Aggressive Fibromatosis of the Mandible in a Two-Month Old Infant

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Abstract Aggressive fibromatosis is a benign spindle cell tumor with locally infiltrative behavior and tendency to recur. It has overlapping features with other spindle cell lesions and hence it is pertinent to be distinguished from them as they have different treatment modalities. We report a rare case involving the mandible of a two-month old infant with histopathological, immunohistochemical and imaging features.

Keywords Aggressive fibromatosis · Desmoids · Desmoplastic fibroma

Introduction

The word, “fibromatosis” is a generic term used to describe a group of benign fibroblastic lesions with similar microscopic features but with diverse biological behavior [1]. It is classified as superficial and deep fibromatosis. Desmoid tumor is a descriptive term used in the literature to describe deep fibromatosis that can be further classified based on location into abdominal, extra-abdominal and intraabdominal desmoids. Since extra abdominal fibromatosis often show aggressive behavior, it is usually described as an aggressive fibromatosis (AF) [1]. We report a case of AF of

the mandible in a two-month old female infant with histopathological, immunohistochemical and imaging features.

Case Report

A two-month old female infant presented with a swelling over the right cheek region. According to the mother, the swelling was noticed right from the birth and showed only mild increase in size over the past few weeks. She also added that the baby cried occasionally while suckling milk. On examination, the child was well nourished and moderately built. A diffuse swelling was present in the right lower jaw measuring, 5×3 cm, extending superiorly from the angle of the mouth to the lower border of the mandible. The skin over the swelling appeared to be slightly inflamed and firm in consistency (Fig. 1a). There was no significant finding noted on intraoral examination. The computed tomography (CT) revealed an isointense, poorly circumscribed, lytic lesion in the body and ramus of the mandible with destruction of the buccal and lingual cortex and an intact pathological fracture extending to the lower border of the mandible (Fig. 1b–d).

Under the impression of a benign tumor, a submandibular incision was made on the right side and the lesion was exposed which appeared unencapsulated, whitish in colour and fibrous in nature. The lesion along with the developing tooth bud was excised in toto. Care was taken during the entire surgical procedure to preserve the periosteum. The bony margins were carefully filed, and no active intervention was attempted to treat the pathological fracture. The lesion was submitted for histopathological examination.

On microscopic examination, a uniform but densely cellular proliferation of spindle cells arranged in fascicular and storiform patterns were evident. Cells with clear or

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Fig. 1 **a** Clinical appearance of the tumor involving the mandibular region. **b** Coronal CT (bone window setting) showing an isodense mass involving the *right mandible*. **c** Axial CT scan (bone window setting) with perforation of the buccal and lingual cortex of the mandible. **d** 3-D reconstructed CT image of the mandible showing extensive erosion

vacuolated cytoplasm formed nodules amidst spindle cell proliferation. The stromal background was generally fibrous with few areas showing densely collagenous stroma. In certain fields, one or two mitotic figures per high power field ($10 \times 40\times$) were noted, but prominent nuclear pleomorphism or cytological atypia was not evident. (Fig. 2).

A panel of commercially available immunohistochemical markers was employed for the purpose of microscopic differential (Table 1). Immunohistochemical analysis revealed intense positive staining for vimentin and α -smooth muscle actin (SMA) in both the spindle and vacuolated cells, but muscle specific actin (MSA) and desmin was less intense (Fig. 3a–d). CD 68 and S100 were focally positive (Fig. 3e, f). Cytoplasmic and nuclear reaction with beta-catenin was observed in the tumor cells (Fig. 3g), but CD34, MyoD1, caldesmon and factor XIIIa were negative. The proliferation index (Ki-67) was found to be less than 3 % (Fig. 3h). The clinical, histopathological and immunohistochemical findings are consistent with aggressive fibromatosis.

Follow-up CT scan after 7 months revealed formation of the lingual cortex of the mandible and periosteal new bone formation (Fig. 4c, d) compared to the initial lesional appearance (Fig. 4a, b).

Discussion

AF presents as a hard mass or swelling that usually is not associated with pain [2]. It may also present with airway obstruction, trismus, dysphagia or proptosis depending on the site [3]. According to a recent review of AF [2], the reported mean age was nine years (range eight months–63 years), with 62 % of cases occurs between 5 and 15 years and 21 % under five years of age in the head and neck region. The literature also shows a tendency towards male predilection [2]. The incidence of aggressive fibromatosis has been shown to be between two and four cases per million per annum [4].

