Solitary Primary Intraosseous Angiosarcoma of the Mandible

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Abstract

Angiosarcoma is a malignant vascular tumor derived from the mesenchymal cells which have undergone an angioblastic differentiation. About half of the angiosarcomas are reported to localize in the skin and soft tissues of the head and neck, i.e., found predominantly to arise from the scalp and face. Angiosarcomas rarely involve the skeletal system, wherein they generally have a tendency for multicentricity. Primary bony angiosarcoma accounts for about 6% of all the angiosarcomas and about 1.4% of all the primary bony sarcomas. A majority of angiosarcomas are reported to occur in the elderly males; its occurrence in the pediatric population is extraordinarily rare. We report a rare case of a solitary primary intraosseous mandibular angiosarcoma in a 7-year-old male child. The unique clinical presentation, the histopathological features along with the management challenges of this fascinating yet aggressive tumor is discussed.

Keywords Angiosarcoma · Bone tumors · Mandibular tumors · Prognosis

Introduction

Angiosarcoma is a rare malignant neoplasm of the vascular endothelium, about 50% of which are known to occur in the skin and soft tissues of the head or neck region [1]. The other described nomenclatures for this tumor include angioblastoma, hemangiosarcoma, malignant hemangioendothelioma, and intravascular endothelioma. Primary bony angiosarcoma accounts for about 6% of all the angiosarcomas and about 1.4% of all the primary bony sarcomas. Intraosseous localization of angiosarcoma in the mandible is exceedingly rare; there have been only a few isolated case reports in the literature [2–4]. We report a unique case of a solitary primary intraosseous mandibular angiosarcoma in a 7-year-old male child.

Case History

A 7-year-old male child presented to our center for further evaluation of an expansible swelling of the right lower jaw.

The swelling had rapidly increased over a period of 2 months following an extraction of a mobile first lower second molar tooth. His past, medical and family histories were unremarkable. Clinical examination revealed a mildly tender expanded right hemimandible with a fleshy growth protruding through the socket of the right first molar which was associated with a tendency to bleed on minimal trauma. There were no significant cervical lymph nodes. Examinations of the other systems were within normal limits. His hematological, coagulation, and biochemical parameters were also within normal limits. A CT scan of the mandible revealed a $4.4 \times 3 \times 2.4$ cm expansile lytic lesion, extending from the right second premolar to the second molar of the right hemimandible. (Figure 1a, b) A CT scan of the chest was normal. A per-oral biopsy from the lesion under general anesthesia resulted in severe bleeding and had to be controlled by packing. The histopathology report of the biopsy was suggestive of a spindle cell sarcoma probably an angiosarcoma. The patient was subsequently taken for a definitive radical surgery, which entailed right posterior segmental mandibulectomy. A primary closure of the resultant defect was achieved with a plan for a definitive reconstruction at a later date. (Fig. 2a–d) The final histopathology revealed a fleshy tumor in the intraosseous portion of the right hemimandible with blood-filled spaces of varying sizes and anastomosing vascular channels lined by cuboidal epithelial cells. Extravasated red blood cells were seen along with focal areas of spindled cells with

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Fig. 1 **a, b** CT scan of the mandible revealed a $4.4 \times 3 \times 2.4$ cm expansile lytic lesion involving the right hemimandible

moderate cytoplasm and elongated nuclei. The surrounding soft tissues showed tumor infiltration; however, the resected margins were free. The tumor cells revealed immuno-positivity to the endothelial markers CD31 and CD34. 20% of the tumor cells showed nuclear positivity to Ki-67. The final histopathology along with immunohistochemistry correlation was suggestive of angiosarcoma. (Fig. 3a–d) The option of adjuvant radiotherapy was discussed with the caretakers in view of the soft tissue infiltration; however, they opted against the same. The patient is presently disease-free and is on follow up for the past 4 years following his definitive surgery.

