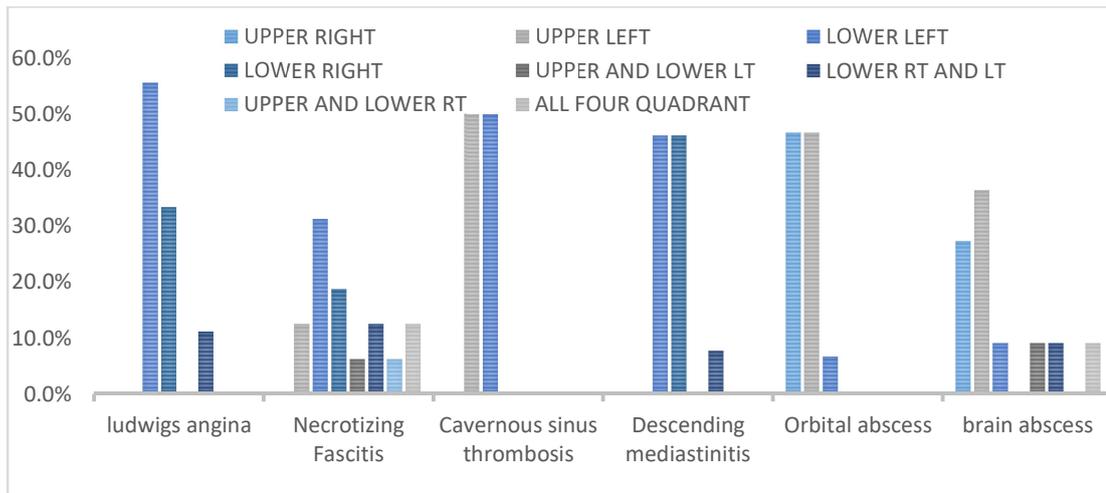


Figure 5- Association among the complications and Quadrants involved.

- All case reports of cavernous sinus thrombosis were associated with quadrants of left side. While the case reports of ludwig angina were associated with the lower jaw, out of which 56% were from lower left quadrant, 33% were from lower right and 11% from combined lower right and left.

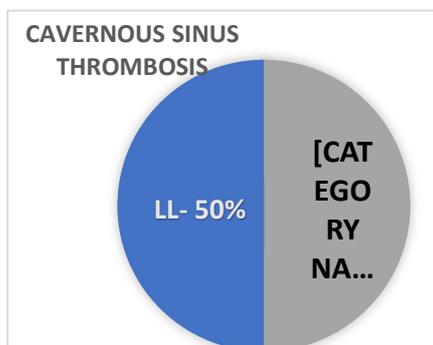


Figure 6- showing all cases of cavernous sinus thrombosis

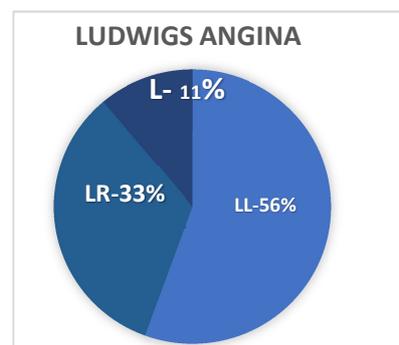


Figure 7- Ludwigs angina all case reports from lower jaw.

DISCUSSION-

Oral cavity as “a perfect hot-bed” for the growth and propagation of pyogenic microorganisms described by Hunter in 1900. After a century, abscesses involving the head and neck's deep fascia planes have been reported more commonly from the odontogenic infection origin (Flynn, 2000).⁶ Oral infections can progress to distant sites through the potential tissue spaces between the fascia extending between the head and neck region. Superficial fascia extending between the head and neck has 3 layered deep cervical fascia deep to it covering the potential spaces.

