Case Report:
Hemangiopericytoma of the Oral Cavity after a Ten-year Follow-up

Emiliano Maresi,1 Silvia Tortorici,2 Maria Campione,1 Maria L. Buzzanca,2 Francesco Burruano,2 Filiberto Mastrangelo,3 and Stefano Tetè3
Departments of 1Pathology and 2Oral and Maxillofacial Surgery, Policlinico P. Giaccone, University of Palermo, Palermo, Italy; 3Department of Oral Sciences, University of Chieti, Chieti, Italy

Abstract. Hemangiopericytoma (HPC) is a mesenchymal tumour that may be benign, malignant, or occur in an intermediate form. We report an unusual case of hemangiopericytoma located in the buccal mucosal region. The histopathologic features showed increased cellularity, necrosis, hemorrhage, low proliferation index, and 4 or less mitotic figures per 10 high-power fields. Since this histological pattern suggests an intermediate form characterized by unpredictable clinical behavior, life-long follow-up is essential. In this patient no recurrences or distant metastases were evident at 10-yr follow-up.

Keywords: hemangiopericytoma, tumor of oral cavity

Introduction
Hemangiopericytoma (HPC) is a soft tissue tumor arising from the pericytes of Zimmermann, which are modified smooth-muscle cells surrounding capillary vessels. These pericytes are located outside the reticulin sheath of the endothelium. Since the vascular pattern expressed by such tumors is common to other tumors, the diagnosis of HPC is based on the following morphologic criteria: on immunohistochemical analysis, the tumor cells are negative for α-smooth muscle actin, desmin, S-100 protein, and cytokeratin, are intensely positive for vimentin, and are focally positive for CD34.

Described in 1942 by Stout [1], HPC occurs most commonly in the soft tissues of the upper and lower extremities, and the retroperitoneum. Location in the head-neck region is uncommon (16%) with lesions reported arising in the orbit, nasal sinus tract, parotid gland, tongue, lip, maxilla, mandible, floor of mouth, hard palate, buccal mucosa, retromolar gingiva, parapharyngeal spaces, and larynx [2-15]. In a metaanalysis by Brockbank [16], from 1949-1979 only 35 cases were reported in the oral cavity, including: tongue (9 cases), upper jawbone (5 cases), lips (4 cases), buccal region (3 cases), cheeks (3 cases); gingiva (3 cases), parotid gland (1 case), and multifocal lesions (1 case)

HPC can occur in any age group and there is no sex predilection. The biological behavior of HPC is unpredictable. Malignant forms are characterized by necrosis, cellular pleomorphism, high proliferation index, and mitoses >4 per 10 high-power fields. The absence of necrosis, cellular pleomorphism, and mitoses <4 per 10 high-power fields does not necessarily indicate benignity; in fact, tumors with benign histologic appearance have been reported to metastasize [17-22].

Case Report
A 20-yr-old Caucasian female presented with a 3-mo history of a hazelnut-sized swelling in the mouth. The mass had a wide base implant, a tense-elastic consistency, was mobile in relation to deep
and superficial tissues, and was located at the upper vestibule in the incisor area. The oral mucosa that covered the mass was strained and moderately telangiectatic on palpation; pulsation was not evident. Surgical excision of the lesion was performed after ligation of the vascular peduncle.

On macroscopic examination the lesion was an ovoid mass (diameter about 4 cm) circumscribed by a thin, transparent fibrous capsule; sectioning revealed a variegated cut-surface with red, yellow, and grey areas (Fig. 1). Microscopically the neoplasm was characterized by abundant and compact cellular proliferation having a fusiform and monomorphic-like appearance; no cytological atypias were evident; on the other hand, a rich net of capillary vessels having a staghorn-like shape was found, with lumina surrounded by endothelial cells (Fig. 2). The tumor cells had a pale cytoplasm with indistinct cell borders and ovoid or round nuclei; some tumor cells were extended and fusiform (Fig. 3).

The mass was entirely circumscribed by a fibrous capsule that did not appear to be infiltrated by tumor cells. Although cellularity was mainly high and compact, focal areas were observed in which the cells were distorted due to hemorrhagic and necrotic phenomena or due to deposition of mixoid material and collagen fibres (Fig. 4). Mitotic figures were $<$4 per 10 high-power fields. Immunohistochemically the tumor cells showed diffuse positivity for CD34 (Fig. 5) and vimentin, but were negative for smooth muscle actin, desmin, cytokeratins, CD 31, S100 protein, and EMA.

