Original Article

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One-year Retrospective Analysis of Major Oral and Maxillofacial Surgical Procedures Performed under General Anesthesia in a Tertiary Care Hospital, Rajshahi, Bangladesh

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ABSTRACT

Background: Major oral and maxillofacial surgeries include one large variety of procedures to include traumatic, neoplastic, cystic, and developmental pathologies. Evaluating surgical trends gives essential insights into disease burden, departmental workload and regional needs for specialized care. Objective: To analyze the frequency and distribution of major oral and maxillofacial surgeries under general anesthesia in a tertiary care hospital over a 1-year period of time.

Materials and Methods: This study was a retrospective study that was conducted in the Department of Oral and Maxillofacial Surgery, Rajshahi Medical College Hospital, Bangladesh. Records of all in-patients undergoing major maxillofacial surgical procedures under general anesthesia in the period from January-December 2024 were reviewed. Data were extracted from the operation theatre register and patients case file and were categorized according to the type of surgical procedure and analyzed descriptively.

Results: A total of 115 major oral and maxillofacial surgeries were carried out during the period of this study. The most common procedures were enucleation of cysts (26.1%), dredging of odontogenic tumors or keratocysts (13.0%) and excision of benign lesions (12.2%). Wide excision of malignant lesions with or without neck dissection accounted for 10.4% while those resulting from trauma such as fracture fixations of the mandible and maxilla accounted for 11.3%. A smaller proportion of cases were performed for complex reconstructions, osteomyelitis or temporomandibular joint (TMJ) and salivary gland surgeries.

Conclusion: Cystic and benign odontogenic pathologies comprised the majority of the major maxillofacial surgeries followed by trauma and procedures for malignancies. Continuous evaluation of surgical patterns helps in optimizing departmental resources, training and patient care strategies in tertiary settings.

Keywords: Oral and maxillofacial surgery, retrospective study, general anesthesia, maxillofacial trauma, odontogenic cysts, Bangladesh.

INTRODUCTION

Oral and maxillofacial surgery (OMFS) is a critical field of dental and surgical sciences concerned with diseases, injuries and defects of the functional and aesthetic elements of the oral cavity, jaws and face. The specialty covers a broad spectrum of conditions from simple extractions to complex reconstructive, oncologic and trauma related surgeries. The distribution of

cases and patterns of surgery in this field are influenced by a number of factors, including population demographics, geographic location, socioeconomic status, healthcare infrastructure and referral patterns.[1,2]

In developing countries such as Bangladesh, oral and maxillofacial units in the tertiary hospitals have a wide range of clinical workload where emergency trauma management has to be integrated with elective surgeries for cystic, neoplastic, and developmental lesions. Trauma remains the leading reason for admission for surgery owing to the high burden of road traffic accident (RTA), interpersonal violence, and falls.[3,4] Studies both nationally and internationally consistently show that RTAs account for more than half of the maxillofacial injuries, with the main victim being a young adult male.[5,6] The mandible is the most common facial bone fractured, followed by the zygomatic complex and maxilla.[4,7]

Apart from trauma, benign cystic and odontogenic lesions are one of the most common causes of elective maxillofacial surgical procedures. Odontogenic cysts and tumors originate from the epithelial remnants of tooth formation and account for a major part of lesions of the jaws worldwide.[8,9] Although many cystic lesions are asymptomatic and are discovered incidentally, larger or infected cystic lesions may require surgical therapy such as enucleation or dredging under general anesthesia. In Bangladesh, two studies have reported that the odontogenic cysts and tumors comprise a significant portion of the operative case load in children and adult populations.[10,11] Similarly, Rahman and Haider reported that ameloblastoma is the most common odontogenic tumor of the jaws that often necessitates wide resection and reconstruction.[12]

Malignant lesions of oral and maxillofacial region still remain an important burden in South and Southeast Asia with habits like tobacco chewing and betel quid chewing, presenting late and lack of awareness leading to extensive surgeries with wide excision, selective neck dissection and reconstruction.[2,13] Studies also emphasized the diversity of odontogenic and non-odontogenic tumors requiring surgical management and the importance of histopathological evaluation for diagnosis and prognosis.[14,15]

In addition to pathological and malignant conditions, tertiary oral and maxillofacial units are increasingly managing complex reconstructive and infection-related cases. Chronic osteomyelitis, oroantral fistulae, temporomandibular joint ankylosis, and fibrous dysplasia often require major surgical procedures under general anesthesia.[16,17] These procedures are vital for restoring function and aesthetics, yet they demand significant operative time, multidisciplinary collaboration, and postoperative care.

