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CLINICAL REPORT

Reconstruction of Midface Defects after Radical Tumor Resection - a Rare Case Report of Solitary Fibrous Tumour of the Hard Palate

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Abstract

Introduction- Spindle cell neoplasm is a variant of squamous cell carcinoma. One of its subtypes is solitary fibrous tumor. Its occurrence in head and neck is very rare and rarer in hard palate. But if occurs, radical excision is the only choice as it has malignant potential but coverage of such large mid face defects imposes a challenge in front of a Plastic Surgeon as it demands both soft tissue coverage and skeletal support. Report of the case- A 33 year male presented to our department with swelling of left side face involving the anterior palate, maxilla, nose, and upper lip. With the help of the surgical oncology team, wide local excision of the neoplasm along with bilateral infrastructure maxillectomy, total rhinectomy, total upper lip resection and total hard palatectomy was done. This created large defect in the mid face which was covered with free anterolateral thigh flap. Biopsy was done which revealed the swelling as a solitary fibrous tumor of hard palate. All the margins were free of tumour. The flap settled well. Nostrils were secured with nasal stents. After 3 months, an expander was placed in forehead of the patient for future nasal reconstruction. After 3 months, nasal reconstruction was done using expanded forehead flap and costal cartilage. After 21 days flap detachment and insetting was done. White roll creation was also done. One more secondary procedure was done for flap thinning as patient had complain of nasal obstruction. After 6 months vascularised free fibula bone graft was introduced to reconstruct maxilla for future dental rehabilitation. The patient is in regular follow up and he is satisfied with the results. Discussion- Mid face defects involving perioral and nasomaxillar areas are very uncommon and require composite reconstruction. In such cases, microvascular free flap coverage is an irreplaceable option. Multiple stages might have to be done for further refinement. Conclusion- Reconstruction after oncological resection is always very demanding. With proper preoperative planning and skilled execution, the patient can be benefited functionally, aesthetically and psychosocially.

Keywords Midface reconstruction · Solitary fibrous tumor

Introduction

Solitary fibrous tumors of hard palate are encountered in clinical practice very rarely. It is a fibroblastic mesenchymal subtype of spindle cell neoplasm. SFT is classified as an intermediate (rarely metastasizing) tumor according to the World Health Organization Classification of Tumors of Soft tissue and Bone, 5th edition [1]. SFTs are slow growing tumors, commonly identified as incidental radiological finding or due to the mass effects on surrounding tissues [2]. Treatment of choice is radical excision as SFTs have the potential to recur and metastasise [3]. Excision of soft tissues and underlying bone creates large defects. As it demands three dimensional reconstruction, it imposes a challenge in front of a plastic surgeon. Only five cases of Solitary fibrous tumor of hard palate have been reported in

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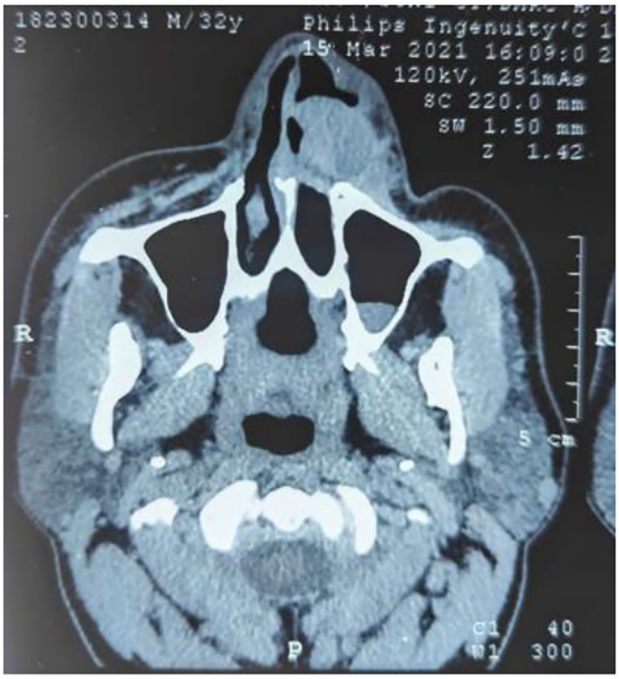

Fig. 1 Pre operative axial section of the mid face showing obstruction of left side of nose

the literature (Pubmed database). It is a case report of solitary fibrous tumor of hard palate for which radical excision of the tumor was done. This resulted in a large mid facial defect which was reconstructed in multiple stages. The target as to isolate the nasal and oral cavity, ensuring a patent airway and giving the patient satisfactory aesthetics.

Case Report

A 33-year-old man presented to the Department of Plastic Surgery at our institute in early 2018 with a painless left anterior hard palatal lesion adjacent to the anterior alveolar margin, which had grown in size since 2017. Wide local excision and primary closure were performed in 2018, and the lesion was diagnosed as a solitary fibrous tumor through histopathology and immunohistochemistry examination.

