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## An unusual tumour of the breast: cytological findings

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### Introduction

The epithelioid variant of malignant peripheral nerve sheath tumour (MPNST), or epithelioid malignant schwannoma is an unusual form of MPNST that closely resembles carcinoma or melanoma as the tumour is composed predominantly of Schwann cells with a polygonal epithelioid appearance.<sup>1–6</sup> It has been estimated that 5% or fewer MPNST belong to this group. The tumours follow a distribution similar to that of the ordinary MPNST, mostly occurring in patients 20–50 years of age, and may arise in the deep and superficial soft tissues of almost every anatomical site, with rapid growth and aggressive biological behaviour. Most of the tumours reported in the literature originated in major nerves. It is the cases in which the origin from a nerve cannot be documented that pose the most challenging problems in diagnosis.

MPNST are some of the most difficult soft tissue tumours to diagnose by fine needle aspiration (FNA)<sup>7–9</sup> and the results vary greatly depending upon a number of factors including the experience and skill of the aspirator and interpreting cytopathologist. The first description of the cytomorphological features was in 1989 by Molenaar *et al.*<sup>10</sup> The majority of the cases described in the literature are isolated reports.<sup>11–17</sup> Difficulties in the FNA diagnosis of schwannoma have been reported by many authors, especially of epithelioid malignant schwannoma.<sup>18,19</sup>

The aim of this paper is to present our case of FNA of epithelioid malignant peripheral sheath tumour of the breast with special reference to the cytological findings.

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### Case report

The patient was admitted because of pains in the thoracic spine and sternum, general weakness and subfebrile temperatures. X-ray showed bilateral lung infiltrates and a subcutaneous nodule 1 cm in size in the lower outer quadrant (LOQ) of her left breast, which was clinically, as well as mammographically and by ultrasound, described as benign. Cytological material was obtained by FNA using a 22-gauge needle attached to 10 ml syringe and Camedo holder. FNA smears were cellular and bloody. Individual bizarre cells of epithelioid appearance were mainly distributed singly but rare loosely coherent clusters were present. Isolated cells were large in size with pronounced anisocytosis. Cytoplasm was abundant and polygonal, well defined, with a granular appearance. Round or oval nuclei were eccentrically located, intensely hyperchromatic with coarse chromatin, a prominent nuclear membrane and prominent nucleoli (Figures 1 and 2). A cytological diagnosis of malignant neoplasm was established. Immunocytochemistry was not performed. The patient underwent surgery.

A subcutaneous nodule measuring 0.7 cm in diameter was excised from the left breast. The tumour was composed of short cords of large epithelioid cells, having large, round nuclei with prominent melanoma-like nucleoli. A spindled 'schwannian' component was much less prominent. Sarcoma, malignant melanoma and anaplastic carcinoma were suspected on light microscopy (Figure 3). In keeping with the immunohistochemical findings [vimentin ++, anti-melanosome (HMB-45) –, S-100 protein +++, desmin –, actin –, cytokeratin MNF116 –, epithelial membrane antigen (EMA) –, neuron-specific enolase (NSE) ++, glial fibrillary acidic protein (GFAP) ++, carcinoembryonic antigen (CEA) –], a histological diagnosis of malignant epithelioid schwannoma was established (Figure 4). The patient died 10 days after the excision with carcinomatous lymphangitis of the

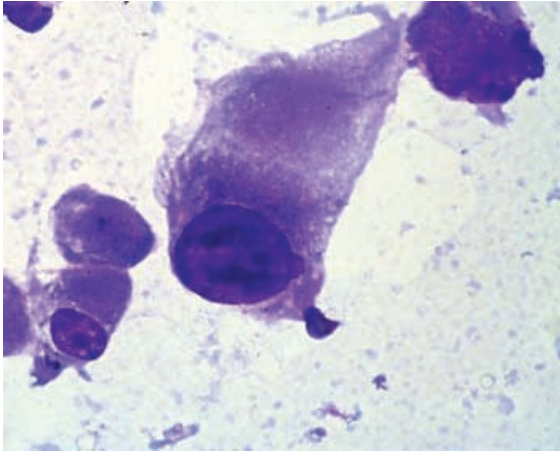


Figure 1. Fine needle aspiration cytology (FNAC) of breast tumour (MGG, × 1000).