High cellularity, low proliferation index, hemorrhagic necrosis, and $<$4 mitoses per 10 high-power fields all suggested an uncertain but not very aggressive biological behavior, as reported in the literature [15,17]. The patient needed to be followed closely for an extended period. Upon follow-up examination at 10 yr post-resection there was no evidence of tumor recurrence or metastasis, confirmed by negativity of the head-facial computed tomographic (CT) scan, bone scintigraphy, and chest X-ray.

**Discussion**

HPC is a rare mesenchymal tumor that occurs as a localized mass; its diameter can range from 1 to 20 cm; it has slow growth and is usually asymptomatic. Based on the medical history and clinical findings of some patients, various etiological factors have been suggested (eg, hypertension, hormonal or metabolic imbalance [2,18-23], and trauma [1]) but the etiology of HPC is unknown.

The differential diagnosis between hemangiopericytoma and other tumor types characterized by a ramified and pericytoma-like vascular proliferation (Table 1) requires immunohistochemical stains to exclude epithelial, muscle, and neural neoplasms. Vimentin is the only marker that is consistently expressed in HPC; with the exception of CD34, which may stain the tumor cells, vascular markers (factor VIII, CD31) stain only the endothelial cells of the blood vessels. An immunohistochemical profile can be useful in cases of Schwannoma, neurofibroma, peripheral nerve sheath tumor, angioleiomyoma, and solitary myofibroma, where the morphological differences are not clear. The tumor that most closely resembles HPC is the solitary fibrous tumor, whose cells also stain for vimentin and CD34; histologically some differences exist: (a) HPC shows homogeneously higher cellularity and staghorn-like vessels throughout the lesion, (b) SFT shows varying cellularity and often thick and keloid-like hyalinization, and (c) numerous mast cells are found in SFT and not in HPC [17,31-36].

The clinical behavior of HPC varies from case to case. According to the histological findings these tumors are classified as low-grade, intermediate-grade, or high-grade based on mitoses, cellularity, and cellular pleomorphism. HPC cases with high-grade malignancy have been reported with lymph node involvement and bone, pulmonary, and hepatic metastases, at a frequency that ranges from 12 to 56%; metastases usually occur within 5 yr after initial diagnosis and are rare after 10 yr [24]. Recurrence has been reported in 20 to 57% of HPC cases approximately 17 mo after the initial treatment [2,25-30]. The prognosis of HPC is unpredictable; the histologic features are poorly correlated with the clinical behavior of the tumor.
Fig. 1. Ovoid tumor mass of about 4 cm diameter, circumscribed by a thin, transparent fibrous capsule. The cut-surface has variegated color with red, yellow, and grey areas.

Fig. 2. Microscopy shows networks of capillary vessels with a staghorn-like shape, whose lumen is lined by flat endothelial cells, surrounded by proliferation of fusiform monomorphic cell without atypia (H&E, original magnification x150).

Fig. 3. The tumor cells present a pale cytoplasm with indistinct cell borders and ovoid or round nuclei (H&E, original magnification x200).

Fig. 4. Deposits of collagen fibers among the tumor cells (H&E, original magnification x200).

Fig. 5. Immunohistochemical staining of tumor cells shows diffuse and high positivity for CD34 antigen (original magnification x200).

although Enzinger and Smith [2] suggested as malignant indices: tumor diameter >6.5 cm, mitotic figures >4 per 10 high-power fields, increased cellularity, cellular pleomorphism, necrosis and/or hemorrhage.

Surgical excision of the HPC lesion represents a treatment of choice, with preceding ligation of the vascular bundle that nourishes the neoplastic tissue, achieving reduction of the size of the neoplasm as well as its removal [25,37-42]. The efficacy of radiation therapy is controversial because HPC is considered to be radioresistant; however, radiation therapy can be useful in the treatment of aggressive HPC and incomplete resections. Chemotherapy and immunotherapy have been
considered for control of malignant HPC and metastatic disease [43-45]. Use of the CO2 laser technique can achieve both excision and cautery, and may thereby decrease the likelihood of local relapse and metastasis [46].

In the patient that we are reporting, the absence of relapse or metastasis at 10 yr after surgical removal, confirmed by negativity of the head-facial CT scan, bone scintigram, and chest X-ray, indicate the non-aggressive behavior of this HPC tumor. According to the literature, malignancy of the HPC tumors is primarily supported by a number of mitoses >4 per 10 high-power fields, and by a proliferation index ≥10%. Presence of hemorrhagic necrosis, hypercellularity, and low proliferation index are typical of borderline forms of HPC [47].

References


