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Spindle cell carcinoma of the parotid gland

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Abstract
Spindle cell carcinomas of the salivary gland are extremely rare, with only a few cases having been previously reported. We present a 55-year-old man with a rapidly enlarging mass in the left parotid gland. Despite radical surgery, the tumour recurred, and led to death 11 months later. Histopathologically, the tumour was composed of two components, a squamous cell carcinoma component and a spindle cell sarcomatoid component. A diagnosis of primary spindle cell carcinoma of the parotid gland was made. Immunohistochemical studies revealed keratin positivity and vimentin negativity in the squamous cell carcinoma component: the spindle cell sarcomatoid component was positive for vimentin and negative for keratin, but showed focal positivity for epithelial membrane antigen. The origin of the sarcomatoid component and the differential diagnosis from malignant mixed tumours are discussed.

Key words: Salivary gland neoplasms; Parotid gland; Carcinoma, spindle cell; Immunohistochemistry

Introduction

Spindle cell carcinomas are variants of squamous cell carcinomas that show histological features of both a squamous cell carcinoma and a spindle cell sarcomatoid element (Leventon and Harry, 1981; Batsakis *et al.*, 1982; Weidner, 1987). Generally, spindle cell carcinomas have a poorer prognosis than the typical squamous cell carcinomas. They occur in a variety of sites, including the upper respiratory tract (Batsakis *et al.*, 1982), oesophagus (Kuhajda *et al.*, 1983), lung (Addis and Corrin, 1985), and stomach (Bansal *et al.*, 1982). However, spindle cell carcinomas occurring in the salivary gland are extremely rare; to our knowledge only three cases appear to have been reported in the literature (Claessen and Mathias, 1921; Love and Sarma, 1986; Ogawa *et al.*, 1987).

This report describes the clinical presentation, the histopathological and immunohistochemical characterization of a rare case of spindle cell carcinoma of the parotid gland.

Case report

A 55-year-old man was referred to our otolaryngology clinic for evaluation of a rapidly enlarging neck mass in the left upper parotid area. The mass had been present for a year but the patient had not sought medical attention. About eight weeks before he came to the clinic, the mass had grown larger. He had no history of neck irradiation.

Physical examination revealed a hard mass measuring 4.5 × 4.3 cm in the left parotid region. There was also a hard mass measuring 2 × 1.5 cm in the left submandibular region, which suggested a lymph node metastasis. Results of otological, nasal, oral, and laryngeal examinations were within normal limits. Chest X-ray, full blood count, and blood chemistry were normal. The echograms detected no lesion suggestive of a primary tumour in liver and kidney. Gallium imaging showed markedly increased uptake in the

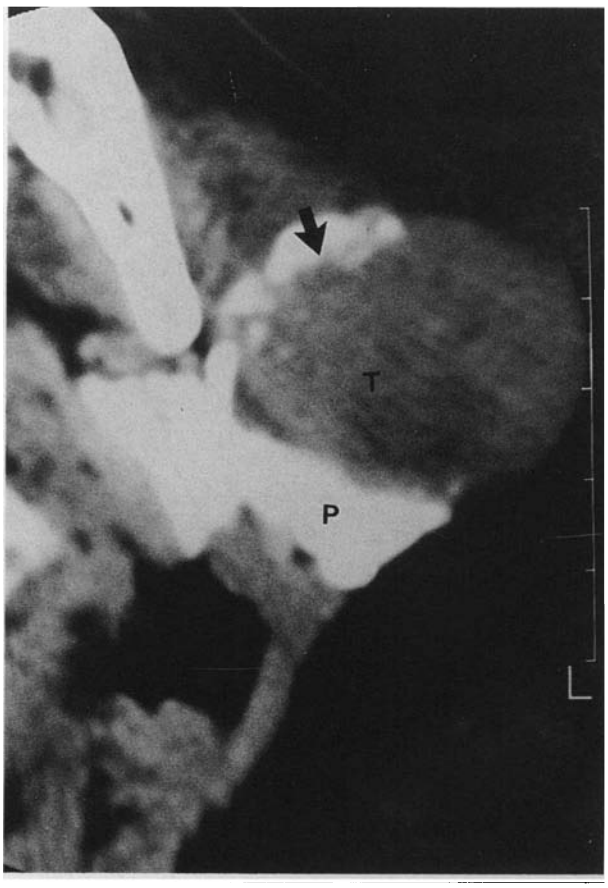

Fig. 1
Axial CT scan showing tumour (T) and contrast-filled parotid gland (P). Ill-defined infiltrative margins (arrowed) suggest malignancy.

