|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||

Available online on http://www.ijmbs.info

International Journal of Medical and Biomedical Studies; 2024; 8(6); 01-09

Serial Case Report

Lip Split Mandibulotomy: Advancements and Clinical Applications in Oral and Maxillofacial Surgery

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Received: 04-09-2024 / Revised 17-10-2024 / Accepted 07-11-2024
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DOI: **https://doi.org/10.32553/ijmbs.v8i6.2886**
Conflict of interest: Nil

Abstract:

Introduction: Lip-split mandibulotomy approach (LSMA) is an access technique used in head and neck (H&N) surgery to allow for the surgical excision of tumors that are inaccessible in the posterior oral cavity and oropharynx. Complications of LSMA include, mal- or non-union, infection, wound dehiscence, oro-cutaneous fistula, malocclusion, and plate exposure. This series case report aims to demonstrate LSMA as a surgical method.

Methods: We present three tumor cases in which one sublingual benign tumor case with size 9 cm, and two malignant sublingual tumor cases with size 3 cm and 5 cm strained the surrounding tissue.

Results and Discussion: The patient underwent tumor excision using a Lip Split Mandibulotomy surgical technique, The increased viewing field facilitates easier and more effective tumor removal. Around the work area, there was no critical organ injury or bleeding issues, and in all cases, scars is among the issue that have emerged.

Conclusions: Lip Split Mandibulotomy can be employed as applicable surgical technique to achieve optimal access to surgery, so it allow the surgeon treated the mass effectively, otherwise some complications can occur post operative such as fistule and dehiscence, so optimal wound care should performed in collaboration between surgeon and patient.

Keywords: Lip split, Mandibulotomy, Tumor

Introduction

Historically, the lip-split mandibulotomy (LSM), also known as the mandibular swing method, has been the primary treatment for large oral tongue and floor of the mouth tumors without bone invasion. This procedure combines a mandibular osteotomy with a lower lip incision. This creates a large gap in the oral cavity that permits easy access to the tumor. On the other hand, serious postoperative issues linked to LSM surgical techniques have been documented, such as delayed bone healing and fixation failure.[1] The midline mandibulotomy method has been utilized in various forms for malignancies of the oral cavity and oropharynx since it was originally described by Roux in 1836. The midline technique was altered in the 1980s

and replaced with the lateral and paramedian approaches, which had better theoretical characteristics, in response to research released by Spiro et al. Later research has examined the benefits and drawbacks of each strategy. To provide for appropriate surgical access to the original lesion and to assist en-bloc excision, mandibular splitting is often suggested for tumors of the tonsils, base of the tongue, and retromolar fat pad, without clinical or radiographic evidence of bone invasion.[2]

Sublingual gland tumors are extremely uncommon; they account for about 1.5% of all major salivary gland carcinomas and 0.5–1% of all epithelial salivary gland cancers. The majority of sublingual gland tumors are malignant; the most prevalent kinds are mucoepidermoid carcinoma and adenoid cystic carcinoma.[3] Sublingual gland tumors are uncommon, hence little is known about their histological and clinical characteristics. As a result, sublingual gland tumors continue to be a diagnostic obstacle for all head & neck, oral, and maxillofacial surgeons.[4] The smallest of the main salivary glands are called sublingual glands. Ranula, which is an extravasation of saliva from the sublingual gland as a result of Rivinus duct injuries, is the most frequent disease of the sublingual glands. Neoplasms of the sublingual gland are extremely uncommon, accounting for just 1% of salivary gland tumors that are epithelial. Sadly, the majority of these are malignant; the most prevalent histological form is adenoid cystic carcinoma (ACC), which is followed by mucoepidermoid carcinoma (MEC). Other rare histological types include salivary duct carcinoma, clear cell carcinoma, basal cell carcinoma, mucinous adenocarcinoma, papillary cystadenocarcinoma, NUT carcinoma, acinic cell carcinoma, carcinoma ex pleomorphic adenoma, polymorphous low grade adenocarcinoma, and primary squamous cell carcinoma. Pleomorphic adenomas are typically indicative of benign tumors (PA).[5]

When malignant sublingual gland tumors are resectable, the standard of care is safe surgical resection. Similar to malignant salivary gland tumors, the degree and frequency of local invasion and regional dissemination are mostly determined by the tumor's stage and clinical characteristics. An advanced tumor stage is associated with a bad prognosis, as per the findings of several prior investigations, and patients with malignant sublingual gland tumors who have risk characteristics can benefit from adjuvant radiation therapy in terms of survival. Adenoid cystic carcinoma pathophysiology, neural/perineural invasion, lymph node metastases, lymphatic/vascular invasion, intermediate or high-grade tumors, and close or positive resection margins are the unfavorable characteristics.[6]

In this article, We present three tumor cases in which one sublingual benign tumor case and two malignant sublingual tumor cases strained the surrounding tissue, the patients was treated by surgery with lip split mandibulotomy as surgical approach because the mass was covered by mandibular bone.

