


Nodular fasciitis arising from the buccal region after segmentectomy with rapid growth mimicking postirradiation myxofibrosarcoma

A case report

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Abstract

Rationale: Nodular fasciitis (NF) can be misdiagnosed as a sarcoma because of its rapid growth and pathological features, such as nuclear atypia and mitoses.

Patient concerns: We present a rare case of a 72-year-old Japanese man who developed NF with suspected postirradiation myxofibrosarcoma (MFS) after segmentectomy for left-sided osteoradionecrosis (ORN) of the mandible.

Diagnosis: A mass appeared in the intraoral postoperative wound 1 year after left-sided mandibular segmentectomy and showed rapid growth, reaching a size of 50mm within 2 months. Incisional biopsy revealed strongly Ki-67-positive spindle-shaped cells with large irregular nuclei and a diagnosis of postirradiation MFS.

Interventions: The patient was diagnosed with oropharyngeal cancer (T4aN2bM0) and underwent surgical resection of primary oropharyngeal squamous cell carcinoma with selective neck dissection and reconstruction with a rectus abdominis musculocutaneous flap at the age of 57 years, followed by postoperative 66 Gy of radiotherapy combined with cisplatin administration. No recurrent or metastatic lesions of oropharyngeal squamous cell carcinoma have been detected for > 10 years. However, the ORN of the jaw worsened, and the patient underwent sequestrectomy 3 times on the right side of the mandible, followed by a left-sided segmentectomy at the age of 72 years. One year after segmentectomy, a 10-mm mass with soft-to-firm consistency appeared in the buccal mucosa of the wound and grew rapidly. An incisional biopsy revealed MFS. Complete resection under general anesthesia was immediately performed.

Outcomes: The histopathological diagnosis of the excised specimen was NF without any malignant findings. Two years after surgery, there was no evidence of recurrence or metastasis.

Lessons: NF grows rapidly and has pathological features similar to sarcoma, making differential diagnosis difficult at the time of incisional biopsy. Further studies should be conducted to determine the clinical and pathological features of this tumor.

Abbreviations: MFH = malignant fibrous histiocytoma, MFS = myxofibrosarcoma, NF = nodular fasciitis, OPSCC = oropharyngeal squamous cell carcinoma, ORN = osteoradionecrosis, PET-CT = positron emission tomography-computed tomography.

Keywords: myxofibrosarcoma, nodular fasciitis, osteoradionecrosis, postirradiation, sarcoma

1. Introduction

Nodular fasciitis (NF), better known as pseudosarcomatous fibromatosis extending from the superficial fascia, is difficult to differentiate from sarcoma because of its rapid growth and similar pathologic features including rich cellularity and common mitotic figures.^[1,2] NF occurs with trauma, mechanical irritation, and inflammatory process including biopsy.^[3] Approximately

50% of cases were misdiagnosed as sarcoma or some other malignant neoplasms.^[4] This lesion is infrequently located in the head and neck region and mainly occurs in the upper limbs.^[5] The most common site of onset in the oral cavity is the buccal mucosa.^[6]

Postirradiation sarcoma is a rare complication that typically develops >10 to 15 years after radiation therapy.^[7,8] Many types of malignancies have been reported in postirradiation sarcoma,

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All data generated or analyzed during this study are included in this published article [and its supplementary information files].