The patient returned in 2021 with a recurrence of the swelling. The swelling had progressed slowly and started displacing the premaxilla anteriorly, causing significant deformity of the face and left-sided nasal obstruction. An NCCT PNS revealed a soft tissue density mass measuring 5.2 cm x 3 cm x 4 cm in the premaxillary region, causing partial obliteration of the anterior nostril on the left side (Fig. 1). MRI of the face showed a 5.1 cm x 4.3 cm x 4.3 cm lesion in the left nostril and maxilla, resulting in osseous erosion and irregularities in the upper anterior alveolar margins, including bilateral central incisors and the left canines. The radiological findings correlated clinically (Fig. 2a).

After the radiological and anesthesia workup, the patient was taken to the operating room. Tracheostomy was performed. Radical tumor excision was carried out to ensure no risk of recurrence. With the assistance of the surgical oncology team, wide local excision of the neoplasm, along with bilateral infrastructural maxillectomy, total rhinectomy, total upper lip resection, and total hard palatectomy, was performed(Fig. 2b). Tumor-free margins were confirmed by a frozen section study. The specimen was sent for histopathological examination. This created defect started from the radix of the nose, extending from bilateral nasolabial folds to the soft palate posteriorly. For coverage of the defect, an Anterolateral thigh flap was planned. The dimensions of the flap were 14 cm x 8 cm, and the donor site was closed primarily. The airway patency was maintained using a 6 mm-sized endotracheal tube as stents. The recipient vessels used were the left-side facial vessels. The post-operative period was uneventful. On biopsy, the swelling was identified as a solitary fibrous tumor arising from the hard palate. On post-op day 7, the patient was discharged after the removal of the

Fig. 2 Preoperative photograph of patient showing left sided midfacial swelling causing left nostril obstruction and facial deformity. **b)** Intraoperative picture showing midface defect after radical excision of the tumor. **c)** Well settled ALT flap one month post operatively

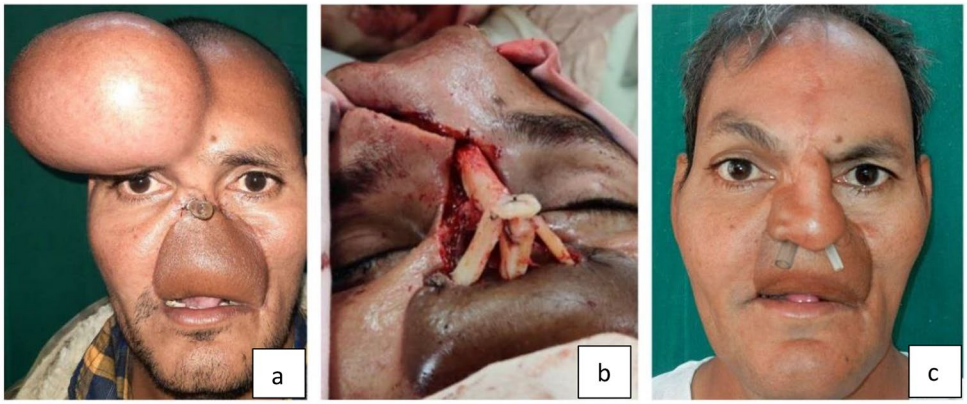

Fig. 3 **(a)** forehead expansion for nasal reconstruction. **(b)** Costal cartilage use for nasal support reconstruction **(c)** 2 month post operative picture of well settled forehead flap. Stent in situ for mild nasal stenosis. White roll can also be appreciated

Fig. 4 Post operative picture after 1 year

tracheostomy. Nasal tubes were in situ.Flap was well settled at one month follow up (Fig. 2c).

After 3 months, nasal reconstruction was planned, and an expander was placed on the right side of the forehead for the same purpose (Fig. 3a). After 4 months, the expander was removed, and an expanded dual forehead flap was used to create the nasal lining and provide coverage. With an ample amount of thin forehead skin, the median forehead skin was used to create the lining, while the paramedian flap was used for coverage. The donor site was still closed primarily. Costal cartilage was sandwiched between the lining and coverage as an alar batten graft, columella strut, and dorsal onlay graft (Fig. 3b). After 21 days, detachment and insetting of the forehead flap were performed, and the white roll was surgically created with the help of vertical mattress sutures on the Anterolateral thigh flap, opposite to the lower lip (Fig. 3c).

After 2 months, the patient underwent thinning of the flap to correct nostril stenosis. At this stage, a Perialar flap had to be used to widen the nostrils. The patient followed up in our outpatient clinic for one year and showed a well-healed flap with an excellent functional and aesthetic outcome (Fig. 4).

6 months later, maxillary reconstruction was done with vascularised free fibula bone graft considering the future need of dental implant placement. 7 cm vascularised free fibula was placed and fixed with mini plates. Anastomosis was done to right side facial vessels. The flap survived well (Fig. 5).

Discussion

Solitary fibrous tumor of hard palate is an uncommon occurrence which has been reported very few times [4–8]. While the studies have emphasised on radiological and histopathological features of this rare tumor, our study demonstrates it from a plastic surgeon's point of view.

