Acta Scientific Otolaryngology

Volume 3 Issue 4 April 2021

Review Article

Use of Weber Ferguson Approach: An Effective Option to Reduce Recurrent Maxillary Fibrous Dysplasia

Emrah Kagan Yasar*, Can Ilker Demir, Ceyhun Uzun and Murat Sahin Alagoz

Department of Plastic, Reconstructive and Aesthetic Surgery, Kocaeli University, Kocaeli, Turkey

***Corresponding Author:** Emrah Kağan Yaşar, Department of Plastic, Reconstructive and Aesthetic Surgery, Kocaeli University, Kocaeli, Turkey.

Received: February 08, 2021

Published: March 19, 2021

Abstract

Fibrous dysplasia (FD) is a progressive but generally benign disease in which normal medullary bone is replaced by abnormal fibro-osseous tissue. The Weber Ferguson (WF) incision can be used for wider resection due to recurrent fibrous dysplasia affecting the right maxillary bone in a patient with a previous history of reduction surgery with an intra-oral approach. The WF incision is an alternative surgical approach option in cases in which an intraoral approach will be inadequate in patients with recurring maxillary FD sufficiently large to affect social life.

Keywords: Fibrous Dysplasia; Infraorbital; Maxilla; Nerve Repair; The Weber-Ferguson Incision

Abbreviations

FD: Fibrous Dysplasia; MCA: McCune-Albright; CT: Computerised Tomography.

Background

Fibrous dysplasia (FD) is a progressive, benign disease in which the normal medullary bone is replaced by abnormal fibro-osseous tissue [1,2]. Abnormal figured deformity, increased volume, and weakening occur in the affected bone [3]. Irregular osteoid formation and abnormal or incompletely developed osseous tissue replace the fibrous tissue [4]. FD can be occur in all bones, although involvement is most common in the femur, tibia, costa, maxilla and mandible.[4] Progression of the disease generally ceases with the completion of bone growth [4].

FD is divided into three groups depending on the clinical characteristics. Monostotic FD is the most common form. Seventy percent of cases involve a single bone, and 20% involve the craniofacial region [5]. Polyostotic FD is a form in which more than one bone is affected. PFD shows clinical findings in earlier ages, and the craniofacial involvement is approximately 50%. McCune-Albright (MCA) syndrome is seen in 3% of cases and it produces earlier symptoms, and polyostotic involvement is accompanied by café-au-lait spots and endocrine disorders [6].

Computerized tomography is the most useful tool for diagnose. Three different types of image have been described. The pagetoid type involves low bone density in expanding bone, and diffuse osseous fragments. A frosted glass appearance is present in the sclerotic type, while sclerotic areas and a low-density appearance are observed in the cystic type. Magnetic resonance imaging (MRI) may be useful in the differentiation of meningioma, osteoma, mucoceles, and soft tissue lesions [7].

Definite diagnosis is made through biopsy, and fibroblasts and collagen bundles form curved linear images resembling Chinese letters instead of osteoblasts around immature bone islands at histopathological examination [8]. Surgery is an effective management option for Fibrous Dysplasia if it has resulted in severe deformity or physiological dysfunction. Total Resection and Reconstruction with a bone graft is the ideal procedure. Mild disfigurement can be managed by simple shaving or other alternatives. Comparison of recurrence rates in total resection and reduction in FD are 66.7% and 24.3%, respectively [9]. Forty percent of FD cases may be evaluated as recurrent and be re-operated over a mean three-year period [10].

The probability of malignancy is approximately 1% [11]. The most common tumor is osteosarcoma, although chondrosarcoma and malignant fibrous histiocytoma can also develop. The risk of malignancy developing in MCA syndrome is higher than in other forms, at approximately 4% [11].

Procedure and Results

A thirty one-year-old woman was evaluated due to swelling in the right molar region causing evident facial asymmetry, expansion in the right upper gingival mucosa, and malocclusion. It is learned that the mass had been diagnosed as FD with biopsy performed due to swelling in the right maxillary region in an other medical center 20 years ago, and the anterior and lateral regions of right maxillary bone had been shaved twice using a closed approach from an upper right gingivobuccal incision. Recurrence had been observed in the first year of follow-up, and the mass had remained stable in size, after some degree of growth, after the age of 21. It is recommended that all contouring procedures must be carried out after the end of the growth phase i.e. after adolescence . Patient must be informed about the risk of recurrence and need for surgical resection in case of growth of lesion. This was not addressed in this particular patient who underwent intraoral shaving during her adolescence.

The patient was re-evaluated. Physical examination revealed mucosal thinning and a minimal open wound due to mass expansion on right maxiller region. Irregularities in the right upper molar and premolar teeth accompanying right maxillary expansion and partial losses impairing occlusion were observed. The patient refused subtotal resection and free flap reconstruction suggestion. Double-approach surgery for more radical resolution of asymmetry with mass reduction was advised. Since the insufficiency of an isolated intraoral approach was estimated, the incisional approach was planned as Weber Ferguson incision.