Case

Case 1

An 11 years old female patient came with complaints of a lump on her chin. +/- 10 years prior to admission, she complains of a lump the size of a marble under the tongue, did not bleed easily and not pain, but she didn’t seek any treatment. +/- 5 years prior to admission, the lump getting bigger to the size of quail eggs, did not bleed easily, and not pain. Then she went to Private Hospital, was performed chest X-ray examination and scheduled for surgery but cancelled. +/- 4 months prior to admission, she complained the lump was getting bigger, the size of a grapefruit that extended to the chin, the patient went to Public Hospital, was performed mass USG and panoramic X-ray examination then referred to Hasan Sadikin General Hospital OMFS

Dept for further treatment. +/- 2 months prior to admission, she was taken incisional biopsy with results angiolipoma at floor of mouth area, and was scheduled for surgery, there was no history of weight loss. The patient came with vital signs and laboratory within normal unit.

Figure 1: Pre-operative clinical findings

Case 2

A 39 years old female patient came with complaints of a lump at floor of mouth region. +/- 1.5 years prior to admission, the patient complained of a lump with size of a peanut appearing at right floor of mouth region, it was painless and didn't easy to bleed, but the patient did not seek any treatment. +/- 11 months prior to admission, the patient complained that the lump was getting bigger to the size of a marble and felt painful. The patient then went to a private clinic, had an occlusal dental x-ray examination, then was referred to a General Hospital OMFS Dept. +/- 9 months prior to admission, the patient went to General Hospital OMFS Dept, she was performed a sialography x-ray, panoramic x-ray and FNAB examination with the results of a benign salivary gland lesion of the type Basal Cell Adenoma at sublingual dextra region. +/- 8 months prior to admission, the patient had an incisional biopsy (10/05/23) with the result Adenoid Cystic Carcinoma at sublingual dextra region, then a review of the anatomical pathology results was performed (23/05/23) with the result Basal Cell Adenoma at sublingual dextra region dd/ Adenoid cystic carcinoma and IHK examination was recommended, with IHK examination results (18/07/23) Adenoid Cystic Carcinoma. The patient had radiotherapy 35 times and finished on December 13th 2023. The patient felt that the lump was getting smaller to the size of a pea, had a soft consistency, was not easy to bleed and painless. There was history of weight loss +/- 3 kg in the last 7 months.

Figure 2: Pre-operative clinical findings

Case 3

A 55 years old male patient came with a complaint of a lump under the left tongue region. +/- 9 months prior to admission, he complained of a lump under the left tongue the with the size of a corn kernel, chewy consistency, there was no pain, and didn't bleed easily, but he didn't seek any treatment. +/- 6 months prior to admission, the lump was getting hurt, so he went to a private clinic and was given pain killer, then he went to Dental Hospital and had panoramic x-ray examination. +/- 2 months prior to admission, he went to General Hospital OMFS Dept and was performed incisional biopsy under general anesthesia with result Basal Cell Adenocarcinoma at sublingual region, then he was scheduled for surgery. There was history of weight loss (+) 7 kg in 9 months.

Figure 3: Pre-operative clinical findings

Case Management

Case 1

The patient had Wide Excision with LSM approach to maximize the visualization then mandibuloplasty surgery pas performed. The lip and mandible bone were split and the mass was revealed, and removed carefully within the sublingual mucosal was preserved, then the mandible bone was re-united by straight 4 hole plate and screws and noticing the condylar bone to reach proper position and function. Intra operative finding was found a soft tissue mass with 11x9x8 cm in size, white brownish in colour, and had chewy consistency, then the mass was sent to laboratory for anatomical pathology examination