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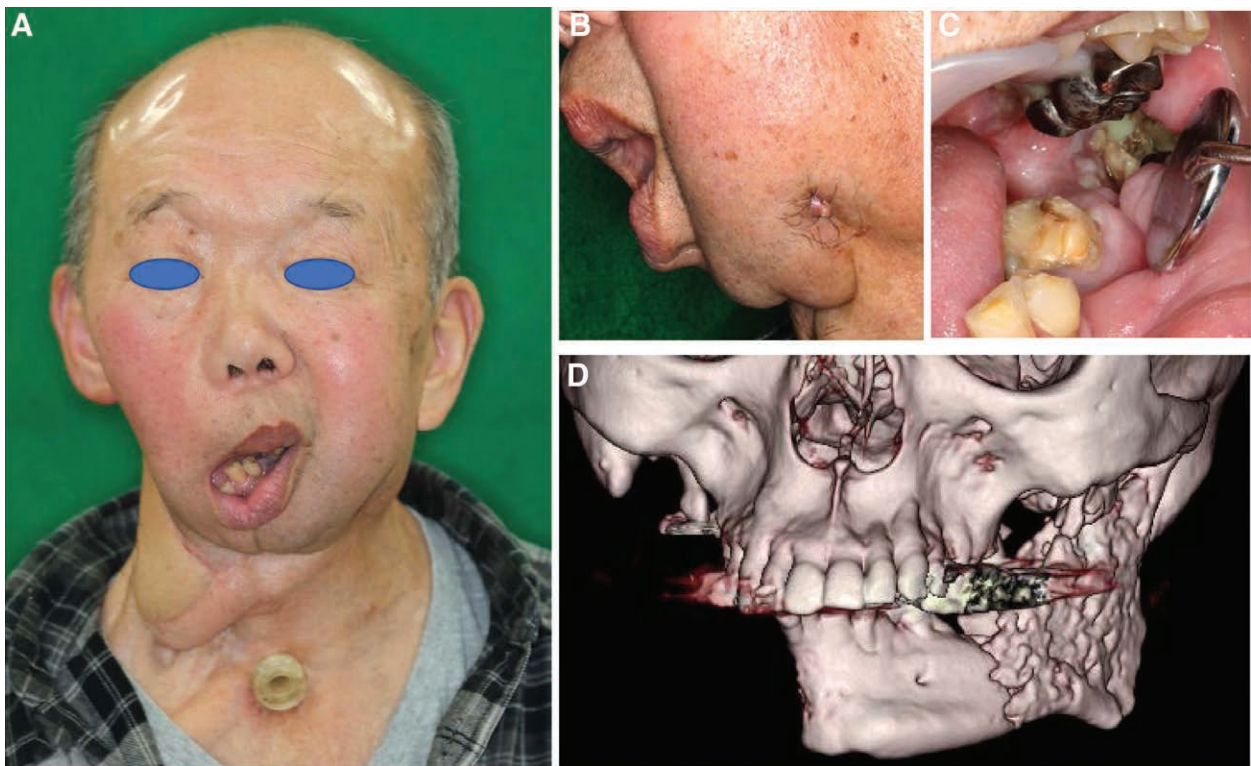


Figure 1. Appearance and imaging results of the patient at the time of referral. (A) The right neck was reconstructed with a rectus abdominis musculocutaneous flap. (B) External fistula due to radiation osteomyelitis in the left buccal region. (C) Intraoral view of the necrotic bone and mucosa inflammation on the left retromolar area. (D) Three-dimensional computed tomography image showing that the mandibular body was totally absent after 3 sequestrectomies. The left lateral mandible exhibited extensive osteoradionecrosis.

