Primary Leiomyosarcoma of the Mandibular Alveolar Mucosa of a 12-Year-Old Child from Ethiopia: A Case Report

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Cranio-maxillofac Trauma Reconstruction 2017;10:56–59.

Abstract

Keywords

- ▶ leiomyosarcoma
- ▶ mesenchymal tumors
- ▶ spindle cells
- ▶ immunohistochemistry

Leiomyosarcomas (LMSs) are rare malignant mesenchymal tumors which show smooth-muscle differentiation. Most LMSs involving the oral tissues primarily affect the maxillary sinus, the maxillary or mandibular bone. We present a case of LMS of the mandibular alveolar mucosa, arising in a 12-year-old male child from Ethiopia. A malignant spindle cell-like neoplasm was diagnosed on clinical and radiographic findings as well as on incisional biopsy. The tumor was resected with wide margins. The following histopathologic examination with additional immunohistochemical studies secured the diagnosis LMS. Microscopically, the spindle-shaped tumor cells were arranged in an interlacing fascicular pattern and contained oval to elongated, blunt-ended (cigar-shaped) nuclei. The immunohistochemical examination showed immunoreactive tumor cells for vimentin, actin, desmin, and H-caldesmon, which is pathognomonic for LMS. Immunohistochemical studies are mandatory to differentiate the LMS from other similar spindle cell neoplastic lesions. Radical resection with safety margins and a lifelong periodic follow-up has to be recommended.

Leiomyosarcoma (LMS) is a very rare mesenchymal tumor that exhibits smooth-muscle differentiation.¹ Soft-tissue sarcomas account for approximately 0.7% of all malignant neoplasms, and LMSs have been reported to account for 3 to 7% of soft-tissue sarcomas.^{2,3} LMS is a neoplasm that rarely affects the oral cavity because of the scarcity of smooth-muscle fibers in this region. This type of fiber is generally present in blood vessels, circumvallate papillae of the tongue, and certain primitive mesenchymal tissue.^{4–7}

Primary lesions are usually found in the soft tissues or in a visceral location, including the gastrointestinal, urinary, and

female genital tracts.⁸ Only 3 to 10% of LMSs arise in the head and neck area—the nose and paranasal sinuses, the skin and subcutaneous tissue, and the cervical esophagus are the most commonly affected sites.⁹ The occurrence of LMS in an intraoral location is very rare. However, when it occurs intraorally, it occurs most frequently in the maxilla, followed by the mandible, tongue, cheek, soft palate, upper lip, and mouth floor.^{10,11} In general, these lesions are well defined and symptomatic, firmly adhering to the adjacent tissues.^{4,6,7,11–13}

LMSs occurring in regions with scanty or absent smooth-muscle structures, such as the jawbones and oral tissues,

received

August 9, 2015

accepted after revision

December 6, 2015

published online

April 27, 2016

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Tel: +1(212) 584-4662.

DOI <http://dx.doi.org/10.1055/s-0036-1582459>.
ISSN 1943-3875.

possibly arise from the tunica media of blood vessels,¹⁴ circumvallate papillae,¹⁵ myoepithelial cells,¹⁶ or from pluripotent, undifferentiated, mesenchymal cells.^{17–20}

LMSs usually show distinctive morphologic and architectural features: they are composed of spindle-shaped cells with elongated nuclei and eosinophilic cytoplasm, sometimes showing longitudinal fibrils.²¹ The tumor cells are arranged in an interlacing fascicular pattern and contain oval to elongated, blunt-ended nuclei (cigar-shaped). The nuclei may show hyperchromatism and varying degrees of atypia and pleomorphism.^{11,22} More rarely, these tumors consist of rounded epithelioid cells with eosinophilic or clear cytoplasm (epithelioid LMS).²¹ The presence of frequent and atypical mitotic figures and necrotic foci indicates aggressive behavior. The prognosis of LMS is usually poor, due to high recurrence and metastatic rates.^{23,24}

This article reports on a case of primary mandibular alveolar mucosa LMS and its morphologic and immunophenotypic features.

Case Report

We present a 12-year-old male child presented with progressively growing soft-tissue mass of 3 months duration in the right lower jaw from mandibular alveolar mucosa between tooth 46 and tooth 47 (Federation Dentaire Internationale (FDI) tooth numbering system) (► Fig. 1). Clinical examination disclosed a reddish lump of soft-tissue consistency with a maximum diameter of 4.5 cm in the right mandibular vestibule. The tumor was pedunculated at the base, covering the

Fig. 1 Vestibular and lingual swelling in the right mandibular molar region. The tumor was slightly tender to palpation and pedunculated at the base, reddish in color, and measured 4.5 cm in maximum diameter covering the occlusal surface of tooth 47, tooth 46, and partially tooth 45. The neoplasm showed occlusal impressions of the opponent teeth.

Fig. 2 The panoramic X-ray is demonstrating an osteolytic inter-radicular alveolar bone lesion between the teeth 47 and 46 with slight periodontal space widening of the distal root of tooth 46.

complete occlusal surface of teeth 47 and 46 and partially 45. The neoplasm shows occlusal impressions of the opponent teeth. It was slightly tender on palpation and score II mobility of tooth 46 according to Miller index.²⁵ The extraoral examination revealed 1-week duration of right submandibular lymphadenopathy which was slightly tender to palpation. The medical and surgical history of the child was unremarkable. He and his parents denied any previous lesion or local trauma. The panoramic X-ray showed an inter-radicular osteolytic lesion between tooth 47 and tooth 46 with slight periodontal space widening of the distal root of tooth 46 (► Fig. 2).