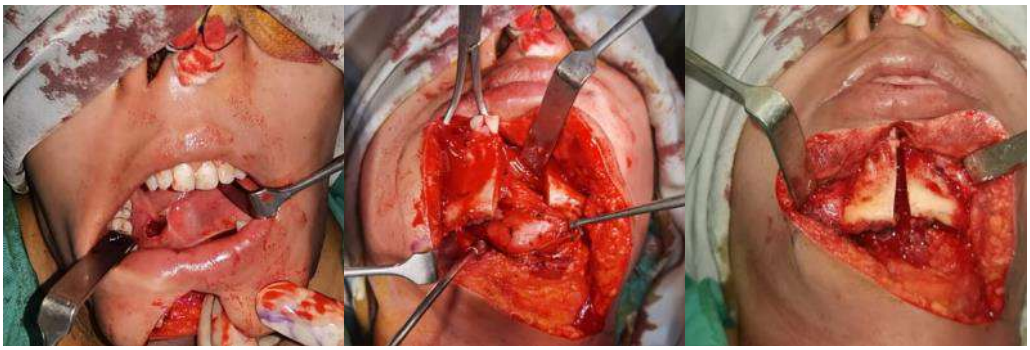
Figure 4. Intra operative findings

After the surgery we evaluated drain production, pressure gauze at chin area for maximize the drain production and minimize the empty space, then the patient was given Ceftriaxone 2x1 gr IV, Metilprednisolone inj 3x125 mg IV, and Kaltopren 2x1 suppository. We keep the wound hygiene and support the wound healing by using chloramphenicol zalf for extra oral wound and hyaluronic acid gel for intra oral wound. The day after the surgery, there was no any complaint from patient, and the intraoral wound was covered by periodontal pack for maximize the wound healing. The suture was removed at seven days post operation then the patient didn't feel any complain such as numbness, dehiscence at suture region and the function of lip and lower jaw were going well

Figure 5. Post operative day one

Case 2

The patient had Wide Excision with LSM approach to maximize the visualization and excisional biopsy of lymph node surgery was performed. The lip and mandible bone were split and the mass was revealed, and removed carefully within the sublingual mucosal was preserved The Mandible bone was re-united by 2 straight 4 hole plates and screws and noticing the condylar bone to reach proper position and function. Intra operative finding was found a soft tissue mass with 3x2.5x11.2 cm in size, white brownish in colour, and had chewy consistency, then the mass was sent to laboratory for anatomical pathology examination



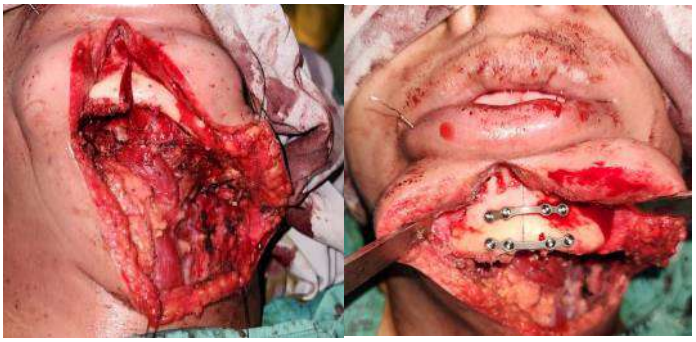


Figure 6. Intra operative findings

After the surgery the patient was given Ceftriaxone 2x1 gr IV, Ketorolac 2x30 mg IV, Omeprazole 2x40 mg IV, Metilprednisolone inj 3x125 mg IV, and Kalnex 3x500 mg IV. We keep the wound hygiene and support the wound healing by using chloramphenicol zalf for extra oral wound and hyaluronic acid gel for intra oral wound. The day after the surgery, there was no any complaint from patient.

Figure 7: Post operative day one

One month after surgery, the patient complaint of a defect at intra oral and extra oral area, the patient told she couldn't clean the wound optimally because of afraid by herself

Figure 8: One month post operative

The patient was given oral hygiene instruction, hyaluronic acid gel for intra oral defect and chloramphenicol gel for extra oral, then the patient was planned for fistulectomy surgery.

Case 3

The patient had wide excision with LSM as surgical approach, and the mandible bone was reconstructed with bridge plate, 5 hole straight plate and screws and noticing the condylar bone to reach proper position and function. Intra operative finding was found soft tissue mass with 5x5x3.5 cm in size, white brownish in colour and chewy consistency. The anatomical pathology conclusion was Basal cell adenocarcinoma at sublingual region.

