J. Oral Diag. 2021;06:e20210002.

CASE REPORT

Desmoplastic fibroma: Case report

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Abstract:

Introduction: Desmoplastic fibroma (DF), an intraosseous tumor of myofibroblastic origin, has been characterized as an uncommon neoplasm. Though representing less than 1% of all bone tumors, it presents a locally aggressive character. **Objective:** The objective of this article is to report a case of DF, focusing on its clinical, radiographic, and histopathological characteristics, and to discuss the morphological criteria for differential diagnosis while comparing with other benign intraosseous tumors. **Case report:** The present case concerns a female patient, 31 years old, a leucoderma who sought clinical care with the principal complaint being swelling in the mouth. In the extra-oral examination, no asymmetry was observed, but in the tomographic examination, the presence of a mixed-aspect intraosseous lesion with areas of hypo-density and of hyper-density, being multilocular, with evidence of vestibular cortex bone expansion was observed. An excisional biopsy was performed and in view of the histological and immunohistochemical data, a final diagnosis of DF was reached. **Conclusion:** Because DF is a rare neoplasm presenting histopathological characteristics superimposed on other entities (whether benign and malignant), thorough clinical, radiographic, histopathological, and immunohistochemical examinations are necessary for a correct diagnosis. Due to its aggressiveness and potential for relapse, the correct choice of treatment and of long-term follow-up is extremely important.

Keywords: Fibroma; desmoplastic, Myofibroblasts, Immunohistochemistry, Mouth neoplasms.

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Article received on December 3, 2020.
Article accepted on January 18, 2021.

DOI: 10.5935/2525-5711.20210002

INTRODUCTION

Desmoplastic fibroma (DF) is a myofibroblastic intraosseous tumor characterized as uncommon and representing less than 1% of all bone tumors, yet it also presents a locally aggressive character[1,5]. Clinically, it presents as a growing and painless swelling that can occasionally cause trismus or even pathological fracture[4,6]. Other characteristics that may be present are tooth displacements, root resorption, divergences, and asymmetries[3,6]. However, these characteristics are not exclusive to DF, and can be confused, whether clinically and radiographically, with other lesions[3].

Its histological characteristics are similar to soft tissue desmoid tumors (DT), making it difficult to differentiate a DF from a fibromatosis. Histologically, DF and fibromatosis exhibit a stroma rich in collagen fibers and small, uniform, elongated fibroblasts[1,4]. Due to the difficulty of reaching a final diagnosis, immunohistochemical markers such as S-100, α-SMA (alpha muscle actin), vimentin, HHF-35 (specific muscle actin), Ki-67, and β-catenin are often used for differentiation[1-4,6].

Being considered aggressive, complete surgical excision of the lesion is performed and clinical follow-up is essential with immediate intervention in cases of recurrence[3,4].

Thus the objective of this article is to report a case of DF, focusing on clinical, radiographic, and histopathological characteristics, and to discuss the morphological criteria for differential diagnosis from other (benign) intraosseous tumors.

CASE REPORT

A female patient, 31 years old, leucoderma, sought medical attention with a principal complaint of swelling in the mouth. On extra-oral examination, no asymmetry was observed. Intra-oral examination proceeded, and an increase in volume was observed in the mandibular alveolar ridge, measuring one centimeter in diameter, presenting a hardened consistency, and appearing to be an intraosseous lesion (Fig. 1). Cone beam computed tomography and rescheduling of the patient for better evaluation was requested. In the next consultation, the tomographic examination revealed the presence of a mixed-looking intraosseous lesion, with hypo- and hyper-dense areas, being multilocular, and causing bone expansion of the vestibular cortex (Fig. 2). An excisional biopsy of the lesion was performed to send a larger amount of material for histopathological examination

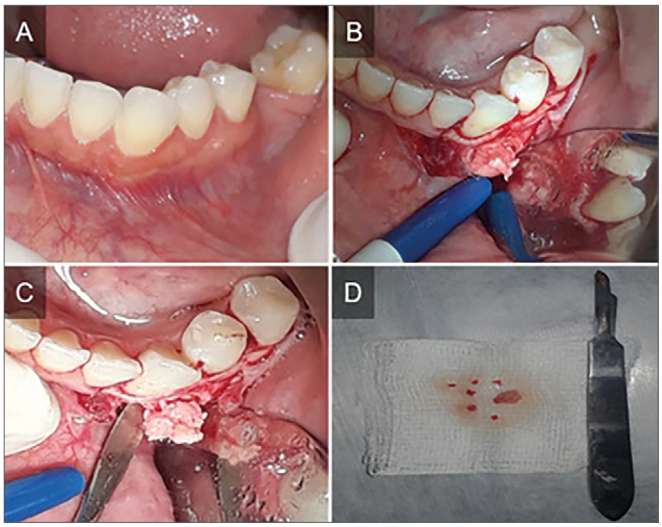

Figure 1. Clinical aspects of the leson. (A) Intra-oral aspect of the lesion. (B) Access revealing fragment of the lesional capsule. (C) Excision of the lesion. (D) Macroscopic aspect of the lesion.

