Research Article

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Assessment of Clinical Pattern and Management of Maxillofacial Space Infection in Children Visiting a Tertiary Health Care Centre in Kavre, Nepal

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ABSTRACT

Introduction: Maxillofacial space infection is one of the most common type of infections in the head and neck region, which has various causes and can involve different maxillofacial spaces. However, many life-threatening complications can occur due to delay in its diagnosis and treatment.

Objective: The objective of this study was to assess the clinical pattern and management of maxillofacial space infection in children.

Materials and Method: This descriptive cross-sectional study assessed 83 children reporting to a tertiary health centre in Kavre, Nepal. Variables including demographic information, aetiology, and pattern of maxillofacial infection, presence of associated symptoms, treatment modality, and complications were evaluated. Statistical analysis was performed using Microsoft Excel and SPSS version 21.0. Frequency was calculated using descriptive analysis.

Result: The results indicated that the most common aetiology of maxillofacial space infection was dental caries in 73 (87.95%) children. Seventy eight (93.97%) children reported pain as the most commonly associated symptom. The mean duration of pain prior to seeking dental care was 12 days and swelling was four days. Similarly, the most common modality of treatment was pulpectomy/ root canal therapy in 46 (55.42%) of children followed by extraction in 20 (24%) and 80 (96.38%) received antibiotics.

Conclusion: The majority of the paediatric maxillofacial space infections were of odontogenic origin. Pulpectomy/ root canal treatment along with antibiotics represent clinically acceptable empiric first-line approach in managing such infections. Extraction was indicated only if the involved tooth was grossly decayed and infection failed to improve after the appropriate endodontic procedures.

Keywords: Maxillofacial; odontogenic; space infection.

INTRODUCTION

Paediatric maxillofacial space infection (MSI) refers to infections in the potential spaces and fascial planes of the maxillofacial region in children.[1] MSI is a common health care concern in children across the world. Timely assessment of the infection helps clinicians manage pain, swelling and

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arrest its spread. However, any delay in diagnosis and treatment might cause life-threatening complications like respiratory obstruction, septic shock, sepsis, cavernous sinus thrombosis, and brain abscess.[2] Therefore, it is essential to assess the clinical pattern of paediatric MSI to aid in treatment planning and improve overall prognosis.

The objective of this study was to evaluate the clinical pattern and management of MSI in children reporting to a tertiary centre in Nepal. This study intends to help clinicians in their decision-making process while managing paediatric MSI with the goals of retaining the natural tooth, avoiding unnecessary extractions and using proper antibiotics. Given the scant literature on Nepali children, this study also attempts to fill the gap in data availability.

MATERIALS AND METHOD

This descriptive, cross-sectional study was conducted in children reporting to Department of Paediatric and Preventive Dentistry, Kathmandu University School of Medical Sciences (KUSMS) with maxillofacial space infection within a period of six months from August 2018 to January 2019. An ethical approval (Ref. 90/18) was obtained through the institutional review committee of the KUSMS. Informed consent was obtained from parents and assent from children regarding their willingness to voluntarily participate in the study. Cooperative children up to 14 years of age with extraoral facial swelling were included in the study. Children referred to other health care centres were excluded from the study. A convenience sampling technique was utilised to recruit all patients who reported with a chief complaint of symptoms related to the maxillofacial infection within the six months period.

The primary author utilised a closed-ended questionnaire to conduct a verbal interview with parents in Nepali language. Clinical examination was performed on paediatric dental chair using mouth mirror and explorer under a suitably directed dental chair light. Intraoral or extraoral radiographs were taken according to nature of the infections. Multiple variables such as demographic data (age, gender), aetiopathogenesis (aetiology, teeth involved, spaces involved, previous antibiotic treatment), clinical presentation (presenting symptoms, time from onset of symptoms until presentation), antibiotics used, treatment procedures, type of anaesthesia, and consequences (complications, duration of stay) were assessed and recorded.

Statistical analysis was performed using Microsoft Excel and IBM SPSS Statistics for Windows, version 21 (IBM Corp., Armonk, N.Y., USA). Frequency was calculated using descriptive analysis. Confidentiality of the participants and data were maintained.

