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Mutilating surgery with free flap in oral and oropharyngeal cancer: A report of case series



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ABSTRACT

Introduction: Globally, oral cancer is the eighth most common malignancy with over 300,000 people are diagnosed in each year. It is also the third most common cancer in South East Asia. The tongue is the most common intraoral site for cancer. The aim of this study is to highlight the relevance of mutilating surgery of head and neck cancer in the current minimally invasive and robotic surgery era.

Case description: We present four case series of tongue carcinoma who underwent combined mandibulectomy, neck dissection (COMMANDO), resection of tumours and reconstruction with anterolateral thigh flaps. All cases showed remarkable outcome in

which the flap was viable and healthy, with good tongue mobility postoperatively. All patients were discharged from ward two weeks after operation with tracheostomy tube decannulated.

Conclusion: COMMANDO operation with anterolateral thigh flap reconstruction is relevant in the current era, especially for the late and advanced stages of oropharyngeal carcinoma. Therefore, multidisciplinary trained surgeons are required to perform these cases, i.e. qualified head and neck surgeon with reconstructive teams.

Keywords: oral, oropharyngeal, tongue, mutilating surgery, free flap

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INTRODUCTION

The oral cavity is lined by stratified squamous epithelium of varying degrees of keratinisation. Over 90% of tumours of the oral cavity are squamous cell carcinomas (SCC). Globally, oral cancer is the eighth most common malignancy with over 300,000 people are diagnosed in each year.¹ It is also the third most common cancer in South East Asia.¹ The tongue is the most common intraoral site for cancer, and in several countries, it is a serious public health problem. Tongue carcinoma accounts for 22% to 39% of oral carcinomas.^{2,3} Most tumours occur in the middle third of the tongue, commonly on the lateral aspect, followed by the ventral aspect of the tongue. Only 4% to 5% of tongue carcinomas occur on the dorsum of the tongue.⁴ Tongue cancer occurs more frequent in males, aged within sixth to eighth decade.⁵ Smoking and alcohol consumptions are common among tongue cancer patients, up to 70%.⁵ Thus, we present four case series who underwent combined mandibulectomy, neck dissection (COMMANDO), resection of tumours and reconstruction with anterolateral thigh flaps.

CASE DESCRIPTION

Case 1

A 54-year-old smoker and an alcoholic gentleman with underlying diabetes mellitus, presented with

painful non-healing ulcer at the left side of the tongue for seven months, which happened after tooth extraction, with on and off bleeding. Examination showed a mass at the left ventral surface of the tongue, measuring 4 cm x 4 cm, crossing midline, with clear posterior plane and normal tongue mobility. There were also 2 cm x 2 cm submental and 2 cm x 1 cm left of the submandibular nodes. Histopathological examination (HPE) showed well-differentiated keratinising SCC.

Magnetic resonant imaging (MRI) scan of the head and neck showed a hyperintense lobulated triangular shape mass in the oral cavity located in the inferior surface of tongue, crossing the midline with the apex on the right, and based on the left floor of the mouth. It measured at 3 cm x 3.7 cm x 4.3 cm and caused posterosuperior displacement of the tongue. The mass appeared to involve bilateral genioglossus muscles, loss of normal appearance of the transverse muscle, loss of plane of demarcation with the left mylohyoid muscle and bilateral geniohyoid muscles. No extension to the base of the tongue. The left submental and right submandibular nodes were enlarged; 1.3 cm and 1 cm, respectively.

The patient was diagnosed with tongue carcinoma (T3 N1 M0). He underwent COMMANDO, tracheostomy, percutaneous endoscopic gastrostomy (PEG) tube insertion and reconstruction of the floor of mouth and

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tongue with free anterolateral thigh (ALT) flap. Postoperatively, the flap was viable with good Doppler signal and good tongue movement. He was discharged from ward on day 14 with tracheostomy tube decannulated.

Case 2

A 44-year-old gentleman; a case of recurrent oropharyngeal carcinoma. He had tonsillectomy and neck dissection done previously with chemo-radiotherapy completed few months prior. He presented with severe trismus and right buccal mass. Examination revealed an ulcerative lesion around the right oropharynx involving both upper and lower jaws.