(Fig. 3). Initially with the patient anesthetized, a triangular flap was performed with the relaxing incision located distal to tooth 32, followed by removal of the lesion with the aid of a 701 trunk-cone drill, attached to a high-speed pen. After the lesion was removed, abundant irrigation was performed and the suture was made with resorbable thread. Histopathological analysis revealed the presence of connective tissue with a proliferation of cells with inconspicuous fusiform and ovoid nuclei, with loose chromatin, and sparse and barely visible cytoplasm in the middle of thick collagen fibers, (sometimes with a hyaline aspect). In addition, the proliferation presented foci with a discreet fasciculate disposition, and did not present any apparent encapsulation, being permeated by the remaining mineralized bone trabeculae.

For the final diagnosis, an immunohistochemical study was performed: presenting negative results for S-100, desmin in spindle cells, and positive staining for β-catenin, with a multifocal pattern in the spindle cell cytoplasm, and positive staining for α-SMA with a diffuse pattern in the spindle cells (Fig. 4). Positive labeling for CD34 in vascular structures was also observed. In view of the histological and immunohistochemical data, a final diagnosis of DF was reached and the patient was monitored for more than a year for potential relapse.

DISCUSSION

DF is a rare myofibroblastic tumor that despite being considered benign, presents very aggressive growth[6,7]. The tumor was reported in 1965 by Griffith

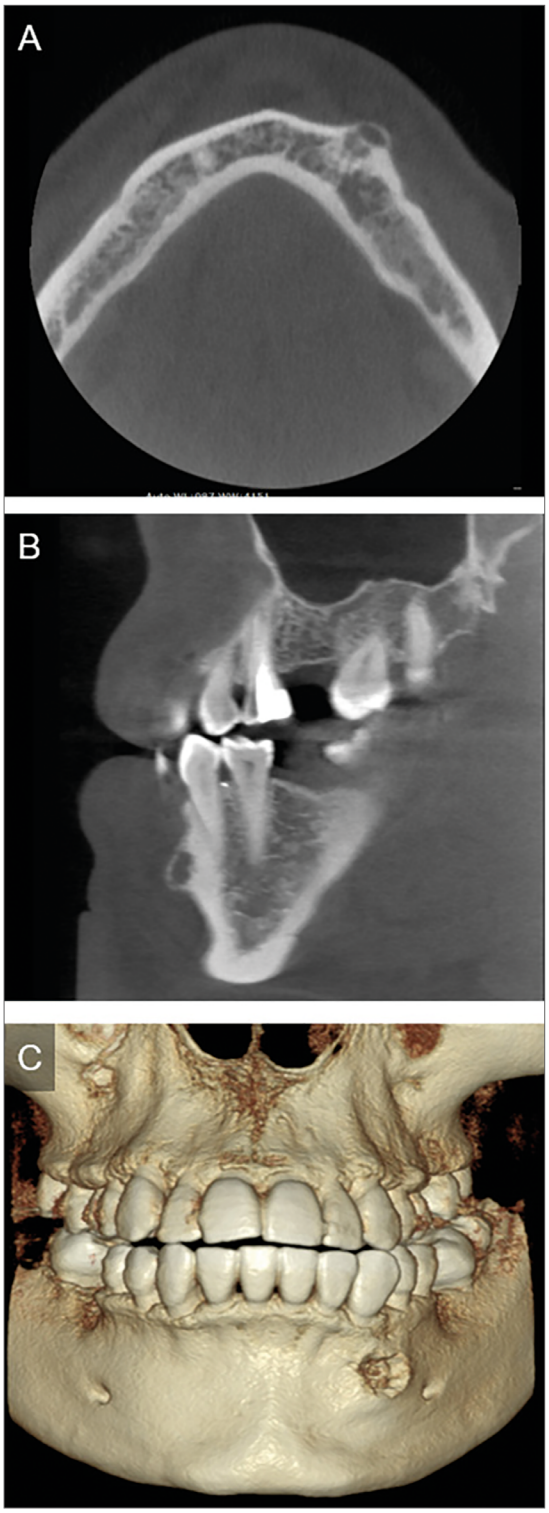

Figure 2. Tomographic aspects of the lesion. (A) Axial reconstruction showing well-defined and corticalized hypodense lesion displacing the vestibular cortex without breaking it. (B) Transverse reconstruction to the rim showing displacement of the vestibular cortex without breaking it. (C) 3D reconstruction showing the lesion area in a region between 33 and 34.