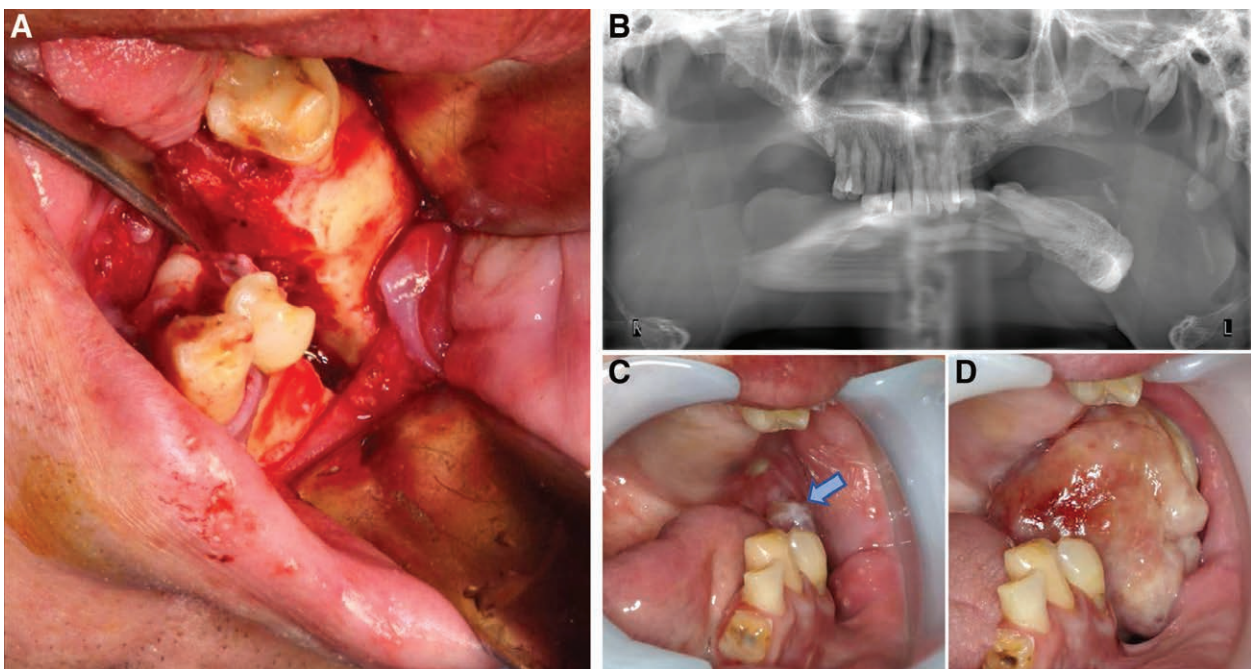


Figure 2. Clinical course from segmentectomy to increased nodular fasciitis. (A) Intraoperative photograph showing mandibulectomy at the anterior part of the mental foramen. (B) X-ray image showing bilateral mandibular body defects after segmentectomy. (C and D) Intraoral view showing the mass growing from 10 to 50mm.

with malignant fibrous histiocytoma being the most common pathological diagnosis.^[9] Myxofibrosarcoma (MFS), previously classified as a myxoid variant of malignant fibrous histiocytoma, was subdivided as a malignant form of “fibroblastic and myofibroblastic tumors” in the 2002 classification of tumors by the World Health Organization.^[10]

Herein, we present a rare case of NF mimicking MFS arising from the buccal region after segmentectomy for osteoradionecrosis (ORN) of the mandible.

2. Case report

A 72-year-old Japanese man developed NF with suspected post-radiation MFS after segmentectomy for left-sided ORN. He was diagnosed with oropharyngeal cancer (T4aN2bM0) and underwent surgical resection of primary oropharyngeal squamous cell carcinoma (OPSCC) with selective neck dissection and reconstruction with a rectus abdominis musculocutaneous flap at the age of 57 years, followed by postoperative 66 Gy of radiotherapy combined with cisplatin administration. Dietary management was initially through gastrostomy, and 3 years postoperatively, he received nutritional supplements using a nasogastric tube. No recurrent or metastatic lesions of OPSCC have been detected for > 10 years. However, the ORN of the jaw worsened, and the

patient underwent sequestrectomy of the right-side mandible 3 times, which resulted in a right-side mandibular defect (Fig. 1), followed by left-sided segmentectomy for the ORN of the left mandible at age 72 (Fig. 2). One year after segmentectomy, a 10-mm mass with soft-to-firm consistency appeared in the buccal mucosa of the wound. Initially, considering the possibility of a mass being caused by an abscess, we decided to prescribe antibiotics and monitor the disease course. However, the mass grew rapidly to 50 mm in 2 months, making it impossible to close the mouth. Furthermore, positron emission tomography-computed tomography (PET-CT) showed a high-accumulation image with a standard uptake value of 6.01. Accordingly, malignancy was considered and an incisional biopsy was performed.

Incisional biopsy revealed >10% Ki-67-positive spindle-shaped cells with large irregular nuclei in the myxodematous stroma. These findings were histopathologically suspicious for MFS and clinically diagnosed as radiation-induced sarcoma since the disease onset was 15 years after radiotherapy. Therefore, complete resection under general anesthesia was immediately performed jointly by otolaryngologists and an oral surgeon. The lesion was a pendulous mass; however, its base was indistinctly bordered by the buccinator muscle (Fig. 3A–C). Intraoperative pathology was benign, and the possibility of residual disease at the resection margin was noted.

