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Research Article

Our Experience of Pediatric Maxillofacial Surgery at the National Referral Children's Hospital in Dakar: A Report of 33 Cases

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Abstract

Purpose: This study aims to provide an overview of the reasons, patterns, and unique aspects of maxillofacial surgical procedures performed on children in a low-income country.

Methods: We conducted a 3-year prospective study (2013 to 2015) at Albert ROYER children hospital in Dakar. It was a preliminary descriptive and analytic study with biodata and statistical analysis to make correlations between indications with Pearson coefficient significant at better than 1%. All Oral and Maxillofacial (OMF) surgeries were included except dentistry, clefts and craniocerebral malformations.

Results: Thirty-three children who underwent OMF surgery were recorded, representing 1.05% of the total patients treated in the department during the study period. Patients age average was 13 months with a range from 2 to 108 months, and a male-to-female ratio of 2.3. The most common reasons for surgery were neoplastic and traumatic conditions, accounting for 54% of cases. Excision and tissue's reconstruction were the most frequently performed procedures. Wire osteosynthesis was the first choice in open primary treatment of fractures while Intermaxillary Blocking (IMB) and functional method were the common conservative performed in 47%. Postoperative good results occurred in 78% of cases, and infection was the most frequent complication. There was correlation between age and conservative treatment (P=0.05), and no relationship was found with economic factors (0.003). However, cosmetic and functional issues were associated with open surgery (P=0.02).

Conclusion: authors highlight the need for residents to be trained in such holistic pediatric surgery.

Keywords: Pediatric surgery; Maxillofacial surgery; Diagnosis; Treatment indications

Background

The competency scope of maxillofacial surgery encompasses a wide range of skills related to the oral and maxillofacial regions [1]. In children, various pathologies, both benign and malignant neoplasms, as well as injuries and congenital malformations, are managed in close collaboration with surgical specialties related to the head and neck. As healthcare evolves and demands on available facilities increase, the necessity to assess and improve the efficiency of existing health systems becomes increasingly evident [2]. There is limited information on pediatric maxillofacial surgical procedures in our context. Therefore, this study aims to report our experience with pediatric maxillofacial surgery, focusing on its plastic, aesthetic, and functional aspects at the national referral children's hospital in Dakar.

Materials and Methods

This was a 3-year preliminary prospective study conducted in Albert ROYER's children hospital. We recorded all inpatients who underwent maxillofacial surgery in our department from 2013 to 2015. Craniofacial and dental procedures and treatment for cleft malformations were excluded from the study. Data collected included the patient age, gender, distribution and the scope and type of treatment provided. The age group was divided as follows: (0-30) days, (1-30) months, (3-5) years, (6-10) years, (11-14) years, and (15-16) years. Data analysis results were presented as frequencies and percentages. Pearson's test was utilized to investigate the correlation between continuous variables, such as age and treatment differences.

Results

Between January 1, 2013, and December 31, 2015, thirty-three children were hospitalized due to pediatric maxillofacial pathology, following specific surgical procedures. The ages of the patients ranged from 2 months to 9 years, with a mean age of 13 months. Among these, 14 patients (42.4%) were in the Preschool age group, while 19 patients (57.6%) were school-aged. Additionally, there were 2 patients (6.1%) in the adolescent group. The male -to-female ratio was 2.3, and the gender distribution varied according to the disease spectrum. Benign neoplastic conditions accounted for 30.3% (n = 10) of the cases, while malignant neoplastic conditions comprised 15.1¨% (n = 5). Traumatic conditions made up 36.4% (n = 12) of the cases, as illustrated in Figure 1.

The main procedures for managing the condition, primarily, were tumor excision and enucleation, observed in 10 cases (30.3%) (Figure 2-5).

