Benign jaw tumors

J. P. Dabholkar · Krishna Vora · Abhishek Vaidya · Arpit Sharma

Abstract The jaw bones may develop the same types of tumors as the other bones of the body but may also develop tumors arising from the alveolar processes (epulis) and the developing teeth (odontomes). They are usually benign in nature and can affect the functions of mastication, swallowing and cause facial deformity. They make about 3% of all bone tumors with a tendency for a local recurrence if a wide excision is not contemplated at the first attempt. Local destruction caused by the tumor can mimic a malignancy; however with imaging we can get a fair idea about the treatment planning. We present a series of 6 cases of such nature for their variety, diagnostic challenge they posed and different reconstruction methods used for better cosmesis.

Keywords Jaw tumors · Odontomes · Ameloblastoma · Osteoblastoma · Dentigerous cyst

Case reports (Table 1)

Case 1

A 22-year-old male presented with left sided maxillary swelling which gradually increasing in size since 1 year. On examination the swelling was $3 \times 2 \times 2$ cm, hard in consistency extending from left central incisor till 2nd premolar (Fig. 1). External bulge was visible in the maxillary region with tenderness. CT scan showed a lytic, expansile lesion with sclerosis arising from the anterior alveolar ridge of the maxilla projecting into the hard palate

Fig. 1 CT scan of the patient with an ameloblastoma. (Note the honeycomb appearance within the tumor.)

J. P. Dabholkar¹ · K. Vora² · A. Vaidya¹ · A. Sharma¹

¹Department of ENT & Head Neck Surgery,
Seth G.S. Medical College &
King Edward VII Memorial Hospital,
Mumbai, India

²Bhatia Hospital, Mumbai, India

J. P. Dabholkar (✉)

E-mail: kemotohns@rediffmail.com

Table 1 Summary of case reports

Case	1	2	3	4	5	6
Site	Left maxilla	Left maxilla	Left maxilla	Left mandible	Left mandible	Left mandible
Age	22	15	24	25	23	20
Symptoms	Gradually enlarging facial swelling in all cases (along with proptosis in Case 2)					
Investigations	CT scan	Lytic expansile with sclerosis	Expansile lesion	Non-enhancing cystic lesion	Lytic expansile lesion	Lytic expansile lesion
	FNAC	Ameloblastoma	Inconclusive	Hemorrhagic	Ameloblastoma	Ameloblastoma
Treatment	Wide excision	Wide excision	Wide excision	Arch preserving hemimandibulectomy	Hemi-mandibulectomy	Hemi-mandibulectomy
Approach	Sublabial incision	Subciliary incision	Upper neck incision	Upper neck incision	Upper neck incision	Upper neck incision
Reconstruction	-	Titanium mesh	SS plate	SS plate	Free fibula	Free fibula
Final HPR	Ameloblastoma	Osteoblastoma	Dentigerous cyst	Ameloblastoma	Ameloblastoma	Fibrous dysplasia

Fig. 2 Preoperative picture of patient with left maxillary ameloblastoma. (Note the left maxillary fullness.)

and nasal cavity with lateral displacement of the medial antral wall (Fig. 2). The neoplasm was excised using a sublabial incision with curettage of the bony walls. Intraoperative frozen section was suggestive of mesenchymal proliferation and the final histopathology diagnosis was inconclusive. Hence immunohistochemistry using CK+ stain was done. The final histopathological diagnosis was that of an ameloblastoma.

Fig. 3 CT scan of the patient with osteoblastoma. (Note the osteolytic expansile bony lesion with sclerosis.)

Case 2

A 15-year-old girl presented with a slowly progressive swelling below the left eye and proptosis since 2 months. CT scan showed an expansile lesion with osteolytic activity with surrounding sclerosis involving the floor of the left orbit extending posteriorly to the inferior orbital fissure (Fig. 3). The probable diagnosis for the swelling was fibrous dysplasia, giant cell reparative granuloma or osteoblastoma. A subciliary incision with lateral extension was done to excise the tumor. Reconstruction of the inferior orbital wall was done with a titanium mesh to avoid sinking of the eye-

Fig. 4 Intraoperative photograph of patient with maxillary osteoblastoma with titanium plate in situ

Fig. 5 Postoperative photograph of patient with left maxillary osteoblastoma

Fig. 6 CT scan of the patient with dentigerous cyst

ball (Figs. 4 and 5). The final histopathological diagnosis was osteoblastoma of the maxilla.

Case 3

A 24-year-old male patient presented with a left cheek swelling since 8 years gradually increasing in size. CT scan showed a non-enhancing cystic swelling of the body of the mandible with thinning of the inner and outer cortex (Fig. 6). A differential diagnosis of an aneurysmal bone cyst or ameloblastoma was assumed. FNAC showed hemorrhagic fluid. The swelling was fully excised using an upper neck incision and the defect was reconstructed using a stainless steel metal wire. The final histopathological diagnosis was a dentigerous cyst.

Fig. 7 Preoperative picture of a patient with left mandibular ameloblastoma (arrow)

Fig. 8 3-D reconstruction CT scan of patient with left mandibular ameloblastoma

Case 4

A 25-year-old male patient presented with a gradually progressive jaw swelling (Fig. 7). He had no trismus. FNAC was suggestive of an ameloblastoma. CT scan showed expansile bone lesion, suggestive of ameloblastoma (Fig. 8). He refused a free graft reconstruction and hence an arch preserving mandibulectomy using an upper neck incision and reconstruction with a stainless steel metallic plate was done (Fig. 9). The final histopathological report was that of an ameloblastoma.