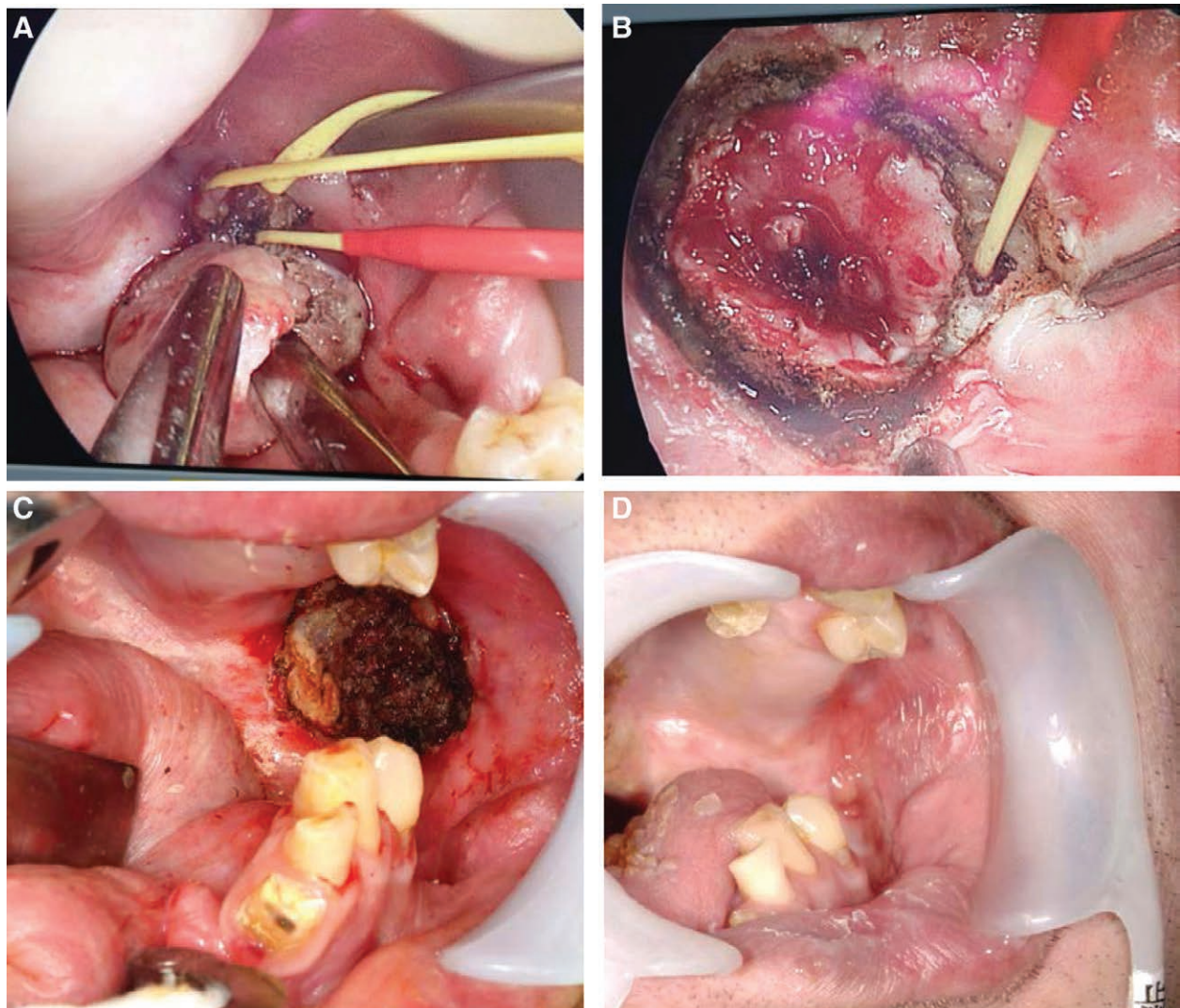


Figure 3. Intraoral intraoperative image of nodular fasciitis resection and postoperative image showing no recurrence. (A) Separating the mass at the basal site of the pedunculated lesion. (B) Resection of the basal site of the pedunculated lesion. (C) The buccinator muscle is exposed at the resection site. (D) Intraoral view showing no recurrence 2 years postoperatively.