Discussion

Angiosarcoma is a malignant, vascular tumor derived from the mesenchymal cells which have undergone angioblastic differentiation. The aetio-pathogenesis of angiosarcoma is poorly understood. An association with prior irradiation, trauma, foreign body, immune deficiency, and a long-standing lymphedema has been described.

These tumors are reported to occur more commonly in adults, especially between the second and the seventh decades of life. It can potentially affect any portion of the skeleton—about 33% in the long bones of the extremities, 33% the axial

Fig. 2 **a** Clinical photograph of the patient at presentation. **b** Intraoperative photograph showing the tumor involving the right hemimandible with adjacent soft tissue extension. **c** Specimen photograph following tumor removal. **d** Postoperative clinical photograph

Fig. 3 **a** H&E $\times 40$, with blood-filled spaces of varying sizes and anastomosing vascular channels lined by cuboidal epithelial cells. Extravasated red blood cells were seen along with focal areas of spindled cells with moderate cytoplasm and elongated nuclei. **b** IHC $\times 40$, 20% of the tumor cells showing nuclear positivity to Ki-67. **c** IHC $\times 40$, tumor cells showing immunopositivity to CD31. **d** IHC $\times 10$, tumor cells showing immunopositivity to CD34

skeleton, and the remaining in the small bones of the hands and feet [5].

There are no specific signs and symptoms for patients with angiosarcoma of the bone, although swelling and pain have been commonly described. Pathological fractures have been reported in about 10% of the cases. Spontaneous bleeding has also been reported, although it was seen following a biopsy in our patient. The radiological appearance of angiosarcoma is non-specific; these tumors are typically osteolytic with bone expansion or peripheral sclerosis. Mirra et al. [6] classified angiosarcoma of the bone into four distinct variants based on the imaging pattern, i.e., solitary, multifocal non-contiguous, multifocal contiguous, and the solitary variant with a multicentric pattern. The latter two have been named angiotropic angiosarcomas in view of their propensity to spread within normal vascular structures along their endothelial surfaces. These tumors have a lower degree of biological malignancy than the solitary and the multifocal non-contiguous variants. Our patient had the solitary variant of angiosarcoma.

The histological diagnosis of angiosarcoma is made by the characteristic vascular channel formation and is aided by the immunohistochemical demonstration of the endothelial markers including CD31 and CD34 among others [7, 8]. Immunohistochemistry also aids in distinguishing primary bony angiosarcoma from a variety of similar lesions including intravascular endothelial hyperplasia, hemangioendothelioma, hemangiopericytoma, lymphangiosarcoma, epithelioid sarcoma, Kaposi's sarcoma, perivascular epithelioid tumor, spindle cell carcinoma, and malignant melanoma. Occasionally, these tumors can mimic periodontal disease and are at times misdiagnosed

as reactive conditions such as pyogenic granulomas. This distinction is important because of the significant differences in the biology, management, and prognosis of each of the above conditions [8].

Surgery in the form of wide excision aimed at achieving negative margins is the treatment of choice for angiosarcomas [9]. Lymph node dissection is not indicated, except when clinically involved. The addition of adjuvant radiotherapy for positive/close margins or worrisome high risk pathological features has shown to provide better outcomes in patients with angiosarcomas [10]. The effectiveness of adjuvant chemotherapy however remains unclear.

Angiosarcomas are considered to be aggressive neoplasms with a poor prognosis because of its potential to metastasize and recurring locally. The 5-year survivals for patients with angiosarcomas range from 12 to 31%. The unfavorable prognostic factors include a higher tumor size, a higher grade, and a poorer differentiation.

In conclusion an accurate clinico-pathological correlation is essential in order to avoid a misdiagnosis of angiosarcoma, especially when it presents as a solitary lesion in the intraosseous portion of the bone and more so in the pediatric age group.

Compliance with Ethical Standards

Conflict of Interest None to declare.

Ethical Issues All procedures performed in this case report were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Appropriate informed consents have been obtained.

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