The midface is composed of skeletal framework and the surrounding soft tissue structures. Skeletal support is provided by the bilateral polyhedron maxillary subunits and soft tissue structures include nose, cheeks and upper lips. In simple terms, it involves structures from the orbital cavity to the oral cavity. Not only does this part of face have aesthetic importance but it is also associated with many functions like speech, respiration, olfaction and mastication. Any breach in its design can lead to aesthetic or functional troubles.

Small defects of the mid face can be reconstructed with local and regional flaps, but when the defect is large, microvascular flap transfers are needed. The use of local tissue provides a perfect colour and texture match but is not always possible. When rebuilding the midface defect, it is

Fig. 5 Post operative picture after maxillary reconstruction with vascularised free fibula bone graft

of utmost importance to provide it with three dimensional anatomy. Support for orbital structures and separation of the oral cavity from the nasal cavity should be taken care of from functional point of view. Last but not least, aesthetic appearance should not be compromised.

The decision of which tissue to choose for microvascular free tissue transfer is entirely the plastic surgeon's preference. For large defects of the midface where dead space is significant and large skin paddle is required, the anterolateral thigh flap can be a good choice. Out of the many advantages of free anterolateral thigh flap; long pedicle length, availability of large skin paddle, bulk of muscle and two team approach were relevant in our case. Zaretski et al. studied the use of ALT free flap for head and neck reconstruction. He stated that cutaneous or fasciocutaneous ALT provides an almost unlimited area of skin for large defects and the vastus lateralis muscle can be included as necessary for bulk. The muscle component is useful for obliterating the maxillary sinus and providing well-vascularized coverage for bone grafts [9].

A similar study of midface defect reconstruction in single stage has been demonstrated by Kim MJ et al., but as we needed the forehead tissue for both lining and coverage during nasal reconstruction, a multistage procedure was undertaken [10].

In the second stage, the full thickness nasal defect required reconstruction of all the three components; the skin envelope, cartilaginous framework and the nasal lining.

As the case demanded a large skin envelope, the expanded forehead flap seemed to be the best choice. Considering the requirements and to avoid secondary deformity of forehead, the expansion of the forehead was planned. It is an excellent choice for total nasal reconstruction as forehead tissue expansion can provide ample, thin, well-vascularised, and colour-matched flaps for facial reconstruction. The versatile design of the expanded forehead flap can minimize donor site morbidity without a visible unsightly scar [11]. The thin flap provided by this technique reduces the chances of revision surgeries like defattening; and avoids a hairy flap. In our case, we used an expanded dual forehead flap was used to create both the lining and the skin envelope.This is an effective method for the reconstruction of a composite nasal defect when it is difficult to find an appropriate local lining flap [12]. Houbing Zheng also used method of expanded double paramedian forehead flap where ipsilateral forehead flap was used for lining and the contralateral forehead flap, together with the autologous cartilage and titanium mesh framework, were used for skeletal coverage [13].

Costal cartilage graft was used to provide skeletal support of nose. It gave us sufficient amount of cartilage graft to make Ala, septum, dorsum, columella and tip of nose. Hsiao et al. in their study of aesthetic refinements of Asian nose stated that where nasal septal and auricular cartilage are scarce or unreliable, autologous costal cartilage dependably provides an abundance of material [14]. Wei M et al. also used costal cartilage and designed it as a three-dimensional strut to support the nasal tip, columella, ala or dorsum and reinforce the nasal septum. The costal cartilage was satisfying in both quantity and quality, particularly when dealing with a large cartilaginous defect, as elaborated by the author [15].

Nasal obstruction can be a delayed outcome of forehead flap. In our case, the patient complained of breathing difficulties after 2 months of detachment and insetting. Bilateral nasal stenosis occurred at the level of external nasal openings. To expand these openings, bilateral inferiorly based perialar flaps were used. A recent study by Allam KA et al. describes correction of alar stenosis with a para-alar flap [16].

The idea of use of vascularised free fibula bone for maxillary reconstruction has been supported by many authors. Fujioka M et al. in their study of skeletal reconstruction of Maxillofacial defects, described that bony reconstruction, non-vascularized bone grafts tend to be absorbed. Thus, we believe that bony reconstruction should be performed with vascularized bone [17]. It is also advantageous in terms of dental implant survival. Implant survival appears to be

higher for those implants placed into vascularised bone grafts in comparison to non-vascularised bone grafts [18].

Conclusion

A midface defect, whether caused by malignancy or any other etiology, demands proper preoperative planning. The surgeon should be capable of assessing the defect three dimensionally and choose the flap cover for best functional and aesthetic outcomes. Providing the final result in the minimum stages is also equally important.

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Declarations

Competing interests The authors have no relevant financial or non-financial interests to disclose.

Ethics Approval This is an observational study. The Institutional Research Ethics Committee has confirmed that no ethical approval is required.

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