

Original Research Article

Functional outcomes following various reconstructive methods following various forms of maxillectomies- a tertiary centre experience

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ABSTRACT

Background: The maxilla is the pivotal structure of the midface, separating the oral, antral, and orbital cavities, and providing support to the globes, lower eyelids, cheeks, lips, and nose. In addition, the maxilla play a critical role in speech, swallowing, and mastication. To evaluate the functional outcomes following various reconstructive methods following various forms of maxillectomies

Methods: Retrospective analysis of medical records of patients who underwent various forms of maxillectomies from January 2011 to December 2013. Postmaxillectomy defects were managed by either prosthesis or local flaps.

Results: Forty patients had various forms of maxillectomies. Fifteen patients had Browns class 1 maxillectomy and all of these patients underwent reconstruction with Pectoralis major myocutaneous flap. Ten patients underwent class 2a maxillectomy and reconstruction with obturator and Split skin thickness grafting. Nine patients underwent class 3a-b resection and four patients class 4a-b resection and all had reconstruction with temporalis myofascial flap. Two patients underwent orbitomaxillary resection with palate preserved and reconstruction with temporalis myofascial and forehead flap. Mean follow up period was 8 months (Range 6- 24 months). Two patients developed moderate grade of trismus after completion of radiotherapy. One patient developed recurrence in neck after 6 months of completion of adjuvant radiotherapy. All had moderate to fair speech and eating function which improved over time.

Conclusions: There was no difference between flap reconstruction or obturator intervention of maxillary defects in speech and eating function. Small and lateral defects are better reconstructed with obturator and defects involving orbit and total maxilla are better reconstructed with regional flaps. Hence even in the era of microvascular flaps, obturator and regional flaps can still be considered for reconstruction of maxillectomy defects with fairly good outcome.

Keywords: Maxillectomies, Obturator, Pectoralis major myocutaneous flap, Temporalis flap

INTRODUCTION

The maxilla is the pivotal structure of the midface, separating the oral, antral, and orbital cavities, and providing support to the globes, lower eyelids, cheeks, lips, and nose. In addition, the maxilla play a critical role in speech, swallowing, and mastication.¹ Incidence of patients undergoing maxillectomy for maxillary cancer or oral cancer invading hard palate is low.²

Only 9% of oral cavity cancers are localized in the hard palate and 12% at the gingiva. The complex anatomy and proximity of critical structures such as eye, brain, and cranial nerves make the treatment challenging.² Consequently, reconstruction of maxillectomy defects is one of the most difficult challenges faced by the head and neck reconstructive surgeon. Traditionally, restoration of hard-palate defects has been accomplished with palatal prostheses. This is a simple, nonsurgical method to

eliminate oronasal and oroantral communication, re-establishing normal speech and maxillary dentition. Other reconstruction options are nonvascularized grafts, local flaps, regional flaps and free revascularized tissue transfer. Local flap includes masseter flap and regional flap include temporalis flap which can be used as myofascial, myosseus, myosseocutaneous flap.³

There is limited literature about function and quality of life issues in patients using an obturator prosthesis for primary reconstruction of a maxillectomy defects. The optimal reconstruction of the maxillectomy defect remains controversial.⁴

The aim of the study was to evaluate the functional outcomes following various reconstructive methods following various forms of maxillectomies.

METHODS

We performed a retrospective analysis of medical records of patients who underwent various forms of maxillectomies from January 2011 to December 2013 at our institute. Forty patients with maxillary sinus cancer, oral cavity cancer involving hard palate and upper alveolus, who underwent various maxillectomies (partial, subtotal, total, total with orbital exenteration) were selected. Postmaxillectomy defects were classified according to Browns classification and the defects were managed by either prosthesis or regional flaps.

Out of 40 patients, most were in the age group 40-70 years with 15 females and 25 males. Three patients, two with carcinoma maxilla and one with carcinoma upper alveolus with involvement of maxillary sinus were subjected to radiotherapy initially and then was taken up for surgery.

Out of 40 patients, 38 had squamous cell carcinomas, one had odontogenic tumour of maxilla and one had adenoid cystic carcinoma of right orbit.

Fifteen patients had undergone Browns class 1 maxillectomy as a component of gingivobuccal cancers extending to upper alveolus wherein a bite resection was performed. All of these patients underwent reconstruction with Pectoralis major myocutaneous flap. Ten patients underwent class 2a maxillectomy wherein they underwent reconstruction with obturator and split skin thickness grafting.

Nine patients underwent class 3a-b resection and reconstruction with temporalis myofascial flap reconstruction and the eyeball in such cases was supported with temporalis flap. Four patients underwent class 4a-b resection and reconstruction with temporalis myofascial flap and in such cases orbital cavity was filled with temporalis muscle. Two patients underwent orbitomaxillary resection with palate preserved and

reconstruction with temporalis myofascial and forehead flap.

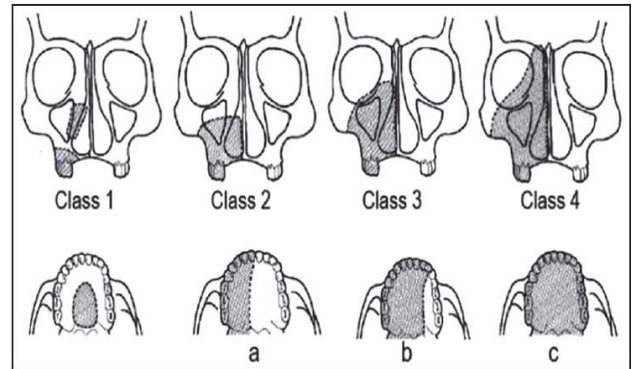


Figure 1: Browns classification.