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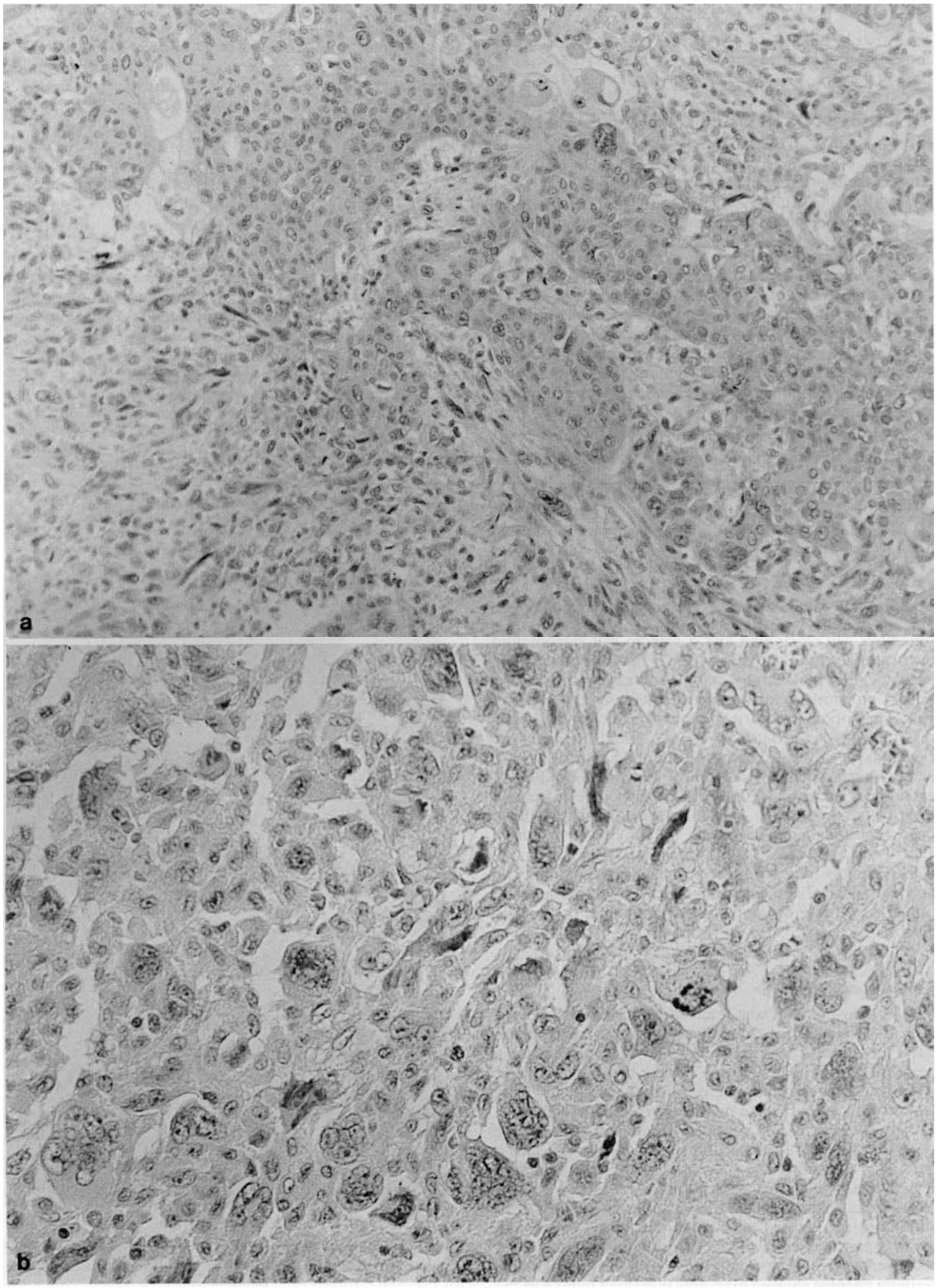

FIG. 2

Photomicrographs. (a) Poorly differentiated squamous cell carcinoma (upper) lying adjacent to and blending into spindle cells. (H&E; ×120). (b) Multinucleated giant cells scattered among the spindle cells and bizarre nucleated large cells in the sarcomatoid component. (H&E; ×400).

