CASE REPORT

Primary intraosseous squamous cell carcinoma: a devil in disguise

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SUMMARY

Primary intraosseous squamous cell carcinoma (PIOSCC) is a rare central jaw carcinoma derived from odontogenic epithelial remnants. When the tumour arises in an existing cyst, it may be difficult to recognise early PIOSCC and carry out necessary treatment. We report a case diagnosed in a 50-year-old man where timely intervention was delayed and prognosis was affected and the case diagnosed eventually by comprehensive clinical, radiological and histopathological examination.

BACKGROUND

Primary intraosseous squamous cell carcinoma (PIOSCC) is a rare entity presenting as a common pathology with routine clinical and radiological features resulting in faulty diagnosis and treatment.¹ It is important to recognise the early changes for these lesions. As it presents with many variations, confusing terminologies and classifications, this lesion can be aptly described as a devil in disguise. The delay in diagnosis affects the treatment and prognosis. Thus, a thorough knowledge, expertise as well as an inquisitive nature is required for a prompt and accurate diagnosis.

CASE PRESENTATION

A 50-year-old man presented with a complaint of swelling on the right side of the mandible and numbness of his lower lip. The medical and family history was unremarkable. On careful history taking, the patient revealed that 9 months previously he was treated for pus discharge from the right posterior mandibular region by a general dental practitioner, wherein an orthopantomograph (OPG) was taken and teeth 46 and 47 were extracted.

On intraoral examination, a tender, diffuse swelling measuring 4 cm×5 cm was present involving the buccal and lingual aspects of the edentulous ridge of 46, 47 region with an intact overlying mucosa, with no associated sinus or discharge. Paraesthesia was present on the right aspect of tongue. The right supraclavicular lymph node was tender.

INVESTIGATIONS

A right lateral oblique radiograph of the mandible was taken which revealed an oval radiolucent area with a well-defined border measuring 4 cm×3 cm in the right angle of the mandible extending into the ramus (figure 1). A posteroanterior skull radiograph revealed an oblong radiolucent area with buccal and lingual cortical plate expansion

(figure 2). The chest radiograph did not reveal any pathology.

The OPG taken 9 months previously revealed an ill-defined 1.5 cm×1.5 cm radiolucent area in the right angle of mandible (figure 3). On comparing the present lateral oblique radiograph with the 9-month-old OPG, it is clearly evident that the lesion has rapidly progressed to attain the present size.

After explaining the procedure to the patient, the written consent was obtained and an incisional biopsy was performed under local anaesthesia. A histopathological examination showed numerous islands and nests of stratified squamous epithelium displaying various dysplastic changes and keratin pearls in a fibro-cellular stroma. The histopathological features were suggestive of a well-differentiated squamous cell carcinoma (SCC) (figure 4).

DIFFERENTIAL DIAGNOSIS

On correlating clinical, radiological and histopathological findings, a diagnosis of PIOSCC was performed. The differential diagnosis of PIOSCC is challenging. An intact overlying mucosa and the

Figure 1 A right lateral oblique radiograph of the mandible demonstrating an oval radiolucent area with a well-defined border in the right angle extending into the ramus.

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Figure 2 A posteroanterior skull radiograph demonstrating an oblong radiolucent area with buccal and lingual cortical plate expansion.

absence of a long standing non-healing ulcer ruled out the possibility of direct bony spread of a primary SCC arising from gingiva, alveolar mucosa or maxillary sinus. Metastatic SCCs as well as metastatic carcinoma from thyroid, kidney, prostate or lung were excluded by a clear chest radiograph and a complete body examination.

TREATMENT

A submandibular incision was made and right hemimandibulectomy with supraomohyoid neck dissection was performed under general anaesthesia. The regional lymph nodes (levels 1–3) were dissected. All frozen sections of the submitted tissues from the surgical margins were free of tumour. The mandible was subsequently reconstructed using a reconstruction plate. Recovery was uneventful. There was no evidence of recurrence till the patient last reported for a follow-up after 6 months.

OUTCOME AND FOLLOW-UP (HISTOPATHOLOGY REPORT)

The resected mandible was sent for further evaluation to the department of oral and maxillofacial pathology (figure 5).

Figure 3 Orthopantomograph taken 9 months ago revealed an ill-defined radiolucent area in the right angle of mandible.

Figure 4 Histopathology demonstrating a well-differentiated squamous cell carcinoma.

On meticulous examination, a dysplastic cystic lining with invasion into the underlying connective tissue was observed (figure 6). Some sections showed multiple islands and nests of invading malignant squamous cells showing cellular and nuclear pleomorphism, vesicular nuclei and prominent nucleoli. Enlarged and invading tumour islands showed basal cell hyperplasia and hyperchromatism, apoptotic bodies, individual cell keratinisation with keratin pearl formation and mitotic figures (figure 7). There were abundant keratin flakes in the lumen and also some areas showed keratin plugging. The cystic lining got completely obliterated, leading to difficulty in identifying the type of cyst from which PIOSCC developed. The tumour connective tissue showed angiogenesis and mild degree of diffuse chronic inflammatory infiltration. All the tumour margins were disease free and the resected lymph nodes showed no evidence of invasion by tumour cells.

DISCUSSION

PIOSCC/primary intraosseous odontogenic carcinoma (PIOC) is defined as a SCC arising within the jawbones which has no initial connection with the oral mucosa and develops from remnants of odontogenic epithelium.¹ Primary intraosseous carcinoma occurs exclusively in the jaw bones. The tumour was first described by Loos in 1913, and Wills in 1948 and termed it as intra-alveolar epidermoid carcinoma. Shear modified it to

Figure 5 The resected specimen.