Based on these features, an incisional biopsy was performed. The primary microscopic examination revealed an impression of an inflammatory myofibroblastic tumor lesion in which tumor cells in form of proliferating spindle cells were imbedded in a predominantly variable amount of acute and chronic inflammatory cells along with a rich vascular network. Intersecting bundles of spindle cells were irregularly infiltrating the oral mucosa without involving the adjacent alveolar bone. Unfortunately, at that time, it was not possible to do immunohistochemistry studies (IHC) due to low resources of reagents. On the basis of the radiological, clinical, and histological findings, a glandular neoplasm, a non-neoplastic proliferative process, or a malignant tumor was considered as differential diagnosis.

The child was advised to take amoxicillin with clavulanic acid first. However, there was no improvement of the right submandibular lymphadenopathy as reaction of the antibiotic treatment. Based on the available evidence from radiographic, clinical, and histologic finding, a malignant tumor was considered.

After informed consent of the parents of the child, level I selective neck dissection was performed, followed by radical intraoral tumor resection with a safety margin of approximately 1 cm in combination with extraction of tooth 46. The microscopic examination of the tumor showed spindle-shaped tumor cells which were arranged in an interlacing fascicular pattern and contained oval to elongated, blunt-ended (cigar-shaped) nuclei. The nuclei were characterized by

hyperchromatism and varying degrees of atypia and pleomorphism. Cross striation was not evident. Mitotic figures, both typical and atypical, were frequently detected (12–20/10 high power field (HPF)). Necrotic foci were scattered throughout the tumor (►Fig. 3a). The immunohistochemical study showed that tumor cells were strongly immunoreactive for vimentin, actin (smooth muscle or muscle specific), desmin, and h-caldesmon (►Fig. 3b). Based on these IHC studies, the final diagnosis was a primary LMS of the mandible alveolar mucosa. Fortunately, no lymph node metastases were identified in the neck dissection specimen. Based on the final definitive IHC diagnosis, the patient underwent staging using chest X-ray, abdominal ultrasound, and CT scan of brain and organ functions test showed no distant metastases. The patient has been kept under periodic follow-up since the date of surgery. No recurrence had been reported by the time of presenting this article. The patient and his parents are satisfied with his quality of life and remained disease free from the time of his last follow-up, 27 months after surgery (►Fig. 4).

Discussion

The case reported here differs in its clinical presentation from the other documented cases of intraoral LMSs due to the younger age at presentation (12-year-old male child) and of the indolent clinical course. LMS is an extremely uncommon

Fig. 3 Histopathologic and immunohistochemistry studies of the leiomyosarcoma. (a) Short, “cigar-like” nuclei with small cytoplasmic clearing adjacent to the nucleus. There are atypical mitotic figures. (Hematoxylin and eosin, $\times 250$). (b) Desmin reactivity in the remarkably pleomorphic tumor cells helps confirm the smooth-muscle differentiation (ABC anti-alpha smooth-muscle actin, $\times 250$).

Fig. 4 Postoperative intraoral view without any signs of local recurrence after the 27th month follow-up.

tumor in children.²⁶ In children, soft-tissue sarcomas are classified as rhabdomyosarcoma or non-rhabdomyosarcoma (NRMS).²⁷ Among the NRMSs of childhood, the most common are synovial sarcomas (20–25%), malignant fibrous histiocytomas (10–20%), and malignant peripheral nerve sheath tumors (10–20%).²⁷

Histopathologically, LMS is a neoplasm characterized by sheets of sweeping, alternating bundles and fascicles of densely packed spindle cells with abundant fibrillar eosinophilic cytoplasm and indistinct cytoplasmic borders, aligned in palisade pattern.²⁸ This malignancy is distinguished from other spindle cell sarcomas with the help of Masson trichrome staining, ICH analysis, and ultrastructural examination.^{27,28} Our patient was positive for vimentin, desmin, and smooth-muscle actin, thus confirming our diagnosis.

The prognosis of intraoral LMS is uncertain. Many reported intraoral LMSs recurred or metastasized repeatedly. Local recurrence occurs in 20.6% of patients and distant metastases (pulmonary or hepatic) develop in 20%. The variable outcome of LMSs may be related to different therapeutic approaches: excision, enucleation, and curettage or radical surgery have been advocated as treatment options.^{29–31} However, from our point of view, radical surgical removal with a wide surgical safety margin of at least 1 cm has to be recommended.

Radiotherapy can be used as adjunctive treatment, postoperatively,³² even if some authors reported that it does not influence recurrence-free or overall survival rates for intraoral LMSs.^{14,29,31,32} Chemotherapy seems ineffective and should be reserved for the palliation of patients with metastatic disease or inoperable tumors.^{29,31,32} In view of the indolent course of some of these neoplasms and of possible late recurrences or metastases, prolonged or life-long follow-up has been suggested.¹⁷ The patient should be closely followed up at least during the first 5 years, when LMSs are more likely to recur or metastasize.^{17,32}

Conclusion

Primary LMS in the pediatric age group is extremely rare. Owing to its innocuous clinical presentation, the possibility of occurrence of this tumor should be considered in differential diagnosis of any oral cavity growth in children. Appropriate clinical and histopathological evaluation supplemented with

ICH is a must. Early and accurate diagnosis followed by radical treatment is of utmost importance for improving the prognosis of these tumors.

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