Color-Doppler US features of a pyogenic granuloma of the upper dorsum tongue

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Abstract The diagnosis of oral lesions is based on clinical history, clinical examination and imaging exams. Different imaging modalities are available for the diagnosis and follow-up of these lesions such as computed tomography, magnetic resonance imaging, color-Doppler ultrasound, angiography and positron emission tomography. To date, color-Doppler ultrasound is considered the first-line imaging approach since it provides a non-invasive, cost-effective, real-time evaluation of oral anomalies. It provides both morphological and vascular information which are useful to determine the best therapeutic options. Differential diagnosis of a bleeding lobular mass of the tongue is, however, not always easy and includes several vascular and non-vascular lesions. We present herein a case of pyogenic granuloma of the tongue that at Color-Doppler US appeared as hypervascular lesion.

Keywords Pyogenic granuloma · Oral cavity tumor · Color-Doppler-US · US · Diagnosis

Sommario La diagnosi delle lesioni orali si basa sulla storia clinica, l'esame obiettivo e gli esami radiologici. Sono disponibili diverse modalità di esame radiologico per la diagnosi e il follow-up di tali lesioni, come la TC, la Risonanza Magnetica, l'eco-color-Doppler, l'angiografia e la PET. Al momento, l'eco-color-Doppler risulta l'analisi di

scelta in quanto consente una valutazione delle anomalie orali immediata, non invasiva, con ottimo rapporto costo/beneficio. Fornisce infatti informazioni morfologiche e vascolari utili per determinare le migliori opzioni terapeutiche. Tuttavia la diagnosi differenziale di una massa lobulare sanguinante della lingua non sempre risulta semplice e include numerose lesioni vascolari e non vascolari. In questo articolo presentiamo il caso di un granuloma piogenico della lingua che all'analisi con eco-color-Doppler è stato identificato come lesione ipervascolarizzata.

Introduction

Soft tissue lesions of the oral cavity often present a diagnostic challenge since several pathologic processes can be encountered such as variation of normal anatomic structures, inflammation, cysts, developmental anomalies, and neoplasm. Within these lesions there is a group of reactive hyperplasias, which develop in response to a chronic, recurring tissue injury that stimulates an exuberant or excessive tissue repair response. Pyogenic granuloma is of the most common entities responsible for causing soft tissue enlargements. Pyogenic granuloma (PG) is a benign non-neoplastic mucocutaneous lesion, with the term “pyogenic” being used erroneously since this condition does not produce purulent secretion and is not related to infection [1]. In fact, granuloma pyogenic development is usually associated with an exuberant response to chronic irritative local factors of low intensity, or trauma, with hormonal factors impacting and, therefore, very often found among pregnant women. It is more prevalent among women in their second to fourth decades of life, and it may involve the skin, lips, cheek mucosa and palate; only rarely

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Fig. 1 At CDUS an hypoechoic, well marginated (a), with diffuse vascularization was depicted (b)

it may involve the tongue [2]. We present here the color-Doppler ultrasound (CD-US) features of a case of histologically proven pyogenic granuloma of the tongue diagnosed in a 62-year-old male patient.

Case description

A Caucasian male, 62-year-old, reporting tongue bleedings due to the presence of an exophytic mass on the dorsum of the tongue, increased in volume in the last 2 months presented to our observation. The patient had a history of arterial hypertension in treatment with ramipril 5 mg per day, gastroesophageal reflux, hypercholesterolemia and prostatic hypertrophy.

At oral examination, on the right margin of the tongue a soft rounded lesion of about 1.5×2 cm size was visible; the outer part was covered by a yellowish-white mucosa while the inner one was reddish. These features led to a clinical suspicion of a vascular malformation.

For this reason, the patients underwent an ECD performed with high-frequency linear probe that showed a

polilobed hypoechoic lesion (Fig. 1a), of size $13 \text{ mm} \times 7 \text{ mm}$, with polilobulated edges, and highly significant arterial and venous vascularization with a peripheral calcification (Fig. 1b). These data suggested a hypervascular lesion. Since the lesion had significantly increased in size in 2 months the patient was submitted a biopsy.