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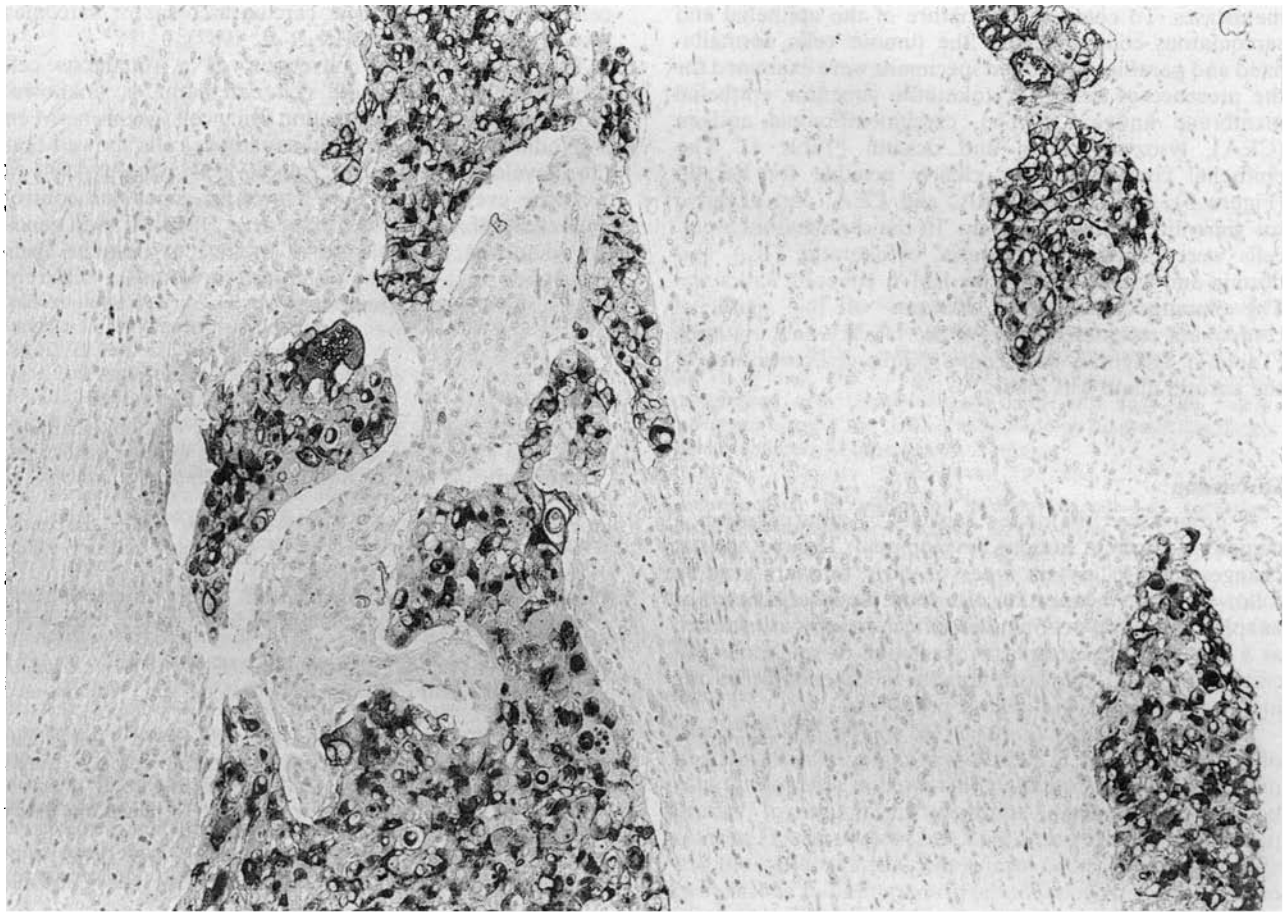

FIG. 3
Stain for keratin showing strong positivity in the epithelial component. (×100).

left parotid gland and submandibular region. In other areas, there was no abnormal increased uptake of gallium. The combined CT-sialogram demonstrated a large left parotid tumour (Figure 1), that had not invaded the adjacent soft tissue. The lesion had ill-defined infiltrative margins with the parotid gland filled with contrast material (Figure 1). Examination of a wedge biopsy specimen taken from the left parotid tumour suggested an undifferentiated carcinoma. Despite the administration of radiation therapy (16 Gy), the tumour enlarged gradually. A left radical parotidectomy including the facial nerve and the overlying skin was performed along with a radical neck dissection. A pectoralis major musculocutaneous flap was used to repair the skin deficit. The patient was discharged to be treated as an outpatient with post-operative radiotherapy to the primary site and to the neck. However, eight months later, the tumour recurred in the left parotid region, and continued to enlarge clinically. Despite the administration of a combined chemotherapy of cysplatin and fluorouracil, the patient died of persistent carcinoma 11 months after his initial presentation. No autopsy was performed.

Pathological findings

The surgical specimen consisted of a moderately firm tumour, measuring 4.5 × 3.5 × 3 cm. The tumour mass was partially encapsulated, but focally invaded the adjacent parotid gland, the facial nerve, and the overlying skin. The cut surface was solid, yellowish-white, and showed central necrosis. The surgical margins were free of tumour.