International literature has demonstrated that oral and maxillofacial surgery has a considerable arrangement of workload based on the region. Trauma was the major indication for maxillofacial surgery in Europe[18], while a more heterogeneous workload was displayed by both Adeyemo et al.[2] and Conceicao et al.[19] in developing countries, with a significant share of elective operations for cystic, infectious and neoplastic lesions.[20] Further, analysis of workload confirms effects on service planning: trauma[21] and benign pathology[5] account for more than two-thirds of surgical cases in units of OMFS in Saudi Arabia and Iran, respectively; encompassed multicenter and regional series confirm the combination. Collectively, these findings suggest that despite regional differences, oral and maxillofacial surgeons worldwide manage a complex mixture of trauma, pathology, infection, and reconstructive conditions.[22-24]
In Bangladesh, few studies have comprehensively described the overall spectrum of major oral and maxillofacial surgeries performed under general anesthesia in tertiary hospitals. Most available data address isolated subsets such as fractures[3,4], odontogenic tumors[10,11] or malignancies[12]. However, there remains a gap in understanding the full operative profile of a tertiary center that accommodates both emergency and elective surgical care.

Therefore, this study was aimed to find out the pattern, frequency and distribution of major oral and maxillofacial surgeries performed under general anesthesia in the Department of Oral and Maxillofacial Surgery, Rajshahi Medical College Hospital, Bangladesh for the duration of 1-year time period. It is intended that the study should give a good picture of the surgical workload and of the relative numbers of trauma, pathological and malignant cases and contribute therefore to planning of clinical services and training in the future as well as to allocation of resources.

MATERIALS AND METHODS

This retrospective study was conducted in the Department of Oral and Maxillofacial Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh, to analyze the pattern of major oral and maxillofacial surgical cases performed under general anesthesia between January and December of 2024. Rajshahi Medical College Hospital is a tertiary referral center providing comprehensive oral and maxillofacial surgical services for the northwestern region of Bangladesh. The department receives referrals from dental units, emergency departments, oncology clinics, and district hospitals, encompassing both elective and emergency cases.

All records of patients who underwent major operative procedures under general anesthesia in the Department of Oral and Maxillofacial Surgery during the study period were reviewed. Data were extracted from patient case files, admission registers, and operation theatre records. Surgeries performed under local anesthesia or minor outpatient procedures were excluded. The recorded variables included

type of operation, indication, and number of cases. Each operation was categorized into specific groups: trauma (e.g., open reduction and internal fixation of mandibular or maxillary fractures), cystic lesions (e.g., enucleation or dredging), odontogenic tumors, malignancy-related surgeries, and miscellaneous procedures (e.g., TMJ arthroplasty, salivary gland tumor removal).

Data were entered into Microsoft Excel and analyzed using descriptive statistics. The number and percentage of each type of surgery were determined and presented in tabular form. As the study aimed to provide a descriptive overview of surgical patterns and departmental workload, no inferential statistical tests were applied. This study was based on the retrospective review of anonymized hospital records. Since no direct patient contact was involved and data were de-identified, ethical committee approval and informed consent were not required.

RESULTS

A total of 115 major oral and maxillofacial surgical procedures were performed under general anesthesia in the Department of Oral and Maxillofacial Surgery, Rajshahi Medical College Hospital, between January and December 2024. The patient cohort primarily included in-patients who required comprehensive surgical management of traumatic, neoplastic, cystic, and developmental maxillofacial conditions.

Among the performed procedures, enucleation of cystic lesions constituted the largest proportion (26.1%, n =30), followed by dredging of odontogenic tumors or keratocysts (13.0%, n =15) and excision of benign lesions (12.2%, n =14). Wide excision of malignant lesions, including those with selective neck dissection or free flap reconstruction, collectively accounted for 10.4% of all cases (n =12).

Trauma-related interventions comprised a significant portion of the surgical workload. Open reduction and internal fixation (ORIF) of mandibular fractures represented 8.7% (n =10), whereas midfacial/maxillary fracture fixation accounted for 2.6% (n =3). Complex reconstructive and corrective procedures such as ORIF of malunited or panfacial fractures, segmental mandibulectomy, and TMJ arthroplasty were performed in a limited number of cases, reflecting the selective nature of tertiary-level surgical care.

