Primary Intraosseous Squamous Cell Carcinoma: An Incidental Finding

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ABSTRACT
Primary intraosseous squamous cell carcinoma (PIOSCC) is a rarely reported tumour. It is a carcinoma arising within the jaws, having no initial connection with oral mucosa and presumably developed from residues of the odotogenic epithelium or from an odontogenic cyst or tumour. Primary intraosseous squamous cell carcinoma is considered a highly malignant tumour that should be treated aggressively. This is a case report of a 56-year-old man presented with a painless swelling at the chin area for 6 months. The panoramic radiograph revealed a large radiolucency at the symphysis of the mandible, with the presence of an embedded tooth. Initially the lesion was thought to be an odontogenic keratocyst or ameloblastoma. Segmental resection and reconstruction of mandible was done. The microscopic examination revealed the tumour as a primary intraosseous squamous cell carcinoma. Post operatively, a remnant of the tumour was noted at the left mandibular area. Patient opted for palliative procedure and underwent 36 cycles of radiotherapy. However, patient subsequently succumbed to the disease.

Key Words: Primary intraosseous squamous cell carcinoma, Odontogenic epithelium, Mandible, Segmental resection


INTRODUCTION
Primary Intraosseous Squamous Cell Carcinoma (PIOSCC) is a rare tumour. It is a central jaw carcinoma derived from odontogenic epithelial remnants. The definitive diagnosis of PIOSCC is very difficult because specific criteria must be adopted: 1) histological evidence of squamous cell carcinoma; 2) total absence of a cystic component or other odontogenic tumour cell; 3) absence of ulcer formation on the overlying mucosa or other evidence of a possible extraosseous origin of the tumour; 4) absence of another distant primary tumour at the time of diagnosis and at least 6 month’s absence of malignancy during the follow up period.¹ Less than 60 cases have been reported in the English literature till to date,²⁻⁵ making case reports of PIOSCC a rare disease.⁶ Besides, this tumour often present as a routine dental disorder which delay the diagnosis and contribute to the poor prognosis associated with it.

In view of the small number of cases reported in the literature, a case of PIOSCC of the mandible which presented as a diagnostic challenge is presented here.

CASE REPORT
A 56-year-old Malay man was first seen in the Department of Oral and Maxillofacial Surgery, Sultanah Bahiyah Hospital, Kedah in December 2009 with a complaint of painless swelling at the chin for duration of 5 months. Lesion had initiated as a small swelling which gradually increased in size. His medical history was non-contributory revealing chronic diabetes mellitus and hypertension that was well controlled under medications, and a history of cigarette smoking for the past 20 years.
Physical examination showed that there was an oval shaped, hard painless swelling at the anterior aspect of the mandible measuring around 8 x 3 cm in size. The chin was slightly protruded with no local raise in temperature. There was no associated cervical lymphadenopathy. Intraoral examination showed an intact overlying mucosa with no sinus or discharge. Bimanual palpation revealed expansion of both buccal and lingual cortical plate of the mandible between the mental foramen. There was no mental paraesthesia.

The bilateral submandibular lymph nodes were removed for histopathological examination.

Radiographically, a huge unilocular radiolucency with ill-defined margin was noted extending from the right body to the left body of the mandible with an impacted canine embedded in the tumour.

Internal structures were totally radiolucent and there is no sclerotic margin at the periphery of the lesion.

Evaluating the clinical and radiographic findings, the working diagnosis considered was of an ameloblastoma. We included the differential diagnosis of odontogenic keratocyst and odontogenic myxoma. Incisional biopsy was performed as it was a routine pre-op investigation test for all cystic-like swellings in this region. However, it was reported as histological non-specific as it was not in consistent with the clinical and radiographic findings. In view of the initial non-malignant differential diagnosis, excisional biopsy was planned. Segmental resection from left to right body of mandible followed by reconstruction with titanium plate was done under general anaesthesia.

