

## Squamous cell carcinoma arising in an odontogenic cyst

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### ABSTRACT

Squamous cell carcinoma arising in an odontogenic cyst is uncommon. The diagnosis of carcinoma arising in a cyst requires that there must be an area of microscopic transition from the benign epithelial cyst lining to the invasive squamous cell carcinoma. We report a histopathologically proven case of squamous cell carcinoma arising in a residual mandibular cyst in a 54-year-old woman. (*Korean J Oral Maxillofac Radiol* 2003; 33 : 235-8)

**KEY WORDS** : Carcinoma, Squamous Cell; Odontogenic Cysts; Jaw

Squamous cell carcinoma arising from the epithelial lining of an odontogenic cyst is a rare but distinct pathologic entity.<sup>1</sup> Although the exact number of documented cases is difficult to determine, Gardner<sup>2</sup> reviewed all documented cases from 1889 to 1967 and determined that there were 25 acceptable instances of malignant transformation within the epithelial lining of an odontogenic cyst. In 1991, Müller and Waldron<sup>3</sup> reported finding 81 cases documented in the world literature. The exact incidence of carcinoma arising in odontogenic cysts is unknown, but it is to vary between 0.01% and 0.02%.<sup>4</sup> The pathogenesis is unknown. However, a long-standing chronic inflammation in the adjacent connective tissue and continuous intracystic pressure have been suggested as possible causative factors.<sup>5</sup>

The clinical and radiographic findings of squamous cell carcinoma arising in an odontogenic cyst are nonspecific, therefore it may be very difficult to distinguish between a simple odontogenic cyst and a malignant tumor.<sup>5</sup> The definitive diagnosis must be made by histologic examination. It may also be very difficult to prove that the carcinoma has indeed arisen from the epithelial cyst lining rather than in close proximity to it.<sup>6</sup>

The purpose of this report is to present a histopathologically proven case of squamous cell carcinoma arising in a residual mandibular cyst in a 54-year-old woman, as well as to compare its clinical, radiographic, and histopathological features with those cases previously reported.

### Case report

A 54-year-old woman was referred by her general dental practitioner for evaluation of a radiolucent area on the left side of the mandible. She visited the dental clinic approximately one week earlier and underwent the left mandibular second molar extraction because of pain. Her medical history was unremarkable.

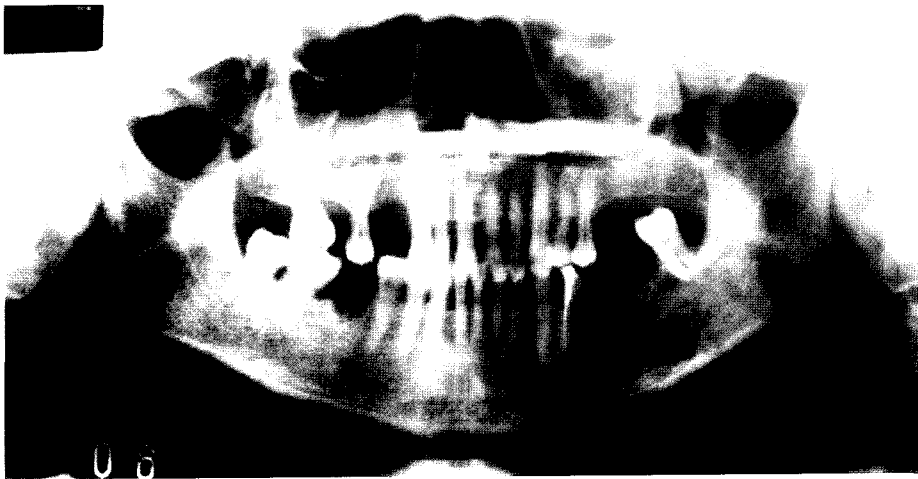
Oral examination revealed a missing left mandibular second premolar, and first and second molars. The extraction socket was filled with a granulomatous tissue. The alveolar ridge was slightly expanded and covered with intact, normal-appearing mucosa. There were no palpable lymph nodes.

The panoramic radiograph revealed a radiolucent lesion extending from the left canine to the left third molar region of the mandible (Fig. 1). The lesion in the premolar area had regular, smooth margins, whereas in the molar area, it had irregular, invasive margins and showed pronounced osseous destruction. Axial and coronal contrast-enhanced CT scans showed an inhomogeneous mass in the mandible that extended through the lingual cortical plate into submandibular space (Fig. 2). The left mylohyoid muscle could not be identified. Medially, the mass abutted the hyoglossus muscle.

