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Case report

Squamous cell carcinoma of the brain with sarcoma-like stroma

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Summary. A cerebral neoplasm containing a well differentiated epidermoid cyst surrounded by islands of infiltrating squamous cell carcinoma and a pleomorphic spindle cell stroma was described. By immunoperoxidase staining all these components contained keratin. The lesion was therefore similar to malignant squamous cell lesions with sarcoma-like stroma occurring in other body sites.

Key words: Brain – Carcinoma – Keratin – Pseudosarcoma

Introduction

We describe here a case of squamous cells carcinoma arising in an epidermoid cyst and showing a sarcoma-like stroma. Numerous positive cells were present using an immunoperoxidase method with anti-keratin anti-serum. Although the sarcoma-like stroma is a well known feature in squamous carcinoma occurring in other locations, this is the first report, to the best of our knowledge, of a primary squamous cell carcinoma with sarcoma-like stroma arising in the brain. Squamous cell carcinoma of the brain is a rare but well known entity. Although the tumor usually arises from an epidermoid cyst in the cerebello-pontine angle or in the lateral pontine region, exceptions have been reported (Garcia et al. 1981).

Case Report

The patient, a 45 year-old man, was well until ten days prior to admission, when he developed headache and left hemiparesis. On the admission, he showed a left seventh nerve weakness together with left homonymous hemianopsia and left hyperreflexia. Clinical history, physical examination and laboratory work-up excluded extraneurologic diseases. X-ray examination of the lungs was normal. Computerized tomography of the brain showed a deep paraventricular lesion in the right parieto-occipital region with dishomogeneous enhancement after contrast infusion. The tumor compressed the posterior horn of the lateral ventricle and isolated the

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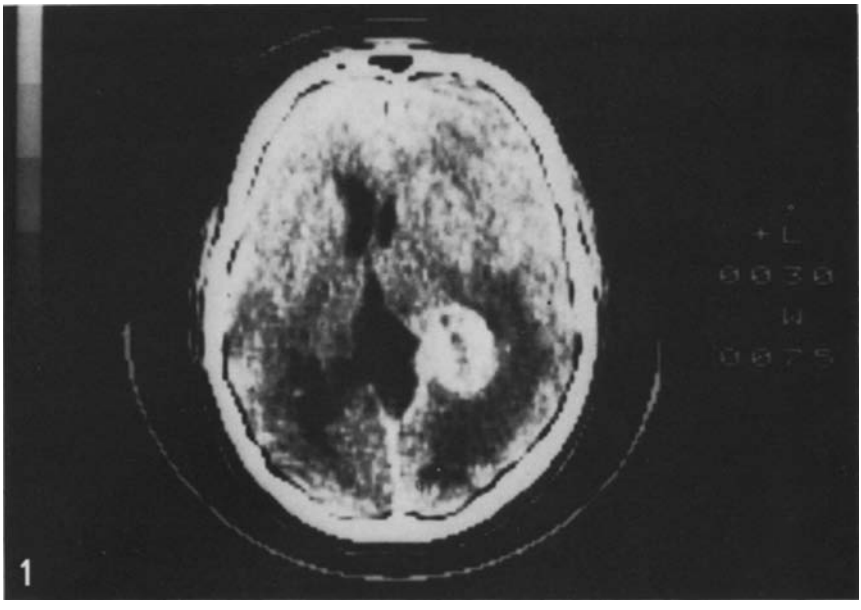

Fig. 1. By computerized tomography, the neoplasm was a well defined paraventricular nodule associated with marked mass effect as shown by displacement of the septum pellucidum and 3rd ventricle to the left.

temporal horn which was enlarged. The septum pellucidum and third ventricle were displaced to the left (Fig. 1). Internal carotid angiography showed elevation of the sylvian vessels with widening of the fronto-parietal branches.

A right parieto-temporal craniotomy was performed. The tumor consisted of a solid, well-defined nodule adherent to the wall of a cyst containing dry, cheesy, yellow material. The neoplasm was resected in multiple fragments. The patient's postoperative course was good. He was given three courses of radiotherapy of 1,500 rads each.

Seven months after the operation, he developed evidence of recurrent tumor, confirmed by CT scan. He died 8 months after the operation. No autopsy was performed. However chest films and laboratory tests performed 3 weeks before death were unremarkable.