The computed tomography (CT) scan showed a right tonsillar tumour with extension into oropharynx wall, pterygoid muscle, extrinsic muscle of the tongue and mandible. The MRI scan of the neck showed a heterogenous enhancing mass in inferolateral part of the right tonsillar bed, approximately 1.5cm thick, extending to the medial and lateral pterygoid muscles superiorly, right mylohyoid and hyoglossus muscles medially, the right masseter and buccinator muscles laterally. The enhancement of the buccinators muscle crossed 5.6cm beyond the midline, almost encasing the length of the outer border of the left mandible body. The intrinsic muscles of the tongue were preserved. There were bone marrow changes in the body and part of right ramus of mandible, with bulging of angle of right mandible.

A positron emission tomography (PET) scan done showed an increased tracer uptake in the region medial to right mandible and extending

to the lateral and anterior part of the mandible. There was involvement of the mandible and tooth indicating progression of the disease process. The size of the active lesion was 4.2 cm x 3.4 cm x 5.4 cm.

He underwent tracheostomy, right mandibulectomy, neck dissection, partial pharyngectomy, maxillectomy, right partial parotidectomy, and gastrostomy feeding tube insertion with fibula free flap for right oropharyngeal carcinoma (T4a N0 M0). Postoperatively, he was well with no obvious tumour seen, good tongue mobility and mouth opening. He was referred to oncology team for further chemotherapy and radiotherapy (RT) treatment. He was discharged from ward on day 14 with tracheostomy decannulated.

Case 3:

A 44-year-old gentleman; non-smoker and non-alcoholic, with history of chemo-radiotherapy done one year ago for a tongue mass that spread to skin over submental area. He presented with residual tumour of tongue four weeks after completing chemo-radiotherapy (17 cycles of chemotherapy and 35 fractions of radiotherapy). No dysphagia or trismus detected. Examination revealed a fungating mass measuring 3 cm x 5 cm x 6 cm at the left lateral border of tongue with necrotic slough, extended to submental region. The mass crossed the midline to the right side, causing limited tongue movement on the left with fullness floor of mouth. HPE showed SCC of the tongue with submental metastasis (Figure 1).

The MRI scan of the neck revealed a well-defined enhancing mass in the anterior part of left tongue, measuring about 2.0 cm x 1.8 cm in size, located within the intrinsic muscle of the tongue with involvement of the tongue dorsum. The mass extended deep into the tongue base, crossed to the midline to the right side and occupied the submental region. Inferiorly, it was fungating through the skin, forming lobulated mass margin (Figure 2). No cystic component within. The deep part of the mass measured at about 3.9 cm x 7.3 cm x 6.0 cm, with irregular necrotic centres seen within the deep mass. It was closely abutting the anterior margin of the left submandibular gland. The upper part of both infrahyoid muscles were involved, severe on the left side. The focal posterior cortical defect of the body of the mandible (9.5mm) seen, with suspicion of tumour erosion (Figure 3). However, no abnormal marrow signal changes seen. The thyroid cartilage, vocal cords and thyroid gland were normal. No obvious cervical lymphadenopathy. The posterior part of the tongue was preserved. The nasopharynx and oropharyngeal structures were normal.



Figure 1. Preoperative image of tongue mass extending to submental region

He was diagnosed as tongue carcinoma T4a N0 M0 and underwent COMMANDO, tracheostomy, PEG tube insertion, and free ALT flap. Postoperatively, the flap was viable with good doppler signal and good tongue movement. He was discharged from ward on day 16 with tracheostomy tube decannulated on day 12.