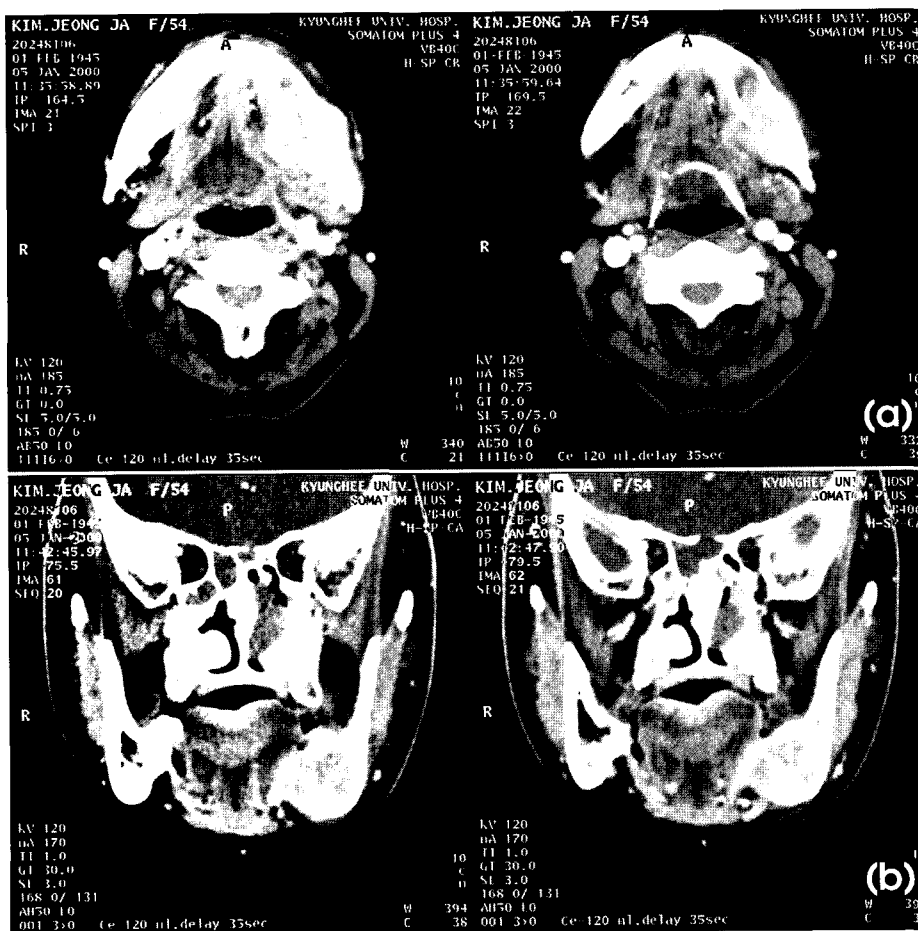
A biopsy was performed under local anesthesia. Histopathologically, the lesion proved to have a fibrous wall lined by non-keratinizing stratified squamous epithelium, which had undergone malignant change varying from intraepithelial to infiltrating squamous cell carcinoma (Figs. 3, 4). A diagnosis of well-differentiated squamous cell carcinoma was made.

She decided to undergo preoperative chemotherapy. Mandiblectomy with neck dissection and reconstruction with a

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**Fig. 1.** A panoramic radiograph showing a radiolucent lesion on the left mandible, which has round, well-defined margin in the premolar area and ill-defined margin in the molar area. The mandibular canal is displaced inferiorly.



**Fig. 2.** Contrast-enhanced axial (a) and coronal (b) CT scans showing an inhomogeneous soft tissue mass extending through the lingual cortical bone into submandibular space.

pectoralis major muscle flap were followed.

### Discussion

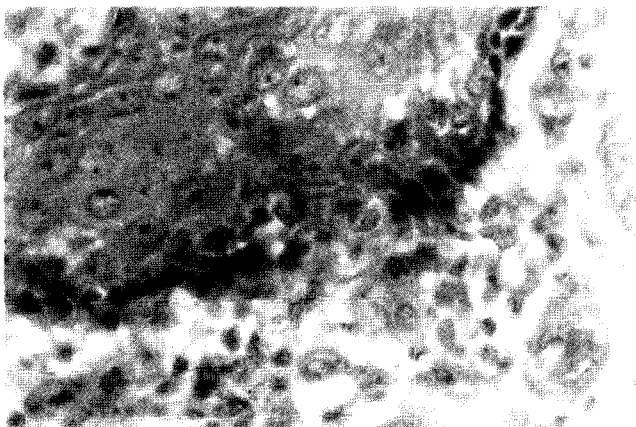
Carcinomatous involvement of the jaws is usually the result of direct extension from adjacent structures. Occasionally,

tumors in distant sites metastasize to the jaws. Primary carcinomas arising within the jaws from enclaved epithelium or from the lining of odontogenic cysts are uncommon.