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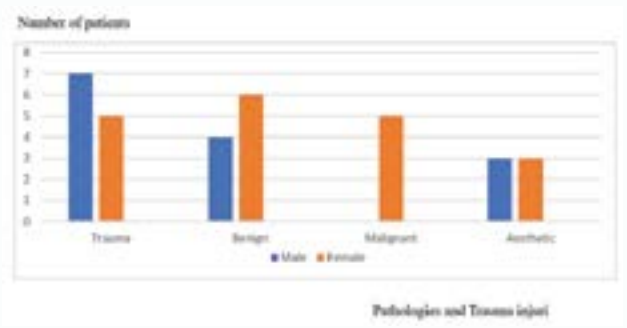

Figure 1: Gender distribution across Pediatric OMF surgery spectrum.

Open reduction and internal fixation were performed in 8 cases (24.3%), plastic, reconstructive and aesthetic procedures were done on 6 patients (18.2%), cancer resection occurred in 5 cases (15.1%), IMB with ortho-facial immobilization was applied in 4 cases (12.1%) (Figure 6).

There was no surgical procedure involving maxillectomy or mandibulectomy. The secondary procedures performed on the children included reconstruction using flaps, specialized wound care, and eventual scar revision (Figure 7). For the treatment of maxillofacial fractures, interosseous wire fixation was used in eight patients, while four others underwent external intermaxillary blocking. Open reduction was performed in 7 cases (21.2%) for jaw fracture and in one case (3.03%) for a left orbital floor fracture

Figure 2: Left lower palpebral hemangiolipoma. A): Palpebral angiolipoma Before; B): Immediate postoperative aspect; C): Long term follow-up.

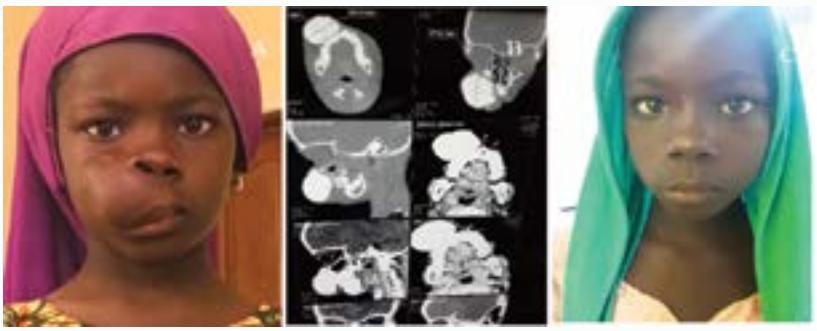

Figure 3: Huge salivary lithiasis. A): Before surgery; B): CT-Scanner image; C): Post endobuccal surgery.

Figure 4: Benign tumour example. A): Massive parotid tumor; B) & C): Dissection and end aspect.

Figure 5: Malignant tumour case. A): Massive embryonal Rhabdomyosarcoma; B): Cauliflower aspect of the tumour; C): End dissection aspect; D): Immediate postoperative aspect; E): Postoperative day 21st.

Figure 6: Mandible horizontal branch's fracture osteosynthesis. A): Left mandible fracture; B): Internal steel wire fixation.

Figure 7: Disrepair oral corner injury reconstructed by nasolabial flap. A): Horse bite lesion; B) Flap lift and immediate reconstructive aspect; C): 3 months follow-up; D): Mouth opening result.

associated with an ipsilateral malar fracture. The average length of hospitalization was 5 days with a range from two to ten days. The study recorded postoperative outcomes with no sequelae in 26 patients which accounted for 78%.

Our study found a significant positive correlation between age and conservative treatment (P= 0.05). Additionally, we observed no relationship between conservative treatment and economic factors (P=0.003). The primary motivations for choosing open maxillofacial surgery were aesthetic and functional goals, which showed a correlation (P=0.02).

