Wide Surgical Excision with Split Rib Graft Reconstruction of Mandible for Ameloblastoma; Our 10 Year Experience

Imran Ahmad · Rampukar Choudhary

Received: 16 September 2012 / Accepted: 14 November 2012 / Published online: 28 November 2012
© Association of Otolaryngologists of India 2012

Abstract Ameloblastoma or adamantinoma is a benign odontogenic tumour arising in facial bones mostly in mandible. There are different modalities of treatment for ameloblastoma viz. chemotherapy, radiation therapy, curettage and liquid nitrogen but surgical resection or enucleation remains the most definitive treatment for this condition. After surgical excision mandibular defect can be reconstructed by non vascularised bone graft or free tissue transfer. we are presenting a detailed study of 50 patients in which mandible was reconstructed with non vascularised split rib graft after surgical resection of ameloblastoma. This is easy, less time consuming and requires no expertise with excellent results.

Keywords Ameloblastoma · Bone graft · Free tissue transfer

Background

The mandibular ameloblastoma is a benign odontogenic tumor that develops from the remaining components of the enamel organ (Epithelial rests of Mallasez), originally described by Falkson in 1879. Later on Mallasez introduced the term “adamantinoma” and “Churchill [1]” finally named it in 1934 as ameloblastoma. Ameloblastoma is responsible for 1 % of all the oral and maxillomandibular cysts and tumors [2]. These tumors are benign in nature, progress slowly; the resulting lesions can cause severe abnormalities of the face and jaw. Additionally, because

abnormal cell growth easily infiltrates and destroys surrounding bony tissues, wide surgical excision is required to treat this disorder. And it has a high percentage of local recurrence rate and possible malignant development when treated inadequately.

There are three different macroscopic subtypes: solid or multicystic, unicystic and peripheral. With the advancement of craniofacial surgical techniques, use of free flaps for mandibular reconstruction; the segmental mandibulectomy and immediate reconstruction with free flaps are beginning to be used more effectively for the treatment of the mandibular ameloblastoma. But centres where microvascular surgery facilities are not available, non vascularised cancellous bone graft remains option of choice either from iliac crest or rib. There is a role of non vascularized bone graft if there is little the adjacent bone fragment. The technique is easy and less time consuming and can be done in places where facility of free tissue transfer does not exists.

Aim

The aim of this article is to evaluate the clinical results of the patients with mandibular ameloblastoma who were treated with segmental mandibulectomy and immediate reconstruction with non vascularised split rib graft.

Materials and Methods

Study was conducted in department of plastic & reconstructive surgery, in J.N.Medical College, A.M.U. Aligarh, India; since February 2002–February 2012. Total 50 patients with ameloblastoma mandible were treated with wide

I. Ahmad · R. Choudhary (✉)
Department of Plastic & Reconstructive Surgery, JNMC, AMU,
Aligarh 202002, India
e-mail: rampukarchoudhary@gmail.com

surgical excision and immediate reconstruction with non vascularised split rib graft. Patients age distribution is provided in Table 1. Females predominated with female to male ratio of 31:19. follow up period ranged from 2 month to 10 years.

All the patients were evaluated pre-operatively; clinically and radiologically. All the cases were subjected to midline lip splitting incision and defect closed with free rib graft from ipsilateral side. In females the incision was placed in inframammary crease. The involved part of the mandible was explored and the lesion was removed enblock and send for histopathological examination which was consistent with ameloblastoma.

A healthy margin of 1 cm was removed on either side and cortex was tunneled on either Side. The created defect was assessed and template was made. Rib along with periosteum was harvested from ipsilateral Chest. The rib was splitted longitudinally. The two halves were overlapped Sharing 1/3 of the Width. Then two halves were fixed together with stainless steel wire no 24. The rib graft was then telescoped in mandible and fixed with screws.

Incision was closed over suction drain of size F.G. 10 in every case and nasogastric tube feeding was started in evening on the day of operation. From post op day 2; respirometry in form of chest physiotherapy was started. Suction drain were removed after 2 days.

Results

Results were assessed in grade as given below: in Table 2.

Grade 1: Excellent, good symmetry in shape and position.

Grade 2: Good, natural look and some charm of normal mandible.

Grade 3: Fair, problems with shape.

Table 1 Age of presentation

Age (years)	No. of patients	Percentage
11–25	17	34
26–40	25	50
41–55	8	16

Table 2 The results

Grade	No. of cases	Percentage
Grade 1	30	60
Grade 2	15	30
Grade 3	04	08
Grade 4	01	02

Table 3 Complications

Type	No. of cases	Percentage
Pleural puncture	04	08
Infection	02	04
Graft loss	01	02

Grade 4: Poor, graft loss.