Materials and methods

The surgical specimen consisted of multiple fragments of neoplastic tissue which were fixed in buffered formalin and embedded in paraffin. Five μm sections were stained with haematoxylin and eosin, Masson trichrome, PTAH, PAS with and without prior digestion, and Masson-Fontana.

An unlabelled antibody-PAP-technique was applied for detection of keratin and glial fibrillary acid protein (GFAP). In particular the anti-keratin and anti-GFAP antsera (DAKO) were used at a dilution of 1:250 for one hour at room temperature; the link antiserum consisted of swine anti-rabbit immunoglobulin and was diluted 1:50; PAP-complexes (DAKO) were employed at a dilution of 1:100. Charbazol was used as chromogen according to Rojas-Espinosa et al. (1974).

Results

Microscopically the cyst was composed of well differentiated squamous epithelium supported by a collagenous wall (Fig. 2). Abundant keratinous mul-

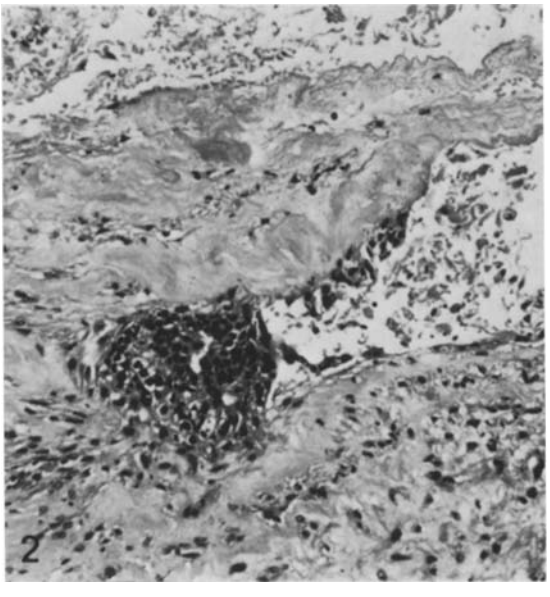

Fig. 2. The cystic component of the neoplasm consists of a collagenous wall lined by well differentiated squamous epithelium (H.E. ×125)

tilamellar material was present. In addition, there was neoplastic tissue in the brain parenchyma outside the cyst wall. This was composed predominantly of a spindle-cell tissue where islands of a moderately to well-differentiated squamous cell carcinoma were present. The squamous cell component blended imperceptibly with the spindle-cell component (Figs. 3–4). The latter showed a sarcoma-like appearence with highly pleomorphic spindle cells having large nuclei with prominent nucleoli and eosinophilic cytoplasm. Areas were present in which bands of collagenous tissue entrapped small groups or individual tumor cells. No striated muscle fibers, nor heterologous elements were seen in the sarcomatoid component. Mitoses were numerous. Large areas of necrosis were frequently observed.

The PTAH and Masson-Fontana stains were negative.

Immunoperoxidase staining for keratin revealed strong positivity in the squamous areas and a variable degree of intracytoplasmic staining in the sarcomatoid component (Fig. 5). The lamellar keratinic material and the squamous epithelium of the cyst were positive. The GFAP stain was completely negative.

Discussion

Thirteen cases of intracranial squamous cell carcinomas have previously been reported. According to Garcia et al. (1981), ten were associated with an epidermoid cyst, whereas the rest did not have any cystic component. The only report of a sarcoma associated with an epidermoid cyst is the one published by Stromeyer (1909). Unfortunately, this paper contained no microscopic illustrations.

The present case is of particular interest because it displayed a sarcoma-like stroma that is occasionally seen in squamous cell carcinomas outside