Figure 2. Intraoperative image shows submental skin involvement of the mass

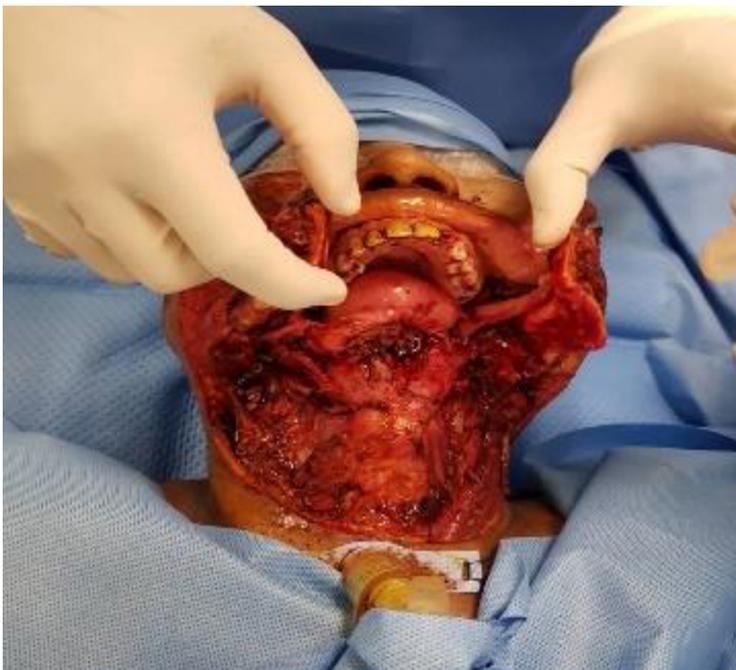


Figure 3. Lip-split, median mandibulotomy performed showing the tongue mass

Case 4

A 58-year-old gentleman, chronic smoker with underlying coronary artery disease, presented with painful non-healing ulcer at the right lateral border of the tongue for three months. It caused loss of appetite, with markedly reduced weight about 8kg in four months. He had history of frequent tongue biting for six months. Otherwise, no blood-stained saliva, no muffled speech, no betel nut chewing, and no alcohol consumed. Examination revealed ulcer-fungating mass at the right lateral border of the tongue, about 3 x 3 cm, blood-stained, not crossing the midline, sparing the base of the tongue and gingivolingual sulcus, and did not involve the floor of the mouth. The tongue movement was normal. He had a palpable 2 cm x 2 cm level II lymph node on the right side.

The CT scan of the neck revealed a homogeneously enhancing soft tissue mass at the right side of floor of mouth, about 2.9 cm x 2.0 cm in size, showing lack of clear plane with the right glossus muscles. It showed features of local infiltration of the adjacent muscles. There was presence of enlarged nodes at the right upper posterior cervical group, 1.8 cm and 1.3 cm in size and a few shotty nodes in the submandibular and submental areas. The pharyngeal muscles, parapharyngeal spaces, soft palate, both tonsillar areas, and nasopharynx were normal. The parotid, submandibular salivary glands, thyroid gland, and larynx were normal.

HPE revealed a well-differentiated keratinizing SCC with perineural invasion. He was diagnosed with tongue carcinoma, stage T3 N1 M0. He underwent a COMMANDO operation, PEG tube insertion, tracheostomy, and free ALT flap. Postoperatively, the flap was viable with good Doppler signal and good tongue movement. He was discharged from ward with tracheostomy tube decannulated on day 8 postoperative. He then underwent concurrent chemo-radiotherapy.

DISCUSSION

Surgical management remains the first line of treatment for oral cavity lesion with postoperative chemo-radiotherapy being used for those at higher risk of recurrence.⁶ It remains a viable salvage option for locally recurrent SCCs of the oropharynx and oral cavity, with 28% cured of disease after salvage surgery. Although minor complications are common after salvage surgery (36%), major complications are uncommon (11%) and can be managed without significant sequelae.⁷

Surgical resection with negative histological margins remains the oncological gold standard for head and neck SCC.⁸ Good visualisation and complete resection of the tumour with wide

margins is essential for malignant lesions in the oropharyngeal region. Transoral robotic surgery (TORS) might be an alternative to existing open approaches (lip-split mandibulotomy) or endoscopic techniques in oral and maxillofacial oncology. However, it cannot be used for patients with trismus (of less than 15 mm), lesions that involved bony structures or presence of carotid encasement. TORS mainly used for benign tumours with well-defined margin and early tumour of head and neck.⁹ As the majority (78%) of salvage cases are of advanced stage, few are amenable to transoral resection; robotic assisted transoral resection.