RESULT

Clinical examination was performed on 83 children among whom 53 (63.85%) were males and 30 (36.14%) females. The most common cause of paediatric maxillofacial infection was dental caries in 73 (87.95%) children followed by lymphadenitis due to non-odontogenic causes in 8 (9.63%), and traumatic dental injury in 2 (2.40%).

Swelling was present in all 83 (100%) children that participated in the study and most commonly associated symptoms was pain in 78 (93.97%) (Figure 1). Mean duration of pain prior to seeking dental care was 12 days and swelling was four days. Parents administered oral antibiotics for 20 (24.09%) children without consulting a clinician. Only 2 (2.40%) children visited a traditional healer before seeking clinical care.

A combined buccal and submandibular space was the most common anatomical location for MSI. Buccal, submandibular, submental, canine, and infraorbital space infections were found in 58 (69.87%), 38 (45.78%), 19 (22.89%), 6 (7.22%), and 16 (19.27%) children respectively. Maxillary primary molar was the most common tooth involved in 32 (42.66%) children. Intraoral periapical radiograph (IOPAR) or orthopantomogram (OPG) was the choice of radiograph for 67 (80.72%) children.

Anaesthesia was not required for 50 (60.24%) children for endodontic procedures. A majority of 80 (96.38%) children received a combination of amoxicillin and metronidazole coverage. The most common modality of treatment was pulpectomy/root canal treatment (RCT) in 46 (55.42%) followed by extraction in 20 (24%). Progression of orofacial swelling to the other half of face occurred in 3 (3.61%) children but no other serious complications was noticed. Incision and drainage

Table 1: Data summary for the study population.

Variables	No of cases (%)
Teeth involved	
Mandibular primary molar	27 (36)
Maxillary primary molar	32 (42.66)
Primary upper anterior	3 (4)
Mandibular permanent molar	11 (14.66)
Maxillary permanent molar	2 (2.66)
Investigation	
IOPAR/OPG	67 (80.72)
Ultrasound sonography (USG)	10 (12.04)
None	6 (7.22)
Anaesthesia used	
Local anaesthesia	26 (31.32)
General anaesthesia	7 (8.43)
None	50 (60.24)
Treatment modalities	
Pulpectomy /RCT	46 (55.42)
Extraction	20 (24)
Extraction with incision and drainage	7 (8.43)
Only antibiotics	10 (12)

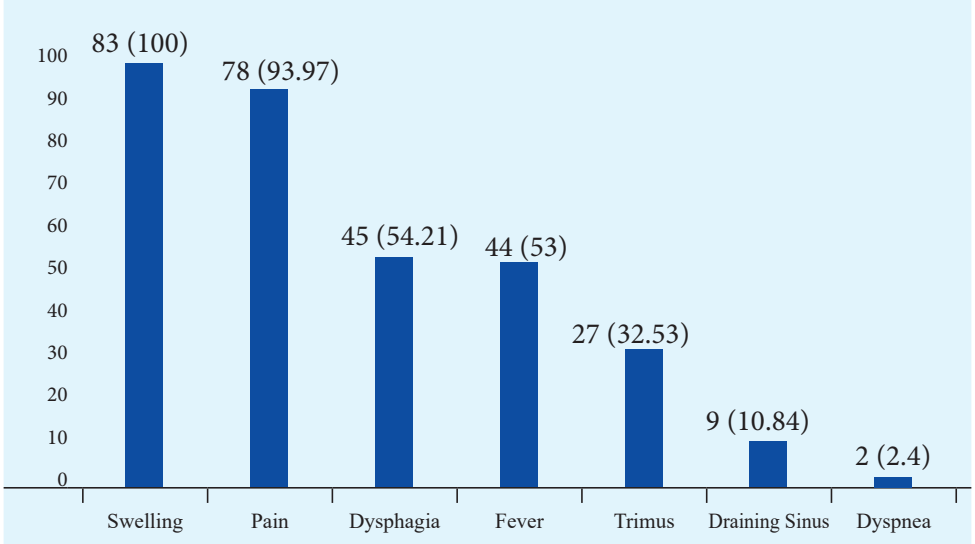

Figure 1: Associated symptoms for maxillofacial space infection, n (%).

was performed under general anaesthesia for arresting the progression of infection in 7 (8.43%) children. The average duration for hospital stay was three days.