Infectious and inflammatory conditions such as osteomyelitis were managed surgically in 2.6% (n =3) of patients through sequestrectomy. Additionally, Caldwell–Luc operations for oroantral fistula repair constituted 3.5% (n =4) of the total caseload. Minor but significant proportions were observed for salivary gland tumor excisions (0.9%), fibrous dysplasia recontouring (0.9%), and multiple dental extractions under general anesthesia for special-needs patients (1.7%).

Overall, the findings highlight a diverse surgical spectrum, with cystic and benign odontogenic pathologies forming the majority of elective surgeries and trauma-related fractures representing a substantial emergency workload in the department.

Table 1: Distribution of major oral and maxillofacial surgeries performed under general anesthesia (January-December, 2024)

Type of Surgery	Number of Cases (%)
Open reduction and internal fixation (ORIF) of mandibular fractures	10 (8.7%)
ORIF of maxillary/midfacial fractures	3 (2.6%)
Wide excision of malignant lesion with/without selective neck dissection	11(9.6%)
Wide excision of malignant lesion with free flap reconstruction (Radial fore arm free flap)	1 (0.9%)
Enucleation of cyst	30 (26.1%)
Dredging of ameloblastoma/odontogenic tumour/odontogenic keratocyst	15 (13%)
En bloc excision of odontogenic tumour	2 (1.7%)
Sequestrectomy for osteomyelitis	3 (2.6%)
Caldwell–Luc operation (oroantral fistula closure)	4 (3.5%)
Temporomandibular joint (TMJ) arthroplasty	1 (0.9%)
Excision of salivary gland tumour	1(0.9%)
Removal of reconstruction plate	2(1.7%)
Extraction of multiple teeth in mentally challenged patients	2(1.7%)
ORIF of malunited fracture	3(2.6%)
ORIF of panfacial fracture	1(0.9%)
Surgical extraction of impacted teeth	10 (8.7%)
Surgical recontouring for fibrous dysplasia	1(0.9%)
Excision of benign lesion	14 (12.2%)
Segmental mandibulectomy with reconstruction	1 (0.9%)
Total	115 (100%)

DISCUSSION

In doing this retrospective analysis of 115 major oral and maxillofacial surgeries under general anesthesia over 12 months, we can see a nonrandom distribution in the caseload. Enucleation of cystic lesions (26.1%, n =30) followed by open reduction and internal fixation of maxillofacial trauma (14.8%, n =17), dredging of odontogenic tumors or keratocysts (13.0%, n =15) and excision of benign lesions (12.2%, n =14) were the largest proportions of elective surgical works. The surgeries (wide excision with or without neck dissection) for malignancy represented 10.4% (n =12). Other procedures included

osteomyelitis surgery (2.6%, n =3), Caldwell-Luc operations (3.5%, n =4), extraction of impacted teeth (8.7%, n =10), reconstructive and other specialized operations were in a very small number.

Studies conducted in Bangladesh replicate these workload patterns. Hakim et al. conducted a study on the management of maxillofacial fractures in the northern region and concluded that trauma remains a significant component of the OMS workload in the region, particularly in relation to traffic accidents.[3] Previous studies on fracture patterns in tertiary hospitals have shown that mandibular fractures are common, with younger adult males being most affected. These findings are consistent with the demographic tertiary burden, which is probably the cause of the 11.3% of fracture surgeries seen in this study.[4,22-24]

Furthermore, our data supports the need for pediatric trauma readiness in mixed and adult population series, as the presentation of maxillofacial trauma in children and adolescents is common and should be expected even after undergoing "major surgery under general anesthesia" in pediatric maxillofacial demographics.[25]

In terms of pathology, Haider et al. examined lesions that were identified as maxillofacial tumors in children and adolescents as a result of dental development.[10] The authors revealed the existence of several benign odontogenic tumors that needed to be surgically treated. Comparably, a tertiary center study also revealed that benign odontogenic lesions continued to account for 11.5% of surgical load. Our analysis of odontogenic tumor/keratocyst dredging revealed 13.0% and benign lesion resection revealed 12.2%, both of which are consistent with the aforementioned studies. The Rahman and Haider case series on ameloblastoma also highlights the need for more extensive surgery (sometimes under general anesthesia) for large benign lesions, which also explains why these lesions take up a lot of operating room time for elective surgeries at our center.[12]

Global literature on maxillofacial surgery confirms these patterns. Road traffic accidents, falls, and interpersonal violence are the main causes of oral and maxillofacial trauma in some locations, according to systematic reviews and multicenter studies; however, the proportion varies depending on the region.[1,18,26] Einy et al. point out that falls and auto accidents are still major causes of maxillofacial trauma, which is consistent with the trauma proportion of the current study.[26] Additionally, research indicates that the trauma remains a persistent burden while the trend is shifting due to increased urbanization.