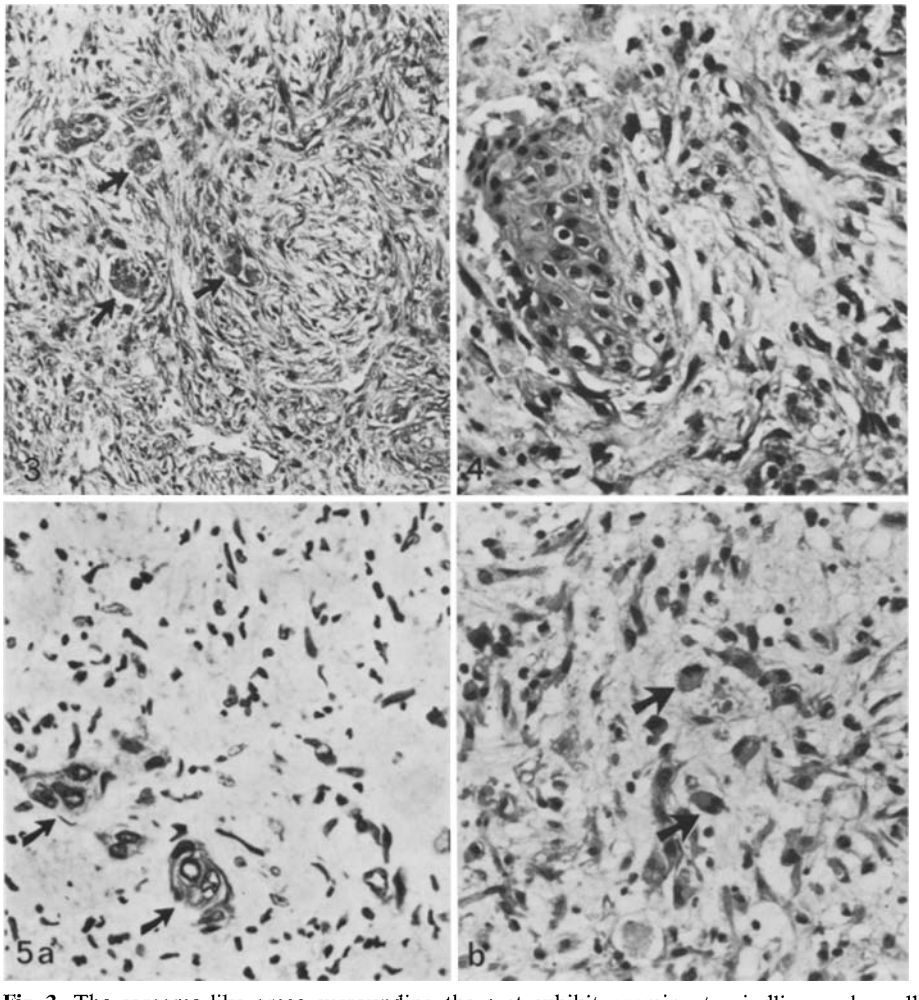

Fig. 3. The sarcoma-like areas surrounding the cyst exhibit prominent spindling and small islands of squamous cells (*arrows*) (H.E. 125)

Fig. 4. A nest of squamous cells imperceptibly blends into sarcoma-like component (H.E. × 300)

Fig. 5. A, B. Immunoperoxidase staining for keratin shows cytoplasmatic positivity in squamous cell areas (**A**) and in some cells within the spindle cell component (**B**) (*arrows*) (× 300)

of the brain. Squamous cell carcinomas with sarcoma-like stroma occur in the oral cavity (Leifer et al. 1974), larynx (Minkler et al. 1970; Goellner et al. 1973; Giangaspero et al. 1978), oesophagus (Stener et al. 1967; Enrile et al. 1973; Battifora 1976; Osamura et al. 1978; Du Boulay and Isaacson 1981), skin (Battifora 1976), female genital tract (Steeper et al. 1983), and paranasal sinuses (Piscioli et al. 1984) but to the best of our knowledge have never been reported in the brain. In the present case, no autopsy was per-

formed, but the possibility of a primary tumor in above mentioned sites has been ruled out. Therefore it appears highly unlikely that the present neoplasm might be metastatic.

The histogenesis of squamous cell carcinoma with sarcoma-like stroma has been studied exhaustively. Ultrastructural studies have been controversial. Some authors (Minkler et al. 1970; Goellner et al. 1973; Leifer et al. 1974) found features consistent with connective tissue elements while others (Battifora 1976; Osamura et al. 1978; Du Boulay and Isaacson 1981) found features suggestive of epithelial cells.

Battifora (1976) demonstrated evidence of intermediate cells with both epithelial and mesenchymal features able to produce collagen. These findings support the concept that spindle sarcomatous areas are the result of a mesenchymal metaplasia of malignant squamous cells (Battifora 1976; Giangaspero et al. 1978; Du Boulay and Isaacson 1981). The presence of keratin in our case and in similar tumors in other sites (Piscioli et al. 1984; Steeper et al. 1983) indicates the spindle cell component is at least partly formed by neoplastic epithelial cells.