DISCUSSION

Dental caries is the most common chronic disease among children.[3] Sequelae of untreated caries is a primary reason for missed school and costly visits to the emergency room.[4,5] According to this study, the most common cause of MSI was odontogenic in nature. It resulted from untreated dental caries which correlated with the studies conducted in other parts of the world.[1,6] Boys were at higher risk for maxillofacial infection compared to their female counterparts.

A majority of participants had recurring pain before the onset of space infection. However, it

was evident that the children were brought to the dental hospital only after they developed swelling. The mean duration of pain was 12 days and swelling was four days before reporting to hospital. Bridgeman et al. observed that despite the presence of intermittent pain in the past, 98% of the patients presented for care only when there was a sudden onset of swelling.[7]

In present study, infection occurred mostly in the buccal space in contrast to the submandibular space involvement in other published literature.[1,8] Furthermore, the most commonly involved tooth was primary maxillary molar as compared to Al-Malik and Al-Sarheed study, that found primary mandibular molar to be more commonly involved.[6]

The first preferred line of intervention was pulpectomy or RCT in contrast to extraction being a common choice of treatment.[6] Since many children tend to seek care at a later stage of infection, clinicians might treat them with invasive procedures such as extraction, incision, and drainage. Current study shows that the odontogenic infections respond favourably to pulpectomy or RCT. Extraction should not be the first line of treatment unless the tooth is grossly carious or if infection persists after starting endodontic procedures such as an access opening. Children with MSI, pain, and fever need immediate attention as delay in treatment can lead to serious complications like dehydration and compromised airways.[3]

A majority of children did not require any anaesthesia as pulp therapy could be performed without any pain in non-vital tooth. Only a few children required general anaesthesia as compared to 37% in a study conducted by Veronez et al.[9] Similar to this study's approach, many clinicians considered a combination of amoxicillin and metronidazole as the first line of treatment.[6,10] Initiating antimicrobial therapy soon after the diagnosis and prior to surgery limits the infection period and minimises consequence of bacteraemia.

The prevalence of self-medication in the study population, was lower compared to other similar studies done in adults.[1,9] Although legislation in Nepal mandates a medical prescription for purchase of antibiotics, unauthorised dispensing seems problematic.[11] This often masks the severity of infection and causes delay in seeking dental care, which eventually affects the treatment choice for managing the chronic maxillofacial infection.

The goal of paediatric clinical intervention is to preserve the infected tooth and limit adverse consequences of MSI. However, the paediatric odontogenic infection and their management can be a challenge due to the complexity of the infection and children's behavioural issues. The social determinants of oral health also play an important role in determining preventive practices, dental care seeking behaviour, and clinical prognosis. Therefore, it is essential to foster a team-based approach to manage paediatric MSI. This medical-dental integration enables general practitioners especially in the underserved areas to recognise the early signs of odontogenic infection and make prompt referral to prevent life-threating consequences of MSI.

There is a lack of comparable data particularly for the Nepali children. A larger sample size and a longitudinal study design could be beneficial to assess the bigger picture of trends in the clinical pattern and management of the maxillofacial infections.

CONCLUSION

In association with family education, early recognition, prompt referral to a dental provider, treatment with pulpectomy/RCT, close monitoring, combination of amoxicillin with metronidazole administered orally represent clinically acceptable empiric first line approach in managing the maxillofacial infections in children. Extraction is recommended only if the involved tooth is grossly decayed and infection fails to improve after the appropriate endodontic procedures. Given an absence of a universally accepted protocol for managing the paediatric maxillofacial space infection, primary health care centres without a dental professional might also benefit from this study's pragmatic recommendations.

Conflict of Interest: None.

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