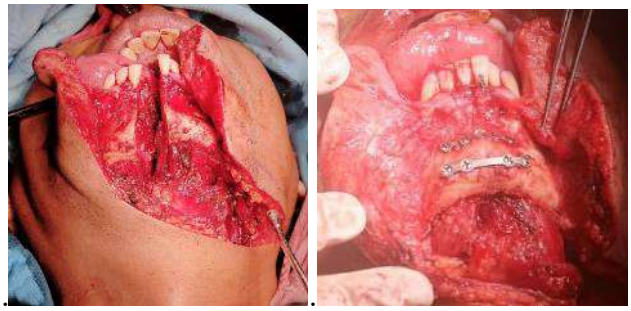


Figure 9: Intra operative findings

After the surgery, we evaluated the bleeding and drain production, the patient was given Ceftriaxone 2x1 gr IV, Ketorolac 2x30 mg IV, Omeprazole 2x40 mg IV. We keep the wound hygiene by hyaluronic acid gel then support the nutrition intake with high protein milk intake. The day after surgery, there was no complaint from the patient.

Figure 10: Post operative day one

Figure 11: Post operative day five

Discussion

Accessing the oropharynx and posterior oral cavity during ablative and reconstructive surgery, lip split mandibulotomy (LSMA) is still regarded as a legitimate, safe, and useful technique[7] Its similar with all of the cases showed above, because the operation went well

with optimum visualization using LSM as surgical approach. Although LSMA does offer sufficient access to the posterior oral and oropharynx areas, the mandible's blood supply may suffer catastrophic consequences if combined with rim mandibulectomy, neck dissection, and postoperative radiation therapy.[7] The literature has detailed a number of surgical techniques for the excision of oropharyngeal and intraoral lesions. This article's goal is to provide an overview of the mandibulotomy process while showcasing the method's adaptability through two clinical case studies. In the first instance, the contents of the submandibular triangle, a portion of the mouth floor, and an adenoid cystic carcinoma of a sublingual gland were removed. The second case involved the removal of a sizable recurrent keratocyst with soft tissue extension from the mandibular ascending ramus's medial side. To the best of the authors' knowledge, no prior reports of the mandibulotomy method have been made for this latter aim. The pathophysiology of the lesion being treated will determine the type and degree of the soft tissue dissection. Once the submandibular area is dissected, the intraoral extension of the incision will allow the genial and mylohyoid muscles to separate, allowing the hemimandible to be reflected laterally. The temporomandibular joint structures are sufficiently pliable during general anesthesia to permit this movement.[8]

Advanced sublingual gland cancers may have spread to nearby tissues including the lingual nerve and submandibular gland. Thus, lingual nerve paralysis might result in individuals with advanced cases presenting with tongue numbness. Swelling of the afflicted submandibular gland may arise from tumor blockage of the submandibular duct, which may lead to an incorrect diagnosis of the underlying illness. Additionally, the cancer is misinterpreted as metastatic nodes. Fortunately, malignant sublingual gland tumors are less likely to cause dysarthria and immobilization of the tongue caused by invasion of the hypoglossal nerve.

The anatomical location and design of a mandibulotomy can be used to categorize the procedure. Anatomically, the posterior or anterior position with regard to the mental foramen distinguishes the lateral and medial mandibulotomies, respectively. The osteotomy in the midline between the central incisors was the original description of the medial mandibulotomy. Later variations included paramedian osteotomies anterior to the mental foramen in the canine area. For mandibulotomy, a number of osteotomy designs with a straight-line cut, a stepped cut, and a notched cut have also been reported. [9]

Osteoradionecrosis, malocclusion, inferior alveolar nerve (IAN) damage, infection, dehiscence, orocutaneous fistula, plate fracture/exposure, mal- or nonunion, and tooth loss (planned or unexpected) are among the complications linked to mandibulotomy. There is a reported 18% to 48% incidence of problems. Radiation therapy administered before to or during surgery raises the risk of a number of problems, including wound infection, inadequate wound healing, orocutaneous fistula, plate infection, non-union, and ORN. It has also been proposed that the location of the mandibulotomy and the osteotomy design may affect the likelihood of certain problems. It is also anticipated that the various problems linked to mandibulotomy may manifest at varying periods[10]. As on cases we reported here, dehiscence was reported on patient who less care about oral hygiene, then fistule was emerged

Complications from mandibulotomies occurred in 16 (23.8%) of the patients: Ten (14.9%) were more than three weeks postoperatively, four (6.0%) were intraoperative, and two (2.9%) were intraoperative. Six (37.5%) of the 16 individuals who experienced problems underwent mandibulotomies in the midline mandibulotomy group (13,7%), a lower rate

statistically significant ($p<0.005$) was seen in the posterior mandible area.[2]

Conclusions

Lip Split Mandibulotomy can be employed as applicable surgical technique to achieve optimal access to surgery, so it allow the surgeon treated the mass effectively, otherwise some complications can occur post operative such as fistule and dehiscence, so optimal wound care should performed in collaboration between surgeon and patient.

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