Histologically, the specimen showed sheets of malignant epithelial cells infiltrating the connective tissue. There are also parakeratin whorls, individual cell keratinisation, giant nuclei, nuclear hyperchromatism, conspicuous intercellular bridges and mitotic figure seen. Islands of neoplastic epithelial cell can be seen infiltrating the connective tissue in Figure 4.

The excised specimen was submitted in one block consisting of a resected segment of mandible measuring 72mm (L) x 32mm (W) x 30mm (H) with attached tumour tissue and an impacted canine. Clinically, the tumour tissue appeared to be non-cystic and friable.

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Figure 1: Panoramic radiograph showed ill-defined radiolucency at the anterior region of the mandible associated with embedded tooth

Figure 2: Posteroanterior radiograph showed ill-defined radiolucency of lesion at the anterior region of the mandible
In view of the intact surface epithelium and intraosseous location, the histological features are consistent with a PIOSCC. There was no evidence of a distant primary site after a full medical examination and routine haematological and biochemical test. The chest radiograph was normal. In conjunction with the history, clinical, radiological and pathological findings, a diagnosis of PIOSCC was made.

Unfortunately, patient subsequently succumbed to the disease, seven months later.

DISCUSSION

Primary Intraosseous Squamous Cell Carcinoma, (PIOSCC), according to the World Health Organization classification\(^7,^8\) is subdivided into 4 groups, depending on its initial epithelial cells (table 1). In this case report, the patient presented with a type 3b PIOSCC.

PIOSCC commonly occurs in elderly patient in the sixth and seventh decades of life\(^9\) with the male predominantly affected with 2:1 ratio and a mean age of 55 years.\(^1\) This is in consistent with the 56 years’ old Malay gentleman reported in this case report. In the world literature review done by Thomas et al.,\(^4\) which consist of mainly European sample size, posterior mandible was the most...
common location (77.14%), followed by maxilla (11.4%) and anterior mandible (8.57%). Though this particular case report is not consistent with the most common location of posterior mandible, however it was similarly reported in other local studies in Asia, where the anterior mandible was reported.10, 11

The aetiology and pathogenesis of PIOSCC are unknown. These tumours arise centrally in the jaw with no communication with the aerodigestive tract mucosa and are therefore not subjected to exposure of usual carcinogenic factors. Suei et al.1 also reported similar findings and suggested the most common risk factor for inducing neoplastic formation of PIOSCC is assumed to be a reactive inflammatory stimulus, with or without predisposing genetic cofactor.12

Table 1: Classification of Primary intraosseous Squamous Cell carcinoma (PIOSCC)

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>PIOSCC exodontogenic cyst</td>
</tr>
<tr>
<td>2A</td>
<td>Malignant ameloblastoma</td>
</tr>
<tr>
<td>2B</td>
<td>Ameloblastic carcinoma arising de novo. Ex ameloblastoma or ex odontogenic cyst</td>
</tr>
<tr>
<td>3</td>
<td>PIOSCC arising denovo</td>
</tr>
<tr>
<td>a)</td>
<td>Keratinizing type</td>
</tr>
<tr>
<td>b)</td>
<td>Non keratinizing type</td>
</tr>
<tr>
<td>4</td>
<td>Intraosseous mucoepidermoid carcinoma</td>
</tr>
</tbody>
</table>

Pain caused by mandible nerve infiltration is the most common chief complaint of these patients.4, 12 Numbness of the lip, rapid swelling of the mandible and trismus due to muscle infiltration are also other common symptoms. Besides, Zwetyenga3 found that 10 out of 36 patients had clinically homolateral positive neck nodes at the time of the diagnosis, 7 in the submandibular triangle and 3 in lateral neck.

It is worth mentioning that these patients are often mistreated for presumed dental problems such as infections or inflammatory or cystic lesions. Our case confirmed this suggestion because patient presented with clinical appearance of an odontogenic cystic lesion, and diagnosis established only after histological examination of the specimens. The absence of numbness and lymphadenopathy in this patient has masked the appearance of a possible malignant tumour. This is also seen by few other case reports.3, 13 Thus, regardless of the clinical appearance, it is the histological findings that lead to the proper course of treatment. To et al.12 found a delay between the first signs and the correct diagnosis, ranging from a few weeks to 18 months is a fact that may compromise the final prognosis.