Discussion

Epidemiological aspects

Pediatric maxillofacial conditions require various surgical interventions. Benign tumor's are managed more frequently than malignant conditions, highlighting the skill and expertise required in the field of pediatric surgery. In 2013, Singh and Malick [3] from India acknowledged the challenges that Oral and Maxillofacial (OMF) surgeons face when managing the maxillofacial complex in children. MOSHY et al. [2] reported an increase in cases at the National Referral Hospital in Tanzania, rising from 151 cases in 2013 to 271 cases in 2017 [4]. In our study, we documented 33 children over three years, averaging 11 cases per year, excluding cleft lip and palate surgeries. We observed a higher number of male patients compared to female. The ratio of males to females varies in the literature likely due to differences in study design, inclusion criteria, and socioeconomic status [5,6]. In Wallys [7] study of approximately 694 cases at Witwatersrand University in Johannesburg, patients aged between 11 and 17 years constituted up to 70% of the sample. Conversely, Shivangi et al. [8] reported a fairly equal age distribution between trauma and pathology cases in Chenai, a southern state in India. This study found that malignant neoplastic conditions were present only in female patients (15.1%), while trauma cases were more prevalent among males.

Clinical feature

Pediatric complaints of tumoral masses and swelling are significant in the maxillofacial surgical population. The mandible is more frequently affected than the maxilla in cases of both trauma and pathology. The range of maxillofacial surgical procedures performed on children, as reported in the literature is extensive. Many of these conditions necessitate surgical intervention. In general, benign neoplastic conditions are more commonly managed surgically, followed by trauma and malignant conditions. The higher prevalence of benign tumors is attributed to the fact that these oral and maxillofacial neoplasms often consist of various painless conditions. As a result, they tend to present later with lager lesions that rarely interfere with function [9,5]. Our study, which reported 54% of cases involving trauma and neoplastic tumors, aligns with existing literature. Furthermore, the associated aesthetic and reconstructive considerations in these cases are significant. Facial fractures in the pediatric population are relatively uncommon, accounting for only 1.5 to 8% of injuries in children under 12 years old and less than 1% those under 5 years old [10-12]. Research indicates that mandibular fractures are the most frequent type of facial fractur, with their occurrence increasing as children grow older due to the development of the mandible [13,14]. Additionally, some studies reveal a higher incidence of nasal bone fractures and suggest that the minimal-related facial injuries are more prevalent in rural areas [15,16].

Our findings align with this literature, however, we encountered only two cases of nasal bone fractures with one case involving a horse bite injury.

Surgical procedure aspects

The surgical management of pediatric maxillofacial conditions requires a high level of skill and expertise from pediatric surgeons. Traumatic injuries often necessitate the alignment and fixation of fractured bone segments to achieve proper occlusion. In some cases, direct exposure of the fracture is essential, allowing for either rigid or semi-rigid fixation methods [15].

In our approach to pediatric minimally invasive surgery, we have opted for wire fixation in all instances of mandible fractures. Unlike the 2018 study, conducted in Nigeria, where mandibulectomy (partial or complete) was common treatment method, we did not perform this procedure in any case [5]. Instead, we carried out enucleation surgery, which included reconstructing the lost hard tissue with an inferior pedicled Facial Artery Muscular Mucosal Flap (FAMM). This decision was influenced by the young age of the patient, a 5-year-old girl, and the importance of aesthetic considerations. We believe that extensive oncological resection during childhood can lead to specific growth complications, particularly, in the maxillofacial region. Our conservative approach to pediatric plastic surgery is also informed by the tumor's low risk of recurrence, in children compared to adults. Overall, our study reports a short mean length of hospitalization with no complications observed in 78% of cases. We found a statistically significant correlation between age and indications for surgery (P=0.05), as well as a significant relationship between the factors associated with open surgery and aesthetic and functional outcomes (P=0.02). Additionally, economic considerations did not influence our treatment approach.

Conclusion

Pediatric maxillofacial surgery encompasses a wide range of procedures that have shown good outcomes in our context. This study excludes craniofacial, dental, and cleft malformations, highlighting that malignant conditions are more frequently observed in females while trauma is the most common indication in males. The authors emphasize the urgent need for pediatric surgeons at the National level to receive training in this specialized field of holistic surgery. This branch of surgery for children integrates plastic, reconstructive, oncologic, orthognathic, aesthetic, and osteosynthesis procedures to address issues related to hard and soft tissues of the mouth and face.

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