Therefore, an excisional biopsy was performed by a KTP laser 532 nm (DEKA, Florence, Italy) at 3 W in CW with a fiber of 320 μm .

Since the vascular nature of the lesion and its size, the residual wound was sutured. After 3 weeks, the wound was completely healed and no great postoperative complications were reported. The immune-histological examination of the excised tissue classified the lesion as a pyogenic granuloma.

Discussion

Pyogenic granuloma or granuloma pyogenicum is a well-known oral lesion. The name pyogenic granuloma is a misnomer since the condition is not associated with pus and does not represent a granuloma histologically [3].

It is also known as “hemangiomatous granuloma” because of the histopathologic picture (hemangioma like) and the inflammatory nature (granuloma) of oral pyogenic granuloma. Cawson et al. [4] suggested that since the blood vessels are so numerous in oral pyogenic granuloma, an alternative term for pyogenic granuloma is granuloma telangiectacticum [5]. Other authors, because of its characteristic histopathologic appearance, consisting of abundant capillaries growing in sparsely cellular, edematous, collagenous stroma, which may contain inflammatory cells, prefer the name lobular capillary hemangioma [6].

Clinically, the lesions typically present as red or bluish papules or polyps that bleed easily. A homogenous reddish area surrounded by a white collarette is found in the majority of cases. They may arise at any age in both sexes and most commonly occur in the head and neck (especially in mucous membranes) and limbs. They preferentially affect the lips, gingiva, mucosa, nose, fingers and face. However, there have been very few reports of these tumors affecting the tongue [7]. Regarding the low occurrence of PG in extralingival sites, it is pertinent to emphasize the importance of the correct diagnosis of these lesions, distinguishing them from other entities which have similar characteristics, so as to obtain a proper treatment approach.

In fact, the appearance of benign oral soft tissue masses may, however, occasionally resemble malignant tumors [8]. Several imaging modalities are available for the assessment of oral vascular lesions such as computed tomography (CT), magnetic resonance imaging (MRI), angiography and ultrasonography (US) [9].

The CT and MRI are standard imaging modalities in oral and maxillofacial surgical field. The extent of the lesions may be determined by all the imaging modalities such as CT, MRI and US, but the velocity of blood flow may be better determined by contrast-enhanced MRI and CDUS. At US usually pyogenic granuloma appears as ill-defined, oval, subcutaneous hypoechoic nodules, whereas color-Doppler sonography may show marked internal vascularity in both the central and peripheral tumor regions due to the presence of feeders vessels as in our case or with scanty vascularity in the peripheral region as in our case [10, 11]. Clinically, the differential diagnoses include vascular tumors like peripheral giant cell granuloma, peripheral ossifying fibroma, fibroma, peripheral odontogenic fibroma, hemangioma, conventional granulation tissue, hyperplastic gingival inflammation, Kaposi’s sarcoma, bacillary angiomatosis, angiosarcoma, and non-Hodgkin’s lymphoma, hemangioendothelioma, angiosarcoma as well as bacillary angiomatosis, but also other skin neoplasms, e.g. amelanotic melanoma, squamous cell carcinoma, basal cell carcinoma and cutaneous metastasis have to be considered [12]. The most important features favoring the diagnosis of pyogenic granuloma are its rapid enlargement

(in the range of a few weeks), its tendency to bleed easily, and the color-Doppler features but as in our case the location was atypical the final diagnosis was achieved only by biopsy. Therefore, when the clinical or CDUS presentation is atypical or when it occurs in rare location such as tongue as in our case, transoral biopsy is necessary to obtain correct diagnosis.

In conclusion, the US users should be aware of the features of pyogenic granuloma since when correctly and rapidly diagnosed it may be adequately treated preventing its recurrence.

Conflict of interest Vito Cantisani, Alessandro Del Vecchio, Eloisa Fioravanti, Umberto Romeo, Ferrdinando D’Ambrosio declare that they have no conflict of interest.

Informed consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). All patients provided written informed consent to enrolment in the study and to the inclusion in this article of information that could potentially lead to their identification.

Human and animal studies The study was conducted in accordance with all institutional and national guidelines for the care and use of laboratory animals.

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