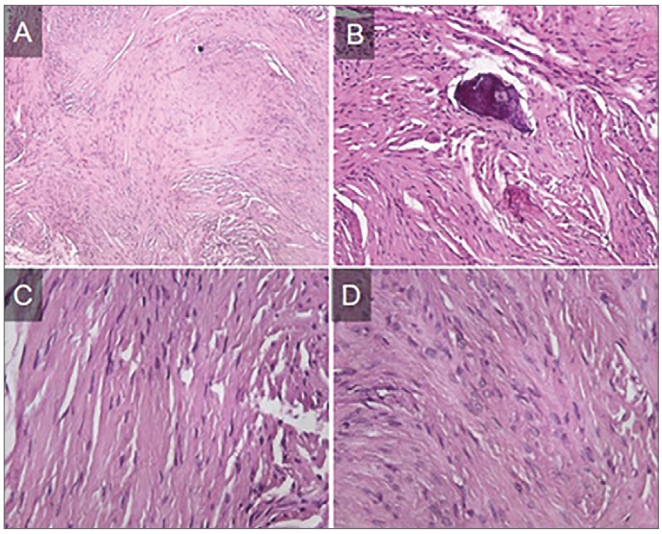

Figure 3. Histopathological findings of FD. (A) FD photomicrography showing abundant stroma of dense fibrous connective tissue with (B) Areas of mineralized bone trabeculae have also been identified; (C) Areas of cells with ovoid and inconspicuous nuclei, with loose chromatin, scarce and barely visible cytoplasm; (D) Areas of cell proliferation predominantly spindle-shaped, elongated and arranged in fascicles.

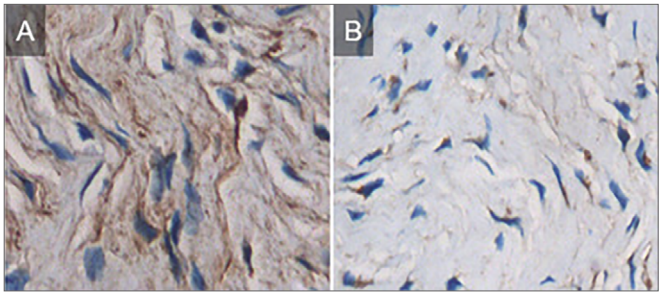

Figure 4. (A) Immunohistochemical expression of α-SMA with diffuse pattern in spindle cells. (B) Positive immunohistochemical reaction of β-catenin with multifocal pattern without spindle cell cytoplasm for.

and Irby[8] in gnathic bones, though it was first named and described by Jaffe in 1958[9], as a densely fibrous entity composed of fibroblasts in the middle of a matrix rich in collagen fibers, resembling a DT. Since then, its etiology remains unknown, yet based on histological and clinical comparisons, certain authors have defended DF as a bone counterpart of DT[9-11].

In the present case, the DF was located in the jaw region, which made the diagnosis difficult, since despite the fact that the jaw is one of the most affected sites, the areas with the highest incidence are the branch, angle, and (mostly) the posterior mandible[6,7,12,13]. Other locations, such as the femur, tibia, pelvic bones, and maxilla have also been documented[6,14,15]. A slight predilection

for the female sex has been observed[6,7] and a wide age range is reported, with preference for the first and second decades of life[6,16].

DFs presenting in gnathic bones are in most cases painless, corroborating the current report. Other signs and symptoms may also be observed, such as asymmetry, tooth displacement and/or root divergence, pain, trismism, and tooth mobility[6,7].

Generally, DF's radiographic characteristics are nonspecific and may present ill- or well-defined borders, and as unilocular or multilocular[3,7], it has a lobed appearance resembling "soap bubbles", and may overlap with other common or unusual lesions in the jaw, such as ameloblastoma, odontogenic myxoma, and central hemangioma[3,7]. Cortical expansion and thinning that cause cortical erosion and perforation are often seen in tumors with greater aggressiveness[3,7]. In addition, DF can present radiographically with the appearance of "sun rays", simulating an osteogenic sarcoma, and thus erroneously induce a diagnosis of malignancy[17].

For assessment of cortical bone and surgical planning, computed tomography (CT) and magnetic resonance imaging (MRI) are respectively preferable to routine radiography[6,18]. In the present case, it was decided to perform a CT to assess the case. The CT revealed a mixed-looking lesion, with areas of hypo- and hyper-density, in addition to presenting multiloculations, similar to "soap bubbles" and causing expansion of the vestibular cortex. Such characteristics led to a diagnostic hypothesis of ameloblastoma.