Pleural puncture, local infection and graft loss were major complication, given in Table 3.

Discussion

Ameloblastoma is the most common epithelial odontogenic tumor. It usually occur in individuals aged 20–40 years. wide surgical excision had been advocated for its management to prevent its recurrence. more than 1 cm of normal margin of mandible and overlying periosteum if cortical perforation had occurred has to be excised [3–11].

Fig. 1 Pre-op photograph showing right sided ameloblastoma mandible of patient 1

Fig. 2 Orthopantomogram (OPG) of same patient 1

Fig. 3 Intra-op photograph of tumor of same patient 1

Fig. 6 Post-op orthopantomogram of same patient 1

Fig. 4 Intra op photograph after split rib graft reconstruction of mandibular defect

Fig. 7 Pre-op photograph of patient 2

Fig. 5 Post-op photograph of same patient 1

Fig. 8 Post-op photograph of patient 2

More conservative treatment modalities such as curettage, cryotherapy, or enucleation have resulted in recurrence rates of 75–90 % [4, 5]. Therefore we removed 1 cm normal margin in all case.

Regarding reconstruction after the excision free tissue transfer is the best option in terms of form, function and

aesthetic appearance by Chana [12] and Disa [13]. But when micro vascular expertise is lacking; non vascularised bone graft is the option of choice.

In all our 50 cases reconstruction was done by non vascularised split rib graft. Despite the large tumors in our patient population, recurrences were not observed in

Fig. 9 Post-op ortopantomograme of patient 2

patients undergoing mandibular resection 90 % patient has good to excellent result in terms of shape, symmetry, function and aesthetic appearance. Complications viz. pleural puncture was identified intra operatively and were repaired and prophylactic ICTD was done in one patient, infection was treated conservatively with antibiotics coverage as per pus culture report. Fig. 1, 2, 3, 4, 5, 6, 7, 8, 9.

Conclusion

There are various techniques for mandibular reconstruction after resection of ameloblastoma even for larger defect rib graft is ideal. The split rib graft technique can be done at centers where micro vascular Surgery is not routine. This is easy, less time consuming and requires no expertise with excellent results in form of shape, symmetry, function and aesthetic appearance.

References

1. Ivey RH, Churchill HR (1930) The need of a standardized surgical and pathological classification of tumors and anomalies of dental origin. *Am Assoc Dent Sch Trans* 7:240–245
2. Jackson IT, Callan PP, Robert A (1996) An anatomic classification of maxillary ameloblastoma as an aid to surgical treatment. *J Craniomaxillofac Surg* 24:230–236
3. Williams TP (1993) Management of ameloblastoma: A changing perspective. *J Oral Maxillofac Surg* 51:1064
4. Gardner DG (1994). Controversies in the nomenclature, diagnosis and treatment of ameloblastoma. In: Worthington P, Evans JR (eds) *Controversies in Oral & Maxillofacial Surgery*. Saunders, Philadelphia, p 301
5. Muller H, Slootweg PJ (1985) The ameloblastoma, the controversial approach to therapy. *J Maxillofac Surg* 13:79
6. Adekeye EO, Lavery KM (1986) Recurrent ameloblastoma of the maxillofacial region. *J Maxillofac Surg* 14:153
7. Demeulemeester LJ, Mommaerts MY, Fossion E et al (1988) Late loco-regional recurrences after radical resection for mandibular ameloblastoma. *Int J Oral Maxillofac Surg* 17:310
8. Olaitan AA, Arole G, Adekeye EO (1998) Recurrent ameloblastoma of the jaws: a follow-up study. *Int J Oral Maxillofac Surg* 27:456
9. Feinberg SE, Steinberg B (1996) Surgical management of ameloblastoma: current status of the literature. *Oral Surg Oral Med Oral Pathol* 81:383
10. Gardner DG, Pecak AMJ (1980) The treatment of ameloblastoma based on pathologic and anatomic principles. *Cancer* 46:2514
11. Olaitan AA, Adeola DS, Adekeye EO (1993) Ameloblastoma: clinical features and management of 315 cases from Kaduna, Nigeria. *J Craniomaxillofac Surg* 21:351–355
12. Chana JS, Chang YM, Wei FC, Shen YF, Chan CP, Lin HN, Tsai CY, Jeng SF (2004) Segmental mandibulectomy and immediate free fibula osteoseptocutaneous flap reconstruction with endosteal implants: an ideal treatment method for mandibular ameloblastoma. *Plast Reconstr Surg* 113(1):80–87
13. Disa JJ, Cordeiro PG (2000) Mandible reconstruction with microvascular surgery. *Semin Surg Oncol*. 19(3):226–234