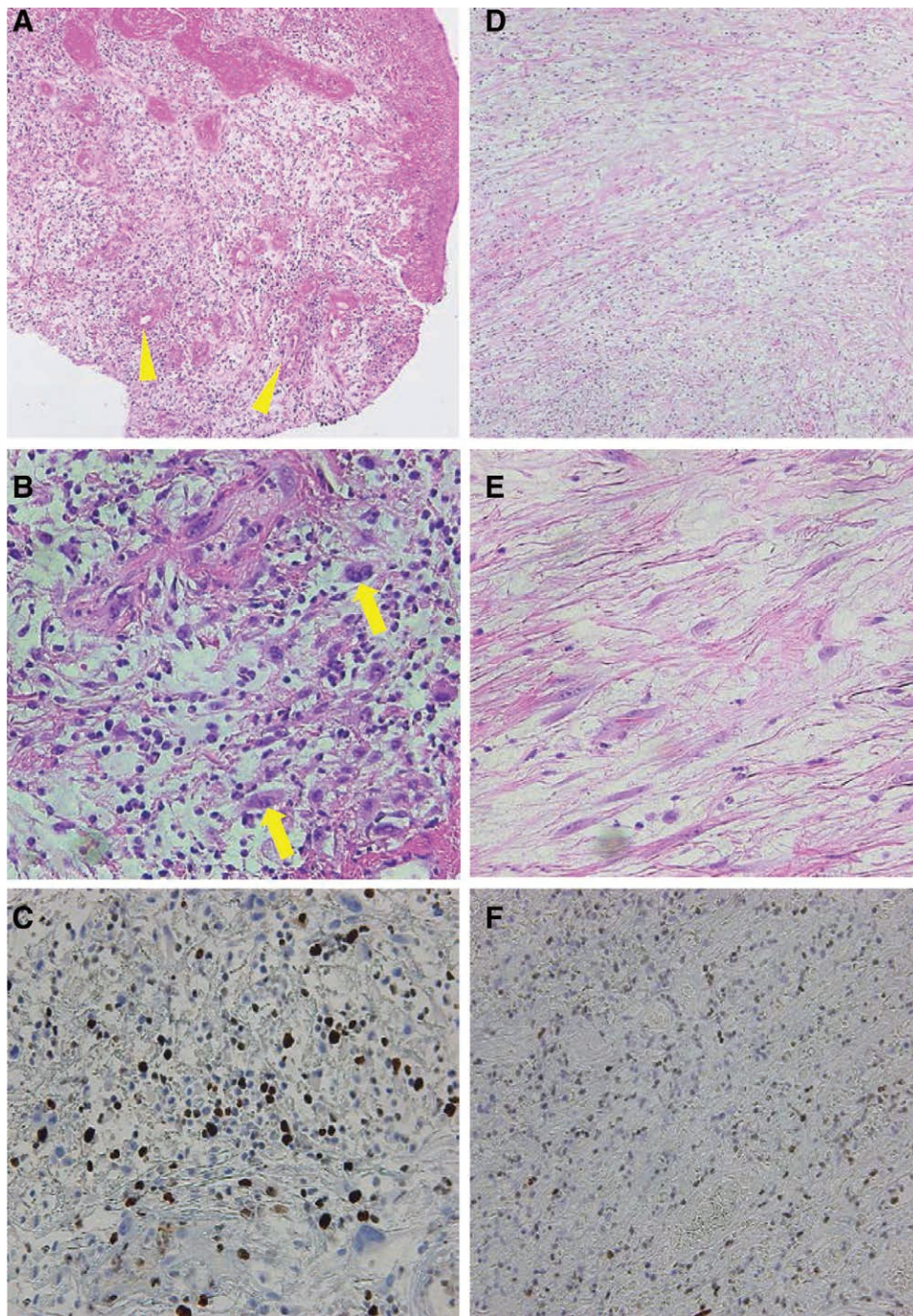


Figure 4. Histopathology of nodular fasciitis at the time of incisional biopsy (A–C) and surgical resection (D–F) [(A and D) Hematoxylin and eosin staining, original magnification $\times 40$, arrowheads show curvilinear vessels; (B and E) hematoxylin and eosin staining, original magnification $\times 200$, arrows show atypia fibroblastic cells with myxoid stroma; and (C and F) staining with antibodies against Ki-67, original magnification $\times 200$].

Therefore, we decided not to perform extended resection of the lesion. Pathological findings of resection revealed a Ki-67 positivity rate of $< 5\%$ and an absence of cellular atypia, leading to a diagnosis of NF. Regarding the pathological findings of the incisional biopsy, Fig. 4A–C shows the proliferation of atypical spindle-shaped cells with enlarged nuclei in the myxoid stroma and strongly positive images for Ki-67. Biopsy specimens showed numerous curvilinear vessels in the low-power field (Fig. 4A) and atypical fibroblastic cells with hyperchromic, pleomorphic nuclei in the high-power field (Fig. 4B). Regarding the pathological findings of the resected lesion, Fig. 4D–F shows sparsely normal spindle-shaped cells in the myxoid stroma and weakly positive images for Ki-67. Resection specimens showed

“tissue culture-like” character in the low-power field (Fig. 4D) and spindle-shaped fibroblasts that are less atypical and polymorphous than those in the biopsy specimen in the high-power field (Fig. 4E). Histopathological examination of the incisional biopsy revealed more inflammatory cell infiltration than that in the resected tissues. Two years after the surgery, at the current age of 75 years, the patient is doing well and there has been no evidence of recurrence (Fig. 3D).

