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WORD COUNT 2493
TIME SUBMITTED 10-FEB-2023 01:41PM
PAPER ID 96462206

Name of Journal: *World Journal of Clinical Cases*

Manuscript NO: 83117

Manuscript Type: CASE REPORT

Sclerosing odontogenic carcinoma of maxilla: A case report

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Abstract

BACKGROUND

Sclerosing odontogenic carcinoma is a rare primary intraosseous neoplasm that was featured recently as a single entity in the World Health Organization classification of Head and Neck Tumors 2017, with only 14 cases published to date. The biological characteristics of sclerosing odontogenic carcinoma remain indistinct because of its rarity; however, it appears to be locally aggressive, with no regional or distant metastasis reported to date.

CASE SUMMARY

We reported a case of sclerosing odontogenic carcinoma of the maxilla in a 62-year-old woman, who presented with an indolent right palatal swelling, which progressively increased in size over 7 years. Right subtotal maxillectomy with surgical margins of approximately 1.5 cm was performed. The patient remained disease free for 4 years following the ablation surgery. Diagnostic workups, treatment, and therapeutic outcomes were discussed.

CONCLUSION

More cases are needed to further characterize this entity, understand its biological behavior, and justify the treatment protocols. Resection with wide margins of approximately 1.0 to 1.5 cm is proposed, while neck dissection, post-operative radiotherapy, or chemotherapy are deemed unnecessary.

Key Words: Odontogenic tumor; Sclerosing odontogenic carcinoma; Head and neck neoplasms; Case report

Soh HY, Zhang WB, Yu Y, Zhang R, Chen Y, Gao Y, Peng X. Sclerosing odontogenic carcinoma of maxilla: A case report. *World J Clin Cases* 2023; In press

Core Tip: Sclerosing odontogenic carcinoma is a rare disease entity with only 14 cases published to date, this case report will further substantiate the understanding to this disease and the management protocols.

INTRODUCTION

Sclerosing odontogenic carcinoma (SOC) is an unusual primary intraosseous neoplasm that was added to the 4th edition World Health Organization (WHO) classification of Head and Neck Tumors in 2017[1]. This disease entity was first described by Landwehr and Allen[2] in 1996 and subsequently reported by Koutlas *et al*[3] in 2008. Nevertheless, this distinct entity remains poorly understood, with only 14 cases published to date[2–5], despite its recent inclusion in the latest WHO classification of Head and Neck Tumors. Clinically, it is characterized by locally aggressive, non-metastasizing properties, while histopathologically, it is typically illustrated by infiltrative thin cords and small nests of epithelial cells in the diffused sclerotic stroma[3]. However, there is no specific or distinctive immunohistochemical staining for SOC. Radiologically, it mostly presents as an osteolytic lesion, with or without bony perforation[4]. The histological resemblance of SOC to other disease entities poses a challenge to the accurate diagnosis of this neoplasm, while the paucity of literature makes standardizing treatment protocols more difficult. Herein, we describe a case of SOC of the maxilla, including diagnostic workups, treatment, and therapeutic outcomes.

CASE PRESENTATION

Chief complaints

A 62-year-old woman presented to her local hospital in December 2017 with a 7-year history of right palatal swelling. The patient first noticed a small, indolent swelling at the right anterior palate 7 years previously, which gradually increased in size over the past 2 years, associated with intermittent toothache and occasional facial swelling.

History of present illness

Initial clinical examination revealed a firm mass over the anterior palate, without apparent buccal and lingual expansion. The initial dental panoramic tomogram (DPT) revealed radiolucency with a well-defined sclerotic border of the right maxilla extending into the right maxillary sinus and significant root resorption of the upper central, lateral incisors, and upper right first molar. Excisional biopsy of the anterior palate was performed under local anesthesia *via* an intraoral approach, with extraction of the upper right central and lateral incisors at the local hospital. The histopathology examination showed SOC. Hematoxylin and eosin (H&E) sections showed small epithelial tumor cell cords in a densely collagenized stroma. No obvious dysplastic features were observed in the given specimen. The swelling resolved; however, the patient noticed the swelling of the palate again in April 2018, for which she was eventually referred to our institution for management of the right maxillary tumor (Supplementary material).

History of past illness

Except for long-standing diabetes mellitus and hypertension, her past medical history was unremarkable.

Personal and family history

Unremarkable.

Physical examination

Clinically, the patient presented with diffuse right facial swelling without overlying skin changes. The swelling was diffuse and firm, causing obliteration of the right nasolabial fold. Mouth opening was not restricted and there was no palpable cervical lymphadenopathy. There were no neurosensory changes to the right infraorbital region (Figure 1A and B). Intra-oral examination showed an irregular mass at the anterior maxilla, extending from the tooth 11 to 15 region, but without obliteration of the buccal

sulcus. The swelling was firm and non-tender upon palpation, with non-ulcerated overlying mucosa. The adjacent teeth showed no marked increase in mobility and there was no fluid discharge noted upon palpation (Figure 1C).