Microscopic evaluation revealed a mesenchymal tumor, composed of spindle cells with myofibroblastic differentiation. Most of the time, hypo-cellularity is observed. The cells have indistinct borders and are organized in fascicles, in an apparently unidirectional pattern, and permeated by thick and wavy collagen fibers[6,12,15]. The stroma usually involves thin bone trabeculae with reactive changes[6]. The periphery of the lesion tends to be compressed and has no capsule[3]. In addition, the World Health Organization (WHO), has defined DF as a tumor of variable cellularity, whose cells may present an ovoid or elongated shape, with uniform nuclei that do not present atypia, pleomorphism, or mitotic activity, and are categorized as benign[19].

In differential diagnoses, regarding histopathological aspects, DF is often similar to other lesions, such as fibrous dysplasia, low-grade fibrosarcoma, and osteosarcoma[6]. In fibrous dysplasia, despite histological similarities, fibrous tissue presents greater hyper-cellularity and vascularity than in DF. In the case of low-grade fibrosarcoma and osteosarcoma, the presence of cell atypias and cell pleomorphisms and/or mitotic figures, characterize their degree of malignancy and differentiate them from DF[6].

Given such histopathological similarities, it is necessary to use immunohistochemical markers to aid in diagnosis. Unfortunately, there is still no specific marker for DF. Despite this, certain markers are being used to distinguish DF from similar entities, such as S-100, α-SMA, HFF-35, Ki-67, vimentin, and β-catenin[3,4,6]. According to Woods et al.[6], S-100 is negative in 93% of DF lesions and 63% of lesions are negative for HHF-35. Further, positive immunoreactivity is observed for vimentin 92%, with 50% for β-catenin, and 77% for α-SMA. Besides these, all DF lesions exhibit Ki-67 marking of less than 5%, indicating a very low proliferation rate[3].

In the present case, S-100 was negative for spindle cells, therefore, helping to discard tumors of neural origin[6], α-SMA has been described as the most important immunohistochemical marker for identifying differentiated myofibroblasts, and presented positive and diffuse immunostaining in spindle cells, confirming characterization as DF myofibroblasts[1,21]. HHF-35, in the current case, was substituted with desmin since both are characterized as antigens found in smooth muscle cells and are generally negative for myofibroblast labeling[20]. Its marking was negative, thus complementing the myofibroblastic lesion diagnosis, and discarding tumors of muscular origin such as leiomyosarcoma and rhabdomyosarcoma.

In this case CD34 was also used, and presented positivity in vascular structures, considered marking standard, and corroborating other already documented cases of DF[22,23]. Finally, β-catenin presented positive multifocal immunoreactivity in spindle cell cytoplasms. However, as already mentioned by Woods et al.[6] and Oliveira et al.[24], in most lesions this immuno-marker does not present as positive. This can be explained by the fact that certain deep fibromatoses (including DT) carry the adenomatous polyposis coli (APC) gene which regulates β-catenin at the cellular level. Thus, some fibromatoses, if deep, can be characterized by accumulation of β-catenin, normally detected in the cytoplasm[24,25].

Hauben et al.[26], was unsuccessful in explaining β-catenin markers in DF as possible mutations in the APC gene. This was due to a low DNA yield from decalcified sections, which has always been an obstacle[2,3].

In the present case, diagnosis of DF was confirmed and supported microscopically by the presence of cells with fusiform, ovoid, and inconspicuous nuclei with a discrete fasciculate arrangement in the middle of thick collagen fibers, no apparent encapsulation, and permeated by remnants of mineralized bone trabeculae, this, together with positive immunoreactivity for α-SMA, β -catenin and CD34.

Due to its aggressive growth, less conservative treatments have been indicated for DF. It has also been observed that tumors with greater cellularity tend to recur more frequently than those with less cellularity[7]. Thus, cases with cortical perforation, soft tissue involvement, and greater cellularity require wider resection margins. Recurrence rates after excision and enucleation range from 20 to 40%, with curettage being up to 70%[7]. Radiotherapy can serve as an alternative treatment when the lesion is inoperative, but in children, due to postoperative complications, it is avoided[1,3,27]. After surgical treatment, a three-year follow-up period is recommended[28].

In the current case, since the lesion was still small and permitted maintaining the adjacent structures, the treatment of choice was removal of the lesion with healthy bone tissue margins, in an outpatient setting, without mandibular reconstruction, and avoiding unnecessary morbidity to the patient. In addition, the patient was instructed on the importance of return visits, as the possibility of recurrence had not yet been ruled out.

CONCLUSION

DF is a rare and benign neoplasm that affects the gnathic bones. It presents histopathological characteristics superimposed on others, whether benign and malignant and is characterized by proliferation of spindle cells and bone trabeculae. In the present case, its location and radiographic aspects led to an erroneous diagnostic hypothesis. Thorough clinical, radiographic, histopathological, and immunohistochemical examinations are thus necessary for a correct diagnosis. This, because clinically (radiographically and histopathologically) it resembles other lesions as in the present case. Due to its aggressiveness and potential for recurrence, a correct choice of treatment and long-term follow-up is necessary.

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