3. Discussion

Radiation therapy is indispensable for the treatment of head and neck cancer. The incidence of ORN, one of the most serious

complications, is as high as 5% to 40%, despite improvements due to current advances in radiation technology.^[11] ORNs are intractable and significantly reduce the quality of life of survivors of head and neck cancer; therefore, it should be prevented to the greatest extent possible, and the use of spacers during radiation therapy should be considered.^[12] Furthermore, the incidence of radiation-induced secondary cancer, including carcinoma and sarcoma, was reported to be 0.7%, which typically develops >10 to 15 years after radiation therapy.^[13] In the present case, 15 years had passed since radiotherapy, and we suspected the development of a radiation-induced sarcoma because of the rapid growth and atypical histopathological appearance, but it turned out to be NF. Generally, the clinical hallmark of NF is rapid growth, resulting in a preoperative waiting period of < 1 month, as in the present case. In contrast, oral NF lesions demonstrate various patterns of swelling. Sudden enlargement after biopsy, spontaneous regression, and disappearance have been reported.^[3,14]

Incisional biopsy revealed a high degree of cellular atypia, Ki-67 positivity, proliferation index, and smooth muscle action positivity, indicating myofibroblast differentiation, leading to the diagnosis of MFS. Therefore, we considered the possibility of an enlarged resection depending on the intraoperative pathological diagnosis of the resected margin and performed the resection in collaboration with otolaryngologists. Intraoperative pathology was benign, and the possibility of residual disease at the resection margin was noted. However, considering the surgical damage caused by additional resection, we decided not to perform extended resection of the lesion. In NF, many studies have reported that strict resection of the margins is not necessary because of spontaneous resolution of the lesions and the lack of recurrence even when the surgical margins are involved.^[6,15,16] NF occurs with trauma, mechanical irritation, and inflammatory processes, including biopsy.^[3] In the present case, mechanical stress and postoperative inflammation to the fascia from the segmentectomy might have triggered the disease.

Tumor cells in MFS show marked pleomorphism and cytologic atypia not seen in NF on routine hematoxylin–eosin staining, which is most useful for a differential diagnosis.^[10,17] However, it is difficult to diagnose NF using only a small amount of incisional biopsy material, as in the present case. The biopsy specimen showed numerous curvilinear vessels and atypical fibroblastic cells with pleomorphic nuclei, leading to the diagnosis of MFS. However, the excisional specimen showed a “tissue culture” character and spindle-shaped fibroblasts with less atypia and pleomorphism than the biopsy specimen, leading to the final diagnosis of NF. In such cases, an initial extensive biopsy might contribute to the differential diagnosis. The degree of inflammation may be very severe and may present as partially poorly differentiated carcinoma through reactive changes according to the site of the incisional biopsy. Furthermore, NF is classified into 3 subtypes according to predominant histological features: myxoid, cellular, and fibrous.^[18] This is a case of myxoid type, which is characterized by greater inflammatory changes than other types.^[18] The pathology of the incisional biopsy in the present case demonstrated a strong inflammatory cell infiltration on hematoxylin–eosin staining, which would have caused Ki-67 positivity due to inflammatory response changes. Similarly, Brookes et al reported that oral inflammatory myofibroblastic tumor demonstrates strong Ki-67 immunoreactivity.^[19] The strong inflammatory findings on the incisional biopsy are caused by the easy contact of the incisional biopsy site with the tooth, which may have caused inflammation due to mechanical stimulation, resulting in increased cellular atypia and a higher Ki-67-positive rate. However, when the entire excisional specimen was evaluated, inflammatory sites due to mechanical stimulation comprised only a small portion, and the Ki-67 positivity rate was almost nonexistent, suggesting that the pathological diagnosis was ultimately NF.

4. Conclusion

NF grows rapidly and has similar pathological features to sarcoma, making differential diagnosis difficult at the time of incisional biopsy. Further studies should be conducted to determine the clinical and pathological features of this tumor.

Author contributions

K.Y. produced the images used in the manuscript and wrote the manuscript. H.I., T.I., and D.S. analyzed and interpreted the patient’s data. K.U. provided the patient data and performed the literature review. All authors have read and edited the manuscript and approved the version to be published. Conceptualization: K.Y.; Investigation: K.Y., H.I., T.I., D.S.; Supervision: H.I., D.S., T.I., K.U.; Writing-original draft: K.Y.; Writing-review & editing: K.Y., H.I., D.S., T.I., K.U.

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