Laboratory examinations

The histopathology examination of the excisional biopsy that was performed at the local hospital showed SOC. H&E sections showed small epithelial tumor cell cords in a densely collagenized stroma. No obvious dysplastic features were observed in the given specimen.

A gross pathological examination revealed a firm, expansile mass involving the right palate and right maxillary sinus. However, the overlying mucosa appeared intact and not ulcerated (Figure 1H). The resected specimens were fixed in 10% formalin, processed, and embedded in paraffin blocks for histopathological examination. H&E sections showed small nests or cords of small neoplastic epithelial cells, immersed within a sclerotic stroma, with perivascular infiltration. Under low power magnification, the tumor cells demonstrated an infiltrating nature towards mature lamellar bone fragments and generally, the tumor appeared to be non-encapsulated. The epithelial cells appeared to be faintly hyperchromatic, while focal areas of tumor islands exhibited round hyperchromatic nuclei with clear cytoplasm. Pleomorphism was uncommon and mitotic figures were scarce, with no significant cellular atypia present (Figure 2A-C). Immunohistochemically, strong positive staining was observed for cytokeratin 7 (CK7) (Figure 2D) and CK19 (Figure 2E). Tumor cell showed positive expression of p40 (Figure 2F) and p63 (Figure 2G). The tumor cells stained negative for vimentin (Figure 2H) and the proliferative activity was approximately 5%-10% according to the Ki-67 staining results, suggesting a low-grade malignancy (Figure 2I). The sections also stained negative for S-100.

Imaging examinations

The initial DPT revealed radiolucency with a well-defined sclerotic border of the right maxilla extending into the right maxillary sinus and significant root resorption of the upper central, lateral incisors, and upper right first molar. DPT was repeated and revealed an ill-defined radiolucency at the right maxilla, with a slight increase in size, as compared with the initial DPT (Figure 1D). The computed tomography (CT) scan showed an expansile enhancing osteolytic mass at the right maxilla, with marked buccal and palatal bone perforation (Figure 1E). The lesion extended into the right inferior turbinate and breached the nasal septum. No prominent radiological evidence of lymphatic spread to the cervical region was seen

FINAL DIAGNOSIS

A diagnosis of SOC was reached based on the clinical features and the radiological and histopathological findings.

TREATMENT

Right subtotal maxillectomy and reconstruction with a vascularized free fibula flap were performed under the guidance of an intraoperative navigation system (BrainLAB, AG, Feldkirchen, Germany). Approximately 1.5 cm surgical margins were resected, guided by the intraoperative navigation system, to ensure clear surgical margins (Figure 1G). The ipsilateral free vascularized fibular flap was harvested simultaneously with the tumor resection. Neck dissection was not performed because of negative clinical and radiological findings of the cervical region. Intraoperative frozen section biopsy from the surgical margins showed that all margins were tumor-free.

OUTCOME AND FOLLOW-UP

Post-operative recovery was uneventful, and the patient was subjected to standardized oral oncology follow-up. At the post-operative one and six month-reviews, the patient was pleased with her post-operative appearance and functions (Figure 3A). Upon clinical examination, the vascularized free fibula flap provided good oroantral seal and

support to the facial profile. The CT scan revealed excellent bony consolidation of the graft and there was no obvious recurrence or metastasis noted radiographically or clinically (Figure 3B-D). The patient remains disease-free 22 mo after the surgery.

DISCUSSION

SOC is a relatively rare and disputable entity that was recently featured in the 2017 WHO classification of Head and Neck Tumours[1]. Despite its recent addition to the WHO classification and its locally aggressive nature, the characteristics and treatment protocol for SOC are inadequately described because of its scarcity. The current literature review yielded 14 cases with comparable characteristics, as summarized in Table 1[2-7,9-13,15-17].

SOC seems to have peak incidence in the fourth to seventh decades of life, with a female predilection[9]. The tumor appears to have a greater propensity to affect the anterior mandible[9], with only 4 out of 11 cases involving the maxilla[2,6,7,11]. To date, including the case presented herein, there are only five reported cases involving the maxilla. Patients frequently complain of long-standing swelling[2-4,7-12], paraesthesia[3,12], pain[2,3], and tooth sensitivity[11]. Similar to our case, the patient complained of long-standing swelling, with occasional pain in the area affected. The wide spectrum of clinical presentations make determining the nature of the lesion, whether benign or malignant, difficult[14].

Radiologically, this tumor could present as well-circumscribed or poorly-defined lytic radiolucency with cortical bone perforation[2-4,9,12,13]. Our case demonstrated similar radiographical features, with both well- and ill-defined sclerotic lesions and notable cortical bone perforation. Root resorption was only described in one of the published cases[11], despite the locally aggressive nature of the tumor. The infiltrative and locally aggressive nature was demonstrated in this case, as indicated by the marked buccal and palatal bone perforation and distinct tooth root resorption on both plain radiographs and CT scans.