The mandibulotomy or mandibular 'swing' approach was first described by Roux in 1839.¹⁰ The primary aim of this procedure was to allow sufficient three-dimensional access for tumour resection to achieve adequate margin clearance,¹¹ provide better access for the repair and restoration of the resection defects.¹² However, mandibulotomy is not performed routinely. It depends mainly on clinical and surgeon factors when deciding the need for a mandibulotomy.¹³ The common complications associated with mandibulotomy are wound dehiscence (27.9%), paraesthesia around the inferior alveolar nerve (IAN) distribution areas (25.6%), abscess formation, non-vital teeth and exposed or infected plate and non-union.¹³

Many larger lesions benefit from free flap reconstructions of the defect. After its first description by Song et al. in 1984 and its subsequent popularity in the Asian population, the anterolateral thigh flap has recently been introduced as an alternative to the radial forearm flap in whites.¹⁴ The aim of reconstruction of the oral tongue following resection is to ensure maximum function of the residual tongue tissue. The use of free flaps may improve healing following salvage surgery by introducing well-vascularized, nonirradiated tissue.¹⁵ Free flaps are commonly used for surgical salvage to facilitate healing of through-and-through defects, protect the great vessels from salivary contamination and reconstruct mandibular defects.

Some of the common free flap complications are thrombosis at the site of microvascular anastomosis (7.73%), followed by fistula formation or dehiscence (6.2%), infection (5.7%), haematoma (5.2%), aneurism and flap failure.¹⁶ Several factors affect the flap failure which include longer operative time more than 10 hours, preoperative chemotherapy, infections, advanced cancer stage and use of anticoagulation drugs.¹⁷

Makittie et al. had reported an excellent overall success rate of 97%.¹⁸ Most importantly, they did not witness any donor site complications. The preservation of the innervation to the vastus

lateralis muscle and avoidance of a skin graft for closure whenever possible were recommended to avoid donor site morbidity. Lueg reported that 26% of the patients had minor donor site morbidity such as seromas, infection, wound dehiscence and hematoma.¹⁹ Yu reported 68 successful anterolateral thigh flaps out of a series of 72 patients.²⁰

Overall five-year survival has been reported as between 37% and 85%.²¹ If oral cancer is detected when it is confined to the oral mucosa, five-year survival rate exceeds 80%, decreasing to 40% for those with regional disease and 20% if distant metastasis has occurred.

The overall recurrence rates have been reported between 27% and 40%.²¹ The sites of recurrence include the primary site (9% to 24%) and the neck (9% to 16%).²¹ The prognostic factors significant for local recurrence include T stage, histopathological grade, time interval between surgery and irradiation, age, sex and total dose of radiation. Fein et al.²² reported more complications in patients treated with surgery alone or combined surgery and RT, compared with RT alone. Reported complications after RT alone include soft tissue necrosis, osteoradionecrosis, haemorrhage, treatment interruption of one week secondary to mucositis and late RT complications of fibrosis, fistula, and pain of 25% to 38%.²² Hicks et al. reported that the incidence of distant metastasis after treatment with surgery alone was 4%.²¹ The incidence after RT has been reported between 9.7% and 19%.²¹

In our cases, we performed mandibulotomy, resection of the lesion and anterolateral thigh flap reconstruction of the tongue defect. All cases showed remarkable outcome in which the flap was viable & healthy, with good tongue mobility post-operatively. All patients were discharged from ward two weeks after operation with tracheostomy tube decannulated. To conclude, COMMANDO operation with anterolateral thigh flap reconstruction is relevant in the current era, especially for the late and advanced stages of oropharyngeal carcinoma. The free flap reconstruction is also suitable for big defect reconstruction. Therefore, multidisciplinary teams are required to perform these cases i.e. qualified head and neck surgeon with reconstructive teams.

CONCLUSION

Surgical resection with negative histological margins combined with postoperative chemoradiotherapy remained as the mainstay of treatment of oral and oropharyngeal cancer. Lesions with larger defect benefit from free flap reconstructions to ensure maximum function of the residual tongue tissue with an excellent overall success rate of 97%.

DISCLOSURES

FUNDING

All of the authors are responsible in all funding in this case series report.

CONFLICT OF INTEREST

There is no competing interest regarding the manuscript.

AUTHOR CONTRIBUTION

All of the authors are equally contributed to the study from the conceptual framework, data gathering, until reporting the content of study.

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