Squamous cell carcinoma arising in an odontogenic cyst appears to be about twice as common in men than in women,<sup>1,2</sup> and occurs at least twice as often in the mandible as the



**Fig. 3.** A photomicrograph of the lesion showing a hyperplastic squamous epithelial lining. (H & E, magnification  $\times 100$ ).



**Fig. 4.** A photomicrograph of the lesion showing variation in nuclear form and staining, and destruction of basement membrane. (H & E, magnification  $\times 400$ ).

maxilla<sup>7-9</sup> with a predilection for the posterior region of the mandible.<sup>10,11</sup> The mean age is 57 years.<sup>1,2</sup> Reported clinical symptoms include swelling, dull pain, draining sinuses, and cervical lymphadenopathy.<sup>1</sup> Eversole et al.<sup>7</sup> reviewed 36 well-documented cases of squamous cell carcinoma arising in an odontogenic cyst. The majority had presented with either swelling or pain. Paresthesia is uncommon and usually occurs as a result of local invasion of the tumor through the neurovascular bundle of the mandible.<sup>1</sup> It is often associated with failure of an extraction site to heal and displacement of teeth.<sup>12</sup> Clinical features of pain, swelling, and failure of an extraction site to heal were found in this case, but paresthesia was absent.

Radiographically, the lesion may show as a rounded radiolucency with ill-defined borders, depending at what stage the

carcinomatous alteration is diagnosed.<sup>13</sup> Ultimately, erosion of the buccal, labial, and lingual plates occurs and roots of adjacent teeth are resorbed.<sup>14</sup> In the case presented, the lesion in the premolar area showed as a well-defined, round radiolucency, whereas in the molar area, it showed infiltration into the normal bone and perforation of the lingual cortical plate, that was suggestive of malignancy. The differential diagnosis for radiolucent lesions of mandibular body includes odontogenic keratocyst, ameloblastoma, and primary intraosseous carcinoma. Malignant change in odontogenic cysts is rare compared to the frequency of the occurrence of squamous cell carcinoma and is unlikely to be diagnosed preoperatively.<sup>15</sup>

Squamous cell carcinoma may arise from inflammatory periapical, residual, dentigerous, and odontogenic keratocysts.<sup>16</sup> In the present case, the pre-existing cyst was presumably a residual cyst of dental origin, but this diagnosis was speculative. Unfortunately, no detailed dental history was obtained from the patient before she left the hospital. The circumstances related to the date and reasons for the loss of the second premolar tooth were unknown. It is, however, possible that this tooth was non-vital and that the cyst may have represented a residual cyst. Schwimmer et al.<sup>1</sup> stated that the most common cyst undergoing malignant change is the residual cyst, constituting 55% of all reported cases.

In evaluating a squamous cell carcinoma arising in an odontogenic cyst, it is important to eliminate several other possibilities, such as invasion of the cyst wall from an adjacent primary or metastatic carcinoma and cystic degenerative change in a primary or metastatic carcinoma.<sup>16,17</sup> The definitive diagnosis of malignant change is made by the recognition of epithelial dysplasia in a cyst lining.<sup>18</sup> Hampl and Harrigan<sup>19</sup> state that the only valid index of malignancy arising within an odontogenic cyst is the presence of a transition zone between normal and malignant epithelium. In our case, we were able to demonstrate that epithelial lining of the residual cyst had undergone malignant change varying from intraepithelial to infiltrating squamous cell carcinoma, thus providing evidence that this was a well-differentiated squamous cell carcinoma arising in an odontogenic cyst. Most of the carcinoma arising in odontogenic cysts are often histopathologically well-differentiated.<sup>2,20</sup> As for cause, long-standing chronic inflammation has been suggested as the principal factor.<sup>21,22</sup> Gardner<sup>13</sup> states that the possibility of malignant transformation of odontogenic cysts is small when the cyst is not infiltrated with inflammatory cells. The neoplastic transformation in the cystic wall of the residual cyst could be caused by an inflammatory reaction to the tooth extraction.<sup>8</sup> Some authors<sup>9,23</sup> have

considered the presence of keratinization in the cyst lining to be a risk factor for malignant transformation. Browne et al.<sup>10</sup> have indicated that odontogenic cysts with keratinization may have greater tendency to develop carcinoma than non-keratinizing cysts. In the case presented, however, histopathological examination showed non-keratinizing stratified squamous epithelium.

We reported a case in which there is evidence that a squamous cell carcinoma has arisen in a mandibular residual cyst. Although the clinical and radiographic features of malignant change in an odontogenic cyst are shared by a variety of diseases of the jaws, their collective presence associated with an apparent cyst-like lesion ought to be viewed with suspicion. Furthermore, the case presented illustrates the importance of adequate and complete histopathological examination of all cysts removed, especially in older patients.

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