Histologically, the tumor is typically characterized by infiltrative thin cords or small nests of epithelial cells in the densely sclerotic stroma. Perineural, intraneural, or vascular invasion, which is another distinguishing feature, were also described in seven cases[3,8,9,11-13], similar to our case, which displayed perivascular infiltration in the H&E section. Although there is no distinctive immunohistochemical marker for SOC, consistent cytokeratin immunoreactivity was seen, with positive staining for CK5/6, p40, and p63 in most reported cases. Only one case demonstrated weak nuclear staining for p63[7] and two cases displayed positivity for CK14[5,7]. Most cases reported negative staining for CK7, whereas our case demonstrated diffuse CK7 expression, which is similar to that reported by Tan *et al*[10], while Koutlas *et al*[3] and Irié *et al*[12] showed focal expression of CK7. Most cases reported negative results for vimentin and S-100, which is similar to the present case; only one case reported unexpected negative staining for CK19[5]. Ki-67 was used in most cases to assess the proliferative index of the tumor, which appeared to be insignificant in the reported cases, which is similar to the current case.

Our case demonstrated substantial demographical, histopathological, and radiographical similarities with previous cases. In this case, the tumor was neglected, possibly because of the vague signs and symptoms. Our immunohistochemistry results were also comparable to those of other published cases, with positive staining of the tumor cells for CK19, p40, and p63. The infiltrative growth pattern with vascular invasion was also similar to the case reported by Saxena *et al*[9], while eight published cases showed evidence of perineural invasion[3,4,7,9,11,12,15,16]. In contrast, four cases reported a lack of perineural or vascular infiltration[5,10,13,17]. Although perineural invasion was often associated with poorer locoregional control and prognosis in squamous cell carcinoma, this appears to be a distinctive histopathological feature in most of the reported cases reported. However, more cases are required to further validate this specific feature as a prognostic factor or tumor grading for SOC. Distant or regional metastasis is yet to be reported in SOC, based on the available published data.

Exclusion from the differential diagnosis can be difficult because of the histopathological resemblance of SOC to other histological differential diagnoses, such as central odontogenic fibroma and desmoplastic ameloblastoma. Central odontogenic fibroma (particularly the epithelial-rich type) is clinically less aggressive than that SOC. The stroma is variably cellular, with fibroblastic connective tissue, and unlike in SOC, the stroma appears to be densely fibrous and sclerotic. Although desmoplastic ameloblastoma demonstrated dense fibrous stroma similar to SOC, it should present with focal ameloblastic columnar cells, even if the presentation is scant. A metastatic tumor was ruled out in this case, given the strong positive expression of p63, which confirmed the basal characteristics of the epithelial cells.

Currently, we lack a standardized treatment protocol because of the rarity of the tumor. SOC demonstrated permeative and locally aggressive characteristics, thus it should warrant more radical resection to prevent local recurrence. Recurrence was reported in two patients following curettage; however, there was no recurrence noted after the subsequent ablative surgery and high-dose radiotherapy, respectively[5,12]. Our case also experienced a recurrence of the tumor at one year following the excisional biopsy; therefore, conservative management of enucleation or curettage might not be adequate. Hussain *et al*[11] suggested that conservative tumor-free margins of 5 mm should be used. By contrast, Landwehr and Allen[2] reported close margins despite having 1.0 cm resection margins. The invasive properties of SOC and its close margins following 1.0 cm surgical margins, as mentioned in the previous reports, prompted us to propose that the surgical margins should be extended to 1.5 cm for both hard and soft tissues to ensure tumor-negative margins. However, more cases are required to better appreciate the true origin, morphological features, and biological behavior to definitively ascertain the tumor resection margins.

To date, based on the currently available data, there is still no evidence of cervical lymphatic spread or distant metastasis reported. The tumor appears to have no evident metastatic capability, despite a typical long-standing history, which is again demonstrated in our case. Nevertheless, two patients were subjected to

radiotherapy[5,6,9], two patients underwent neck dissection in addition to tumor resection[3,8,9], one patient underwent chemotherapy following tumor resection[12], and one patient received high-dose radiotherapy following disease recurrence[5]. Nevertheless, prophylactic neck dissection or adjunct therapy, such as chemotherapy and radiotherapy, were deemed unnecessary because the tumor has yet to show metastasis potential[9,11]. As the treatment approach and its efficacy for SOC remains ambiguous, we suggest that standard oral oncology follow-up should be carried out for at least 5 years in patients diagnosed with SOC because of the locally aggressive and infiltrative nature of this tumor. Nevertheless, more cases are required to further illustrate this entity and guide clinical diagnosis and treatment.

CONCLUSION

In summary, the biological behaviors, and characteristics of SOC remain ambiguous owing to its rarity, with limited case reports published to date. More cases are needed to further characterize this entity, understand its biological behavior, and justify the treatment protocols. To date, surgical resection with adequate surgical margins remains the mainstay treatment, with no disease recurrence in most cases, while neck dissection and postoperative radiotherapy or chemotherapy were not deemed necessary. We hope that this case report will facilitate the validation of this disease entity and contribute to the establishment of treatment protocols.

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