Radiographically, AF presents as an ill-defined, osteolytic, destructive lesion or shows only periosteal spicule formation [2]. Microscopically, AF shows intersecting broad sweeping bands of spindle cells in a collagenous stroma [3]. The spindle cells may be of both fibroblastic and myofibroblastic types [1]. These cell types are also features of other spindle cell lesions, and therefore, differentiation from these tumors are important.

Benign fibrous histiocytoma is more common in middle-aged and older adults. It is characterized by plump spindle cells arranged in fascicular and storiform growth patterns, with foam cells and multinucleated giant cells forming rest

Fig. 2 **a** Proliferation of spindle cells arranged in fascicles and nodules of clear to vacuolated cells surrounded by dense collagenous stroma (H & E, $\times 100$). **b, c** Higher magnification of the respective focus as shown in (**a**) (H & E, $\times 240$)

Table 1 Immunohistochemical markers

Marker	Dilution	Clone	Company
SMA	Ready to use	1/A4	BIOGENEX
VIMENTIN	1/200	V9	BIOGENEX
MSA	Ready to use	MHF35	BIOGENEX
DESMIN	1/100	D33	DAKO
CD 68	Ready to use	PG-M1	DAKO
S100	1/800	–	DAKO
Beta-CATENIN	1/50	NCL-B-CAT	LEICA
Ki-67	1/100	MIB-1	DAKO
CD 34	1/100	QBEnd10	DAKO
MYF4	Ready to use	L026	BIOGENEX
h-CALDESMON	1/400	h-CD	DAKO
Anti-human factor XIIIa	Ready to use	E 980.1	BIOGENEX

of the cellular component [5]. Like the present case, positive staining for CD 68 and myogenic markers are expected, as foam cells are either derived from monocyte-macrophage lineage (CD 68 immunophenotype) or smooth muscle cell origin (S100-vimentin-SMA immunophenotype) [6]. However, the expression of myogenic markers are usually less intense in reaction [7], but typically show positive reaction with factor XIIIa.

Infantile myofibromatosis represents a heterogeneous group of lesions originating from myofibroblasts which could be solitary (myofibroma) or multiple [8]. They have predilection for head and neck region including the jaw bones [8, 9]. Although immunohistochemical analysis revealed a myofibroblastic differentiation in our case (Fig. 3a, c), the classic biphasic pattern of cellular arrangement (dark staining round cells around hemangiopericytoma-like blood vessels and light staining plump myoid spindle cells) [1] was not a feature of the present case.

Infantile fibrosarcoma is a locally destructive lesion with a tendency towards recurrence and metastasis [10]. As in the present case (Fig. 2b), microscopic distinction of infantile fibrosarcoma from AF is quite difficult [10], and in such situations, nuclear beta-catenin expression has been used as a reliable marker to distinguish them (Fig. 3g) [11].

Although our case showed reaction with desmin, SMA and MSA, the possibility of tumors with myogenic differentiation is unlikely due to the negative reaction with MyoD1 [12] and caldesmon [13]. Similarly, unlike the present case (Fig. 3g), low-grade fibrosarcoma, leiomyosarcoma, myofibroma and nodular fasciitis are known to express beta-catenin [11], but their expression is only cytoplasmic in nature [11]. Desmoplastic fibroma is said to be the intrabony counterpart of desmoid tumors, but lack nuclear beta-catenin expression [14].

Fig. 3 **a, b** Intense reaction with vimentin and SMA ($\times 400$). **c, d** Less intense reaction with MSA and desmin ($\times 400$). **e, f** Focal reactivity with CD68 & S100 ($\times 400$). **g** Cytoplasmic and nuclear reaction to beta catenin ($\times 400$). **h** Occasional reaction with Ki67 ($\times 400$)

The imaging findings of the present case indicate an aggressive lesion, but the histomorphology is generally bland. However, the reported recurrence rate for AF is approximately 40 % [1], and for those involving head and neck may have a higher recurrence rate [2]. Hence, wide surgical excision, with or without adjuvant chemotherapy or anti-estrogen therapy is the treatment of choice [2]. Though a negative surgical margin may be difficult to obtain in cases of fibromatosis, the tumors do not progress significantly and even regress spontaneously. Use of adjuvant chemotherapy should be considered when the tumor is adjacent to vital structures resulting in incomplete excision.