Histologically the present case may mimic different types of primary or metastatic neoplasms. A mixed tumor with glial component is excluded by the negativity of PTAH and GFAP stains. Deep-seated primary fibrosarcomas, which represent the most frequent intracerebral spindle-cell sarcoma (Kernohan and Uihlein 1962; Burger and Vogel 1982) can be ruled out by recognition of small aggregates of squamous cells. The diagnosis is confirmed by the staining for keratin, localized both in the squamous and in the spindle component. This protein is considered as specific marker for epithelial cells (Sienski et al. 1981; Espinoza and Azar 1982). It has never been observed in sarcomas (Gabbiani et al. 1981) with the exception of synovial sarcoma (Miettinen et al. 1982).

Numerous studies (Stener et al. 1967; Enrile et al. 1973; Goellner et al. 1973; Giangaspero et al. 1978) suggest that the clinical course of squamous cell carcinoma with sarcoma-like stroma is more indolent than that of ordinary invasive squamous cell tumors in an equivalent location. Nevertheless, further reports are necessary to ascertain the biologic behaviour and the response to the therapy of this unusual type of neoplasm in the brain.

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References

Battifora H (1976) Spindle cell carcinoma. Cancer 37:2275–2282

Burger PC, Vogel FS (1982) Surgical pathology of the nervous system and its covering (2nd ed). J Wiley and Sons New York, pp 375–378

Du Boulay CEH, Isaacson P (1981) Carcinoma of the oesophagus with spindle cell features. Histopathology 5:403–414

Enrile FT, de Jesus PO, Bakst AA, Baluyot R (1973) Pseudosarcoma of the esophagus (polipoid carcinoma of esophagus with pseudosarcomatous features). Cancer 31:1197–1202

Espinoza CC, Azar HA (1982) Immunohistochemical localization of keratin-type proteins in epithelial neoplasms. Am J Clin Pathol 78:500–507

Gabbiani G, Kapanci Y, Barazzone P, Franke WW (1981) Immunochemical identification of intermediate-sized filaments in human neoplastic cells. A diagnostic aid for the surgical pathologist. Am J Pathol 104:206–216

Garcia CA, McGarry PA, Rodriguez F (1981) Primary intracranial squamous cell carcinoma of the right cerebellopontine angle. J Neurosurg 54:824–828

Giangaspero F, Baruzzi G, Lemma E, Lorenzini P, Minghetti G, Ferracini R (1978) Carcinomi fusocellulari del laringe. Pathologica 70:537–545

Goellner JR, Devine KD, Weiland LH (1973) Pseudosarcoma of the larynx. Am J Clin Pathol 59:312–326

Kernohan JW, Uihlein A (1962) Sarcomas of the Brain. CC Thomas, Springfield, pp 25–69

Leifer C, Miller AS, Putong PB, Min BH (1974) Spindle-cell carcinoma of the oral mucosa. A light and electron microscopic study of apparent sarcomatous metastases to cervical lymph nodes. Cancer 34:597–605

Miettinen M, Lheto VP, Virtanen I (1982) Keratin in the epithelial-like cells of classical bifasic synovial sarcoma. Virchows Arch [Cell Pathol] 40:157–161

Minkler DS, Meligro CH, Norris HT (1970) Carcinosarcoma of the larynx. Case report with metastases of epidermoid and sarcomatous elements. Cancer 26:195–200

Osamura RY, Shimamura K, Hata J, Tomaoki N, Watanabe K, Kubota M, Yamazaki S, Mitomi T (1978) Polipoid carcinoma of esophagus. A unifying term for "carcinosarcoma" and "pseudosarcoma". Am J Surg Pathol 2:201–208

Piscioli F, Aldovini D, Bondi A, Eusebi V (1984) Squamous cell carcinoma with sarcoma-like stroma of the paranasal sinuses. Histopathology (in press)

Rojas-Espinosa O, Dannenberg AM, Sternberger LA, Tsuda T (1974) The role of cathepsin D in the pathogenesis of tubercolosis. Am J Pathol 74:1–18

Steeper TA, Piscioli F, Rosai J (1983) Squamous cell carcinoma with sarcoma-like stroma of the female genital tract. Cancer 52:890–898

Stener B, Kock NG, Petterson S, Zetterlund B (1967) Carcinosarcoma of the esophagus. J Thorac Cardiovasc Surg 54:746–750

Sienski W, Dorsett B, Ioachim HL (1981) Identification of prekeratin by immunofluorescence staining in the differential diagnosis of tumors. Hum Pathol 12:452–458

Stromeyer F (1909) Über ein mit Sarkom kombiniertes Cholesteatom des Gehirns. Beitr Pathol Anat Pathol 47:392–398

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