Figure 6 A photomicrograph showing dysplastic cystic lining and invasive carcinoma at several places (H&E stain, ×40).

primary intra-alveolar epidermoid carcinoma while Pindborg in 1971 coined the term PIOC.² Suei *et al*³ suggested the term odontogenic SCC to replace PIOC. Eversole *et al* in 2005 used the term PIOSCC and further categorised into three subcategories of PIOSCCs: (I) solid tumour that invades marrow spaces and induces osseous resorption, (II) SCC arising from lining of an odontogenic cyst, making a subdivision in carcinomas arising in a keratocystic odontogenic tumour ('keratocyst') and carcinomas arising in other odontogenic cysts and (III) SCC in association with other benign epithelial odontogenic tumours.⁴ We suggest the use of a widely accepted single term for a given lesion to encourage more ease in communication and understanding between pathologists as well as oral surgeons. The term 'primary intraosseous odontogenic squamous cell carcinoma', can be used.

Elzay reviewed the literature on PIOC of the jaws and suggested a modification of the 1972 WHO classification, which was again modified by Slootweg and Muller taking into account the various possible origins of PIOC. Waldron and Mustoe later included intraosseous mucoepidermoid carcinoma as an additional type.⁴ On the basis of the notion that SCC of odontogenic origin arises not only in the bone marrow but also in the

Figure 7 A photomicrograph showing enlarged and invading tumour islands, which showed basal cell hyperplasia and hyperchromatism, apoptotic bodies, individual cell keratinisation with keratin pearl formation and mitotic figures (H&E stain, ×400).

periodontal and subepithelial soft tissue spaces, Suei *et al*³ recently proposed a modified classification for odontogenic carcinoma. Hence, a new more complete classification is warranted.

To define a lesion in the jaws as PIOSCC, three specific criteria should be present:

- ▶ Absence of ulcer formation on the overlying mucosa;
- ▶ Absence of a distant primary tumour at the time of diagnosis and at least 6 months during the follow-up period;
- ▶ Histological evidence of SCC.⁵

Our case fulfilled all the above criteria.

Radiographic evidence of the carcinoma arising from a pre-existing cyst is demonstrated more convincingly if the previous radiograph reveals the presence of a cyst before the emergence of the carcinoma.⁶ This scenario aptly describes our case where the presence of a radiolucent cyst-like lesion and its progression to SCC was noted.

The identification of direct transition from the benign epithelial lining of a pre-existing odontogenic cyst to a SCC in PIOSCC from odontogenic cyst will differentiate it from PIOSCC (solid type).⁷ We feel in our case the cystic component got over-ridden by the tumour component as the lesion was initially missed by the general practitioner. If intervention was made earlier more cyst lining could have been observed histologically, aiding in identifying the type of cyst from which the PIOSCC developed.

The lesion leaves many questions unanswered, which requires further research:

- ▶ What is the role of keratinisation in prognosis of the pathology?
- ▶ What determines which odontogenic cyst/keratocystic odontogenic tumour will undergo carcinomatous transformation and its role in prognosis?
- ▶ Does tobacco and alcohol have a role in etiopathogenesis?
- ▶ What is the role of chronic inflammation in the development of SCC in an existing cyst?
- ▶ What are the predisposing factors for any untreated odontogenic cyst to undergo malignant transformation?

The presence of variations in numerous odontogenic-origin benign and malignant tumours underlies the fact about the pluripotency of the odontogenic cell rests that are so frequently found in the periodontal ligament or the area distal to third molars. Thus, better the understanding of the lesion, faster is the diagnosis with better prognosis.

Learning points

- ▶ Biopsy is a mandatory procedure for any suspicious lesions.
- ▶ All ill-defined radiolucent or radio-opaque lesions must be comprehensively sampled and studied histopathologically.
- ▶ Primary intraosseous carcinoma can present as a routine dental disorder.
- ▶ A widely accepted terminology and a new comprehensive classification are needed to describe this lesion.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Eversole LR, Siar CH, van der Waal I. Primary intraosseous squamous cell carcinomas. In: Barnes L, Evson JW, Reichart P, Sidransky D, eds. *World Health Organization classification of tumours. Pathology and genetics head and neck tumours. World Health Organization International Agency for Research on Cancer*. Lyon: IACR Press, 2005:290–1.
- 2 Thomas G, Pandey M, Mathew A, et al. Primary intraosseous carcinoma of the jaws; pooled analysis of world literature and report of two new cases. *Int J Oral Maxillofac Surg* 2001;30:349–55.
- 3 Suei Y, Taguchi A, Tanimoto K. Recommendations of modified classification for odontogenic carcinomas. *Med Hypotheses* 2004;62:382–6.
- 4 Bodner L, Manor E, Shear M, et al. Primary intraosseous squamous cell carcinoma arising in an odontogenic cyst: a clinicopathologic analysis of 116 reported cases. *J Oral Pathol Med* 2011;40:733–8.
- 5 Shambhulingappa P, Sheikh S, Puri N, et al. Primary intraosseous carcinoma of mandible: an update on review of literature with a case report. *J Clin Exp Dent* 2010;2:e91–5.
- 6 Slater LJ. Odontogenic malignancies. *Oral Maxillofac Surg Clin North Am* 2004;16:409–24.
- 7 Chaisuparat R, Coletti D, Kolokythas A, et al. Primary intraosseous odontogenic carcinoma arising in an odontogenic cyst or de novo: a clinicopathologic study of six new cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2006;101:194–200.

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