But when total excision of tumor can be made, use of chemotherapy should be considered only after weighing the morbidity caused by chemotherapy [3]. As our patient is a pediatric patient, the use of chemotherapy may result in significant morbidity. The initial surgical excision was deemed adequate and the need for adjuvant therapy did not arise as the patient is disease-free at the last follow-up.

In conclusion, we report a case of AF in a two-month old infant. Although immunohistochemistry may be useful to separate it from other competing diagnoses, careful assessment of morphological and clinical features and age of the patient is necessary to make a cautious diagnosis.

Fig. 4 **a** Axial CT scan (bone window setting) with perforation of the buccal and lingual cortex of the mandible. **b** 3-D reconstructed CT image of the mandible showing extensive erosion. **c** Axial CT scan (bone window setting) taken after 7 months showing formation of

lingual cortex and periosteal bone. **d** Post operative 3-D reconstructed CT image of the mandible showing bone remodeling and healed fracture line

Conflict of interest The authors declare no conflict of interest.

References

- Weiss SW, Goldblum JR (2008) Enzinger and Weiss's soft tissue tumors, 5th edn. Mosby Elsevier, St. Louis
- Seper L, Bürger H, Vormoor J, Joos U, Kleinheinz J (2005) Aggressive fibromatosis involving the mandible—case report and review of the literature. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 99:30–38
- Sharma A, Ngan B, Sandor GK, Campisi P, Forte V (2008) Pediatric aggressive fibromatosis of the head and neck: a 20 year retrospective review. *J Pediatr Surg* 43:1596–1604
- Wcislo G, Szarlej-Wcislo K, Szczylik C (2007) Control of aggressive fibromatosis by treatment with imatinib mesylate. A case report and review of the literature. *J Cancer Res Clin Oncol* 133:533–538
- Fletcher CDM (2007) Soft tissue tumors. In: Fletcher CDM (ed) *Diagnostic histopathology of tumors*, 3rd edn. Churchill Livingstone Elsevier, London, pp 1527–1592
- Vukovic I, Arsenijevic N, Lackovic V, Todorovic V (2006) The origin and differentiation potential of smooth muscle cells in coronary atherosclerosis. *Exp Clin Cardiol* 11:123–128
- Reid MB, Gray C, Fear JD, Bird CC (1986) Immunohistological demonstration of factors XIIIa and XIIIb in reactive and neoplastic fibroblastic and fibro-histiocytic lesions. *Histopathology* 10:1171–1178
- Lingen MW, Mostofi RS, Solt DB (1995) Myofibromas of the oral cavity. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 80:297–302
- Montgomery E, Speight PM, Fisher C (2000) Myofibromas presenting in the oral cavity: a series of 9 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 89:343–348
- Stout AP (1962) Fibrosarcoma in infants and children. *Cancer* 15:1028–1040
- Bhattacharya B, Dilworth HP, Iacobuzio-Donahue C, Ricci F, Weber K, Furlong MA, Fisher C, Montgomery E (2005) Nuclear β -catenin expression distinguishes deep fibromatosis from other benign and malignant fibroblastic and myofibroblastic lesions. *Am J Surg Pathol* 29:653–659
- Andrade CR, Takahama Junior A, Nishimoto IN, Kowalski LP, Lopes MA (2010) Rhabdomyosarcoma of the head and neck: a clinicopathological and immunohistochemical analysis of 29 cases. *Braz Dent J* 21:68–73
- Ceballos KM, Nielsen GP, Selig MK, O'Connell JX (2000) Is anti-h-caldesmon useful for distinguishing smooth muscle and myofibroblastic tumors? an immunohistochemical study. *Am J Clin Pathol* 114:746–753
- Hauben EI, Jundt G, Cleton-Jansen AM, Yavas A, Kroon HM, van Marck E, Hogendoorn PC (2005) Desmoplastic fibroma of bone: an immunohistochemical study including beta-catenin expression and mutational analysis for beta-catenin. *Hum Pathol* 36:1025–1030