Histopathological examination revealed that the tumour had focally invaded adjacent scleroatrophic and inflamed salivary gland tissues. There were some residual atrophic salivary ducts within the tumour. The tumour consisted of two recognizable components; a squamous cell carcinoma and a spindle cell sarcomatoid component. The latter predominated, the former being present along the tumour margin adjacent to the salivary gland. A gradual transition between the two components was seen (Figure 2a). In some areas of the sarcomatoid component, multinucleated giant cells were observed scattered among the spindle cells (Figure 2b). No cartilage, osteoid or myxoid areas were found. The lesion was diagnosed as a spindle cell carcinoma of the parotid gland. Of 15 resected cervical lymph nodes, two in the submandibular region of the neck dissection contained metastatic squamous cell carcinoma. No spindle cell sarcomatoid component was present in the

TABLE I
IMMUNOHISTOCHEMICAL FEATURES OF TUMOUR CELLS AND SALIVARY DUCTS

	Epithelial component	Sarcomatoid component	Duct epithelium
Keratin (P)	+	–	+
Cytokeratin (M)	+	–	+
Vimentin (M)	–	º	–
EMA (M)	+	–	+
CEA (M)	+	–	+
Lysozyme (P)	º	*º	+
Actin (M)	–	º	–
Desmin (M)	–	–	–

(+), positive; (º), focal positive; (–), negative; *, few giant cells. P, polyclonal antibody; M, monoclonal antibody.

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metastases. To compare the nature of the epithelial and sarcomatous components of the tumour cells, formalin-fixed and paraffin-embedded specimens were examined for the presence of keratin, cytokeratin, vimentin, epithelial membrane antigen (EMA), carcinoembryonic antigen (CEA), lysozyme, actin and desmin (Table I). The epithelial component was clearly positive for keratin (Figure 3), cytokeratin, EMA, and CEA, and negative for vimentin, actin and desmin. In the sarcomatoid areas, cells were negative for keratin, cytokeratin, CEA and desmin and focally positive for EMA, vimentin and actin. The immunohistochemical features of the epithelial component resembled those of the salivary duct epithelia (Table I). Diagnosis of primary spindle cell carcinoma of the parotid gland was made.

Discussion

A progressive loss of the capacity to differentiate is a common feature of tumour development. The metaplastic changes seen in certain types of early tumours may be followed by the acquisition of a more undifferentiated or anaplastic phenotype. Spindle cell carcinomas are formed as a result of the metaplastic transition of squamous cell carcinoma to the anaplastic spindle cell phenotype having highly aggressive tumourigenic properties.

We have presented a rare case of spindle cell carcinoma of the parotid gland. The primary tumour, which had been present for a year, suddenly increased in size two months before the patient's admission. Although a radical parotidectomy was performed, the patient died 11 months after the operation of a local recurrence. Histopathological examination revealed that the primary tumour consisted of a squamous cell carcinoma and a spindle cell sarcomatoid component. The latter predominated and areas of transition between both components were demonstrable. The clinical and pathological findngs prompt us to speculate that a sarcomatoid transition in the primary lesion caused rapid progression of the parotid tumour.

The sailvary glands have been recognized as an uncommon site of spindle cell carcinoma. Claessen and Mathias (1921) reported a submandibular gland tumour which consisted of epithelial and spindle cell or pleomorphic cell populations. This could be the first case report of a spindle cell carcinoma of the salivary gland. Love and Sarma (1986) reported a mucoepidermoid carcinoma of the submandibular gland with an extensive spindle component that initially suggested a sarcoma. They demonstrated the epithelial nature of the sarcomatoid component by immunoperoxidase staining for keratin. Ogawa *et al.* (1987) reported a similar salivary gland tumour, but they did not describe the histological findings in detail.

The findings in this case differ from those in carcinosarcomas or true malignant mixed tumours, which show differentiation into specific tissues such as neoplastic bone, cartilage and striated muscle (Batsakis, 1979). The spindle cell component of our case exhibited spindle cells with no differentiation of mesenchymal tissue. Leader *et al.* (1987) reported that the epithelial component of spindle cell carcinoma showed keratin positivity and vimentin negativity: the sarcomatoid component was positive for vimentin and negative for keratin. While our patient exhibited similar immunohistochemical features, we observed a focal positivity for EMA, providing evidence for epithelial properties in the sarcomatoid component. This finding may have some value in distinguishing spindle cell carcinomas from true carcinosarcomas or sarcomas (Auclair *et al.*, 1986; Leader *et al.*, 1987).

The cause of the conversion of a squamous cell carcinoma into a spindle cell carcinoma is unknown. However, a recent investigation using cell fusions between a spindle cell carcinoma and squamous cells showed that the development of the spindle cell phenotype is a recessive event caused by a loss of the genes that control epithelial differentiation (Stoler *et al.*, 1993). If such genes are identified, it would be of interest to examine their expression in a variety of human tumours at different stages of differentiation.

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