RESULTS

Fifteen patients with Browns class I defect where upper bite resection was done as a part of composite resection for gingivobuccal cancers, for whom reconstruction was done with pectoralis major myocutaneous flap had good recovery in the post-operative period and their speech and eating function were restored eventually.



Figure 2: Post-operative right partial maxillectomy with obturator in situ.



Figure 3: Carcinoma left maxilla following left total maxillectomy and obturator and split skin graft.

Ten patients with class 2a maxillectomy with split skin graft and obturator reconstruction had uneventful post-

operative period and the speech and eating function improved eventually. Out of the thirteen patients with class 3 and 4 resection and reconstruction with temporalis flap, one patient had partial loss of temporalis flap, one had postoperative epiphora due to ectropion which were managed conservatively. Two patients who underwent orbital exenteration developed nasocutaneous fistula which were reconstructed with forehead flap.



Figure 4: Temporomyofascial flap in the total maxillectomy with orbital exenteration defect.

Mean follow up period was 8 months (Range 6-24 months). Two patients developed moderate grade of trismus after completion of radiotherapy. One patient developed recurrence in neck after 6 months of completion of adjuvant radiotherapy. All had moderate to fair speech and eating function which was assessed by verbal evaluation during follow up and the same was found to improve over time.

DISCUSSION

Following maxillectomy for carcinoma maxillary antrum, upper alveolus, hard palate, etc, depending on the extent of maxillectomy and defects, various reconstructive methods can be planned based on the Browns et al classification system. But the extension of the defect in the vertical plane according to the classification system described by Brown et al did not correlate with functional outcome.

This probably indicates that once the palatal surface and alveolar arch have been adequately restored, the continuity of the maxillary superstructure has a limited effect on speech and swallowing, although they may have an effect on cosmesis or orbital support. Hence Brown et al, also proposed a sub classification based on the horizontal palatal defect.

*Browns classifications of maxillectomy.*⁵

Vertical component

- No oro nasal or oro antral fistula or only resection of palatal bone leaving dental bearing part of maxilla intact.
- Not including orbital floor or rim.

- Including orbital floor with or without skull base.
- Orbital exenteration.

Horizontal component

- Less than or equal to midline of the hard palate.
- Bilateral alveolar maxilla and hard palate.
- Entire alveolar maxilla and hard palate.

In present series, the patients were selected for reconstruction taking into account of both horizontal and vertical component. Out of 40, fifteen of our patients had class 1 resection as a part of composite resection for gingivobuccal cancer and reconstruction was with pectoralis major myocutaneous flap. Ten patients had class 2a resection and was reconstructed with split skin graft and obturator and all of them restored good eating and speech function by 3 months post operation.

Placing well-fitting obturator after surgery can improve the quality of life by restoring speech and eating function and traditionally, rehabilitation with a palatal obturator has been the most common approach for treating maxillectomy defects.⁶ The advantages of this technique are a shorter operative time, shorter postoperative hospital stay, and complete visualization of the maxillectomy cavity, which simplifies oncologic surveillance.

The disadvantages associated with obturators, include the potential for hypernasal speech, regurgitation of foods and liquids into the nasal cavity, difficulty in maintaining hygiene of the maxillectomy cavity, and the need for repeated prosthesis adjustments due to progressive changes in the size and shape of the palatal defect, especially in patients who receive radiation therapy and difficulty to obturate larger defects as the prosthesis may be overly heavy and difficult or impossible to retain, particularly in partially or totally edentulous patients.⁷

So, in those patients with extensive disease who requires post-operative radiation therapy, reconstruction with local or regional flaps are more favourable. But in our cases where obturator reconstruction was done, none of the patients had problem in placing the obturator post radiation therapy. Temporalis flap may be used for small and medium sized palate defects. After harvesting through ipsilateral hemiconal incision, the flap is passed into the maxillectomy or palatotomy cavity by removal of zygomatic arcade. The fascial surface is allowed to mucolise intraorally after forming a natural intra oral lining than one provided by skin flaps.⁸

In present series nine patients underwent class 3a-b resection and 4 patients underwent class 4a-b resection and reconstruction for these 14 patients were done with temporalis myofascial flap. Only one patient had partial loss of temporalis flap. Speech and eating function was restored eventually in all the patients.

Reconstructions with soft tissue only flaps are indicated in small to medium sized lower maxillectomy defects. The best candidate for prosthetic reconstruction is one who has not under gone radiation and with small lateral or posterior palatomaxillary defect and viable dentition to support prosthethis.

None of our patients in the study had microvascular flap reconstructions as considering the volume of cases and the available resources and the financial status of most of our patients, we opted for simple reconstructive methods which can provide best outcome for the patient.

According to the present study type II asterion was the commonest (73%). A thorough knowledge of location and morphometric features of transverse and sigmoid sinus with other superficial landmarks is essential during posterolateral approaches to the posterior cranial fossa. The measurements of asterion with other bony landmarks provide database for the clinical-surgical practice and also for forensic and anthropological application.

CONCLUSION

There was no difference between flap reconstruction or obturator intervention of maxillary defects in speech and eating function. Even in the era of microvascular flaps, small and lateral defects can be better reconstructed with obturator and defects involving orbit and total maxilla can be better reconstructed with regional flaps giving a good functional outcome to the patient.

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