Radiographic examination also plays an important role to detect PIOSCC. However, PIOSCC shows great variation in size and shape and in the appearance of their border.4 Cup or dish shaped pattern, poorly defined moth eaten appearance, and well defined lesions are some descriptive that had been reported.4 PIOSCC that grew slowly usually had a well-defined, rather smoothly contoured border, while those that grew more rapidly showed a poorly defined, ragged border.4 Since the margins of PIOSCCs show great variation, they are usually indistinguishable from other benign or malignant tumours. As in this case, a more comprehensive radiographic examination, which includes computed tomography, should be implemented. A huge tumour like this will warrant slicing computed tomography which will provide a better picture of the osteolytic process in the mandible and involvement of the surrounding soft tissue. Occasionally, PIOSCC is associated with impacted tooth. Out of 37 cases, Huang et al.2 had reported a number of six mandible tumours that were found to be associated with impacted wisdom tooth. There were no evidence of root resorption, thus exhibiting a typical radiographic “floating teeth” pattern.14 In this case report, one tooth was embedded at the area of tumour.

The histological features if PIOSCC can be challenging due to the presence of histological variation of the odontogenic cyst epithelium in the tumour. If there is histological evidence of a previous ameloblastoma at the site, such as plexiform pattern of peripheral cells, the diagnosis of malignant ameloblastoma can be made with confidence.8 Whereas the histological finding of a Type3 PIOSCC must be of Squamous Cell Carcinoma (SCC), with or without keratinization. The histological picture of PIOSCC is often not pathognomonic and will often include lesions that produce squamous odontogenic epithelium including acanthomatous ameloblastoma, benign
and malignant salivary gland tumours that present with squamous metaplasia. In our case report, absence of surface ulceration of the overlying mucosal helped to rule out the possibility of surface SCC, whereas absence of distant primary tumour after thorough clinical investigation had led us to the diagnosis of PIOSCC. Radical surgery is accepted as the primary mode of therapy in PIOSCC of this type. The treatment modalities can be surgery alone or it can be combined with radiotherapy and chemotherapy. In Jing's recent study of 37 patients, all the patients underwent surgery of the tumour site that consisted of partial or total mandibulectomy (18 patients) and segmental resection (19 patients). Among the 37 cases, 14 cases were treated by surgery only, while another 18 cases received both surgery and adjuvant post-operative radiotherapy, and 5 patients received both chemotherapy and radiotherapy following surgery. Almost all patients also underwent radical neck dissection (35 patients). Despite the treatment modalities offered, local recurrence and distant metastasis to other organs including the brain, lung and long bone may occur. Patients who underwent surgery alone appeared to have better outcome than patients who received adjuvant radiotherapy or chemoradiotherapy. This is most probably due to the fact that a patient presenting with small lesions do not require extensive adjunctive radiotherapy and chemotherapy to begin with, where surgical intervention alone is sufficient. The reported prognosis for the patient with PIOSCC is generally poor, with only 75.7% survival rate in 1 year; followed by 62.1% in 2 years' and 37.8% in 3 years' time. Variables on survival rate, such as age, gender and lymphadenopathy, and primary treatment are not statistically significant to be reported due to its rarity of the condition.

CONCLUSION

The early diagnosis is important in dealing with PIOSCC so that suitable treatment can be given earlier. Radical surgery and reconstruction without definitive diagnosis would jeopardize the overall management and prognosis of the case. Hence, the diagnosis of intraosseoussquamous cell carcinoma should be considered in all cases of persistent pain and swelling in the jaw, more so in those presented with paraesthesia and lymphadenopathy. Patients must be kept under close follow-up until the outcome of initial diagnostic report is known. It is also advised that additional well-documented examples of PIOSCC should be reported as it will contribute to better information on management and prognosis of this uncommon neoplasm.

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REFERENCES


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