Following cutaneous and mucosal incisions, the infraorbital nerve was seen displaced due to osseous expansion. The nerve was sacrificed for repair. The right maxillary bone was shaved and reduced using classic osteotomes, ultrasonic bone cutters and a handy micromotor. A piece of 1x1 cm mass has taken from core of the mass for histopathological assessment.

The lower maxillary region was accessed through the gingivobuccal incision with the extraction of all the right upper premolars and molars, and the requisite bone resections and contour adjustments were completed. Other adjustments were made based on the contralateral maxillary volume and contour, and the osseous intervention was then concluded. Prior to incision repair, the infraorbital nerve was repaired with 9-0 nylon suture under microscope. Repairs were completed with intensive subcutaneous and continuous sutures, and the skin sutures were closed with strip bands.

The open mucosal wound which occured 3 days postoperatively was treated with local antiseptics, and secondary healing was achieved. The skin sutures were removed on seven days. Scar treatment with gel applications began on the second week, and continued for three months. The patient was followed-up for two years. CT was performed at annual check-ups, and no recurrence was observed at the postoperative third year. Patient preoperative, perioperative and postoperative views are seen in figure 1.

Satisfactory sensation was observed at recovery of the infraorbital nerve. Two-point discrimination was 8 mm on the repaired side and 5 mm on the healthy side. The patient awarded a score of 8 out of 10 on the superficial sensation test in the repaired infraorbital nerve dermatomal region compared with the healthy side.

Discussion

Diagnosis of FD is largely made with imaging and biopsy following the emergence of clinical findings in late adolescence and early adulthood. Progression of the disease is generally regarded as concluding with the completion of body development [3,12]. The aim in surgical treatment is preventing function loss, reduc-

Figure 1: Preoperative and postoperative coronal (a-b) and axial (c-d) views of CT show the changes about measures of mass. Also there was no findings of recurrence of FD.

ing deformity for best cosmetic outcome, and to minimize potential pathological fractures [13]. The removal of all mass is not essential for an optimal outcome [14].

Although the risk of malignancy is not high, evaluation in terms of recurrence with X-ray or CT at annual follow-up should not be overlooked [1,15]. Postoperatively, FD recurrence and reoperation are common after reduction surgery [9]. Sudden onset volume increases, neurological deficits, and functional losses are warning signs in terms of malignancy.

Reduction operations with a mucosal approach had twice been performed in the present case due to right maxillary FD mass diagnosed 20 years previously, although the disease had remained stable for 10 years after reaching dimensions capable of restricting social life with recurrence. More radical treatment than previously was required due to expansion and occlusion problems causing mucosal thinning. Facial degloving approach was not recommended to the patient because of the mass extended to the zygomatic bone and posterior of the maxillary bone. It was thought that it would be difficult to reach these places with the facial degloving approach. Weber Ferguson incision was preferred in order to achieve maximum reduction and to work with comfort perioperatively. The patient was informed in detail about the scar and scar management after the surgical procedure. Maxillary volume was therefore reduced, using a Weber Ferguson incision, with anterior and lateral interventions around the zygaticomaxillary junction. Despite risks of cicatricial deformity caused by lower eyelid, lateral nasal nerve and upper lip skin, muscle and mucosa incisions, and risks of hypoesthesia and dysesthesia following severing of the infraorbital nerve, careful repair of the nerve and scar management following appropriate repair of epidermal layers can produce satisfactory postoperative results.

In the present case, satisfactory results were achieved with a wider incision for a more radical mass reduction compared to previous closed treatments. Control CT on 30 months postoperatively , it was observed that reduction of the mass was existing compared to CT on the previous year, and no findings of recurrence were determined as seen on figure 2. Adequate nerve healing, and only a nearly imperceptible cutaneous scar remained. According to the postoperative CT scans yearly, it was planned to follow the ossification process of the maxillary mass and to restore the maxillary tooths with prothesis. However, even in the postoperative 3rd year, as it was thought that it would be risky to still have a dental prosthesis procedure because of immature bone sight on CT.

Figure 2: The Weber Ferguson incision and harvesting the composite flap (a) and view of right infraorbital nerve is seen after reduction of maxillary FD (b). Anterior and lateral views are seen preoperatively (c,d) and 30 months postoperatively (e,f). Absolutely acceptable and only a nearly imperceptible cutaneous scar is seen.

Conclusion

Treatment of FD in symptomatic patients is surgical. Cosmetic and functional problems must be predicted by determining whether or not the disease is progressing, and a surgical plan must be prepared with discussion of potential morbidity risks. The Weber Ferguson incision is a nice surgical option in cases which an intraoral approach will be inadequate for patients with recurring maxillary FD sufficiently large to affect social life. Sensation of infraorbital nerve dermatome was satisfactory following microsurgical coaptation. Fear of potential risks of scarring and sensory problems should not prevent the selection of the Weber Ferguson Incision.

Conflict of Interest

There are no conflict of interests between authors.

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