As in other multicenter or broader studies, in addition to fractures, benign cysts or odontogenic diseases are common surgical indications, usually for tumor removal or enucleation.[5-7] Consistent with that finding, we found that cystic lesions comprise the largest category (26.1%), confirming that non-trauma pathology also requires a significant amount of operating time and resources in tertiary-level treatment.

The predominance of cystic and benign odontogenic pathology in the caseload has been thought to be partly a consequence of referral bias (complex or large lesions which require general anesthesia) and a backlog of patients who have delayed presentation. The substantial proportion of dredging (13.0%) suggests that a significant proportion of lesions are large or recurrent necessitating a more extensive procedure than simple enucleation. This may be associated with disruption in detection or referral, which is in accordance with literatures on delayed presentation in maxillofacial pathology.[17,19]

The trauma workload (maxillofacial fractures) at 14.8% reflects the fact that emergency trauma remains an important workload. As the previous national authors reported, RTAs continue to increase, presumably as a consequence of local traffic patterns, safety norms and demographic risk factors (younger adults, male-predominance), requiring preparedness of the department for both elective pathology and emergency trauma surgery.[3,4]

The malignant cases (10.4%) that required wide excision (with or without neck dissection or reconstruction) underline the importance of tertiary centers in oncologic surgery. Whereas many benign lesions are treated locally or at an earlier stage, malignant oral or maxillofacial lesions may be late present, requiring more extensive surgery under general anesthesia. This proportion is notable given the high incidence of oral cancer in Bangladesh and South Asia, where betel quid chewing, tobacco use, and poor oral hygiene are prevalent risk factors.[13,27] This is in agreement with the literature on the burden of oral malignancies and the need for ablative plus reconstructive surgery.[13,14]

Other less frequent but clinically significant procedures included Caldwell–Luc operations for oroantral fistula closure (3.5%), sequestrectomy for osteomyelitis (2.6%), and surgical management of fibrous dysplasia or TMJ ankylosis. Although each category represented a small proportion of the total, these cases highlight the broad clinical scope of oral and maxillofacial surgery in tertiary hospitals. Osteomyelitis and chronic infection-related surgeries reflect persistent challenges in infection control, especially where antibiotic misuse and delayed referral are common.[17,28]

The power of this study is the use of theatre records over a predetermined 12-month period to capture an entire spectrum of high-risk surgical procedures under general anesthesia. As with any retrospective research, there are limitations, too. Patients undergoing simple procedures or local anesthetics were left out, thus the entire spectrum of pathology is not represented.

Some referral bias may be present as large lesions or more complex cases tend to be referred to tertiary centers. The

combination of trauma, oncologic surgery, and elective benign/cystic pathology suggests that future exposure to each of these fields should remain constant as training and practice advance. Oral and maxillofacial surgeons must acquire skills in both elective treatments of tumors/cysts as well as emergency trauma care including reconstructive surgery. Moreover, from a policy, these findings offer evidence for improved prevention strategies: earlier diagnosis of cystic or odontogenic lesions via community dental screening[29], enhanced trauma prevention measures (e.g., road security), and higher incidence regions provide evidence for targeted prevention[30].

The current study supports national and worldwide literature by stating that trauma remains a significant component of practice, benign and cystic lesions continue to have a high elective surgical load, and malignant or advanced pathology necessitates tertiary level facilities. The data would be useful for ongoing audit, resource planning, resident training and preventive public health interventions.

CONCLUSION

The variety of cases highlights the wide clinical scope of practice for oral and maxillofacial surgeons, ranging from trauma, infection, oncologic, and reconstructive surgery. These findings demonstrate a diverse surgical workload encompassing elective and emergency care within the specialty. These data provide a baseline overview of departmental surgical activity and may serve as a reference for institutional audit, workload documentation, and future comparative studies.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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DATA AVAILABILITY STATEMENT

The data presented in this study are available on reasonable request from the corresponding author.

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