Submandibular and sublingual spaces are continuous posterior to the Mylohyoid muscle. Edema or swelling in these spaces may lead to airway compromise. The cone shaped parapharyngeal space communicating the brain through various foramina like Ovale, Lacerum may lead to cerebral abscess.⁷ Abscess in the retropharyngeal space may spread to mediastinum or rarely to pericardial area. About 70% of cervical infections have spread to mediastinum through retropharyngeal space.⁸⁻¹⁰ The age of the subjects ranged from 7 to 80 years with mean age of 40.45 years. Male predominance in the study was in accordance with the other studies. In study done by R. Sánchez et al most cases 61.5 of severe of odontogenic infections were from lower posterior segments of jaws which was in accordance with our results that lower segments (64%) were more involved than upper jaw in the complication cases.¹¹ According to the study done by Jamiela A. et al, incidence of Ludwigs Angina in male and female was 54% and 46%. Which is similar to our results i.e. 56% and 44% in males and females respectively.¹²

CONCLUSION

There was not any significant correlation between age group and complications but people of age group 41-80 years were more affected with the complications. Similarly, there was no significant association of gender and complications but number of case reports of males with complications was more than females. Lower jaw segments particularly lower left was more associated with the complications than the other segments.

REFERENCES

1. Bali, Rishi & Sharma, Parveen & Gaba, Shivani & Kaur, Avneet & Ghanghas, Priya. (2015). A review of complications of odontogenic infections. *National journal of maxillofacial surgery*. 6. 136-43. 10.4103/0975-5950.18386
2. Mannan, Md & Khan, AF & Hossain, Sabrina & Sultan, Saad & Mamun, Abdullah. (2022). Complications and Management of Neck Space Infection. *Bangladesh Journal of Otorhinolaryngology*. 28. 56-61. 10.3329/bjo.v28i1.60825.
3. Lowry, John. (2006). Head, Neck and Dental Emergencies. *Annals of The Royal College of Surgeons of England*. 88. 246-247. 10.1308/003588406X95174f
4. M.D, F.A.C.S. & Vernon, Rowland & Wills, Paul & JR, Rowland. (1981). Complications of Space Infections of Head and Neck. *The Laryngoscope*. 91. 1129 - 1136. 10.1288/00005537-198107000-00010.
5. Gradon, Jeremy. (1997). Space-occupying and life-threatening infections of the head, neck, and thorax. *Infectious disease clinics of North America*. 10. 857-78. 10.1016/S0891-5520(05)70330-5.
6. P Warley, O Silva, R Costa, CorrêaBrum, F Alves The connection between brain abscess and odontogenic infections: A systematic review
7. Economopoulos GC, Michalis A, Palatianos GM, Sarris GE. Management of catheter-related injuries to the coronary sinus. *Ann Thorac Surg* 2003;76:112-6.
8. Alsoub H, Chacko KC. Descending necrotising mediastinitis. *Postgrad Med J* 1995;71:98-101.
9. Estrera AS, Landay MJ, Grisham JM, Sinn DP, Platt MR. Descending necrotizing mediastinitis. *Surg Gynecol Obstet* 1983;157:545-52.
10. Moncada R, Warpeha R, Pickleman J, Spak M, Cardoso M, Berkow A, et al. Mediastinitis from odontogenic and deep cervical infection. Anatomic pathways of propagation. *Chest* 1978;73:497-500.
11. Sánchez R, Mirada E, Arias J, Paño JR, Burgueño M. Severe odontogenic infections: epidemiological, microbiological and therapeutic factors. *Med Oral Patol Oral Cir Bucal*. 2011 Aug 1;16(5):e670-6. doi: 10.4317/medoral.16995. PMID: 20711116.
12. McDonnough JA, Ladzekpo DA, Yi I, Bond WR Jr., Ortega G, Kalejaiye AO. Epidemiology and resource utilization of Ludwig's angina ED visits in the United States 2006-2014. *Laryngoscope*. 2019 Sep;129(9):2041-2044. doi: 10.1002/lary.27734. Epub 2019 Feb 20. PMID: 30786031.