Case 5

A 23-year-old male patient presented with a gradually progressing left sided lower jaw swelling. Hemimandibulect-

Fig. 9 Picture of mandibular reconstruction using stainless steel plate

Fig. 10 Photograph of patient with right mandibular fibrous dysplasia (arrow)

Fig. 11 Picture of the excised mandible with fibrous dysplasia

tomy and reconstruction with a free fibula graft fibula graft was done. The final histopathological report was that of an ameloblastoma.

Case 6

A 20-year-old male patient presented with a right sided lower jaw swelling (Fig. 10). Hemimandibulectomy using an upper neck incision and reconstruction with a free fibula graft was done (Fig. 11). The final histopathological report was that of a fibrous dysplasia.

Discussion

Benign jaw tumors may be divided into three broad groups (Fig. 12) [2].

Jaw tumors are relatively rare tumors, the most common of them is the ameloblastoma followed by odontomas [4, 5]. They may occur in either jaw, commonly in relation to the molars and premolars. In dentigerous cysts, the permanent tooth in association with the cyst is missing. The age incidence varies from tumor to tumor. The dentigerous cysts are more common in children and young adults whereas ameloblastomas and osteoblastomas are more common in the middle aged people. In our series, most of our patients were young adults and in contrast to the usual norm our patient with osteoblastoma is a 15-year-old female.

The etiology of most jaw tumors is unknown. The dentigerous cysts arise due to separation of the enamel epithelium from the surface of the crown of an unerupted tooth and the accumulation of fluid in the interval.

Jaw tumors usually present with swelling of the face, palate, or alveolar process [6]. Rapid growth can lead to pain due to stretching of the periosteum and tenderness over the affected bone. Pathological fractures may occur

Fig. 12 Classification of benign jaw tumors

if large amount of bone is destroyed. The chief complaint in all our patients was that of a gradually enlarging facial swelling.

Radiographs will show well-defined radiolucent swellings [6]. In dentigerous cysts, X-rays will show that the crown of the missing tooth is not in its usual erupting position, instead it lies in a rounded, unilocular cavity and the surrounding bone is sclerotic. In our case of the dentigerous cyst, the CT scan did not show the missing tooth (Fig. 6) and FNAC showed only hemorrhagic fluid, hence a provisional diagnosis of an aneurysmal bone cyst or ameloblastoma was assumed. It was only after the final biopsy report that the diagnosis of dentigerous cyst was established. Ameloblastomas will show multilocular cysts with a honeycomb appearance [1]. They may be unilocular when small and they often resorb the teeth they contact (Fig. 1). Osteoblastomas have central radio-opaque areas suggesting new bone formation (Fig. 3). FNAC helps but it cannot always provide a definite diagnosis. Biopsy will confirm the diagnosis. Immunohistochemistry is of great value in cases of doubt. In two of our cases, a final diagnosis was only reached upon after immunohistochemistry using the CK+ stain.

They are benign tumors but can be locally invasive. Very rarely a malignant change may occur [5]. Hence the treatment of jaw tumors includes wide resection with a surrounding cuff of normal tissue. Larger lesions may require bone grafting and internal fixation [3]. All our cases underwent a wide excision and were reconstructed with stainless steel metal plate, titanium mesh or a free fibula graft. Postoperatively the cosmetic deformity in all our cases was corrected satisfactorily with preservation of function.

The overall recurrence rate is approximately 20%; therefore, close follow-up monitoring of patients is required. In our follow-up ranging from 6 months to 5 years we have not yet had any recurrence.

Conclusion

Above studies highlights the variety posed by the benign jaw tumors, necessitating a detailed work up of all patients. Imaging and radiological characteristics are quite pathognomic but can be misleading at times. FNAC may help but cannot always establish diagnosis. Final histopathology will clinch the diagnosis; however immunochemistry may be required in some cases. Hence, the decisions of wide excision of the tumor so as to avoid a recurrence and reconstruction of the defect for better postoperative cosmesis and function poses a real challenge to the treating surgeon.

Acknowledgment We are thankful to Dr. Sanjay Oak, Director (Medical Education & Major Hospitals), Seth G.S. Medical College and King Edward VII Memorial Hospital, Mumbai for his permission to use the hospital medical records for preparing the manuscript.

References

1. Mackenzie IJ. The Mouth. Scott-Brown's Otolaryngology, Fifth Edition. 57–59
2. Nan AK. Tumors of the Jaw. Undergraduate Surgery. 273–279
3. Steward GR. The teeth and gums, jaws, nose, ear. Bailey & Love's Short Practice of Surgery. Twenty-First Edition. 649–668
4. Olgac V, Koseoglu BG, Aksakalli N (2006) Odontogenic tumors in Istanbul: 527 cases. Br J Oral Maxillofac Surg 44(5): 386–388
5. Ladeinde AL, Ajayi OF, Ogunlewe MO, Adeyemo WL, Arotiba GT, Bamgbose BO, Akinwande JA (2005) Odontogenic tumors: a review of 319 cases in a Nigerian teaching hospital. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 99(2):191–195
6. Stypułkowska J (1998) Odontogenic tumors and neoplastic-like changes of the jaw bone. Clinical study and evaluation of treatment results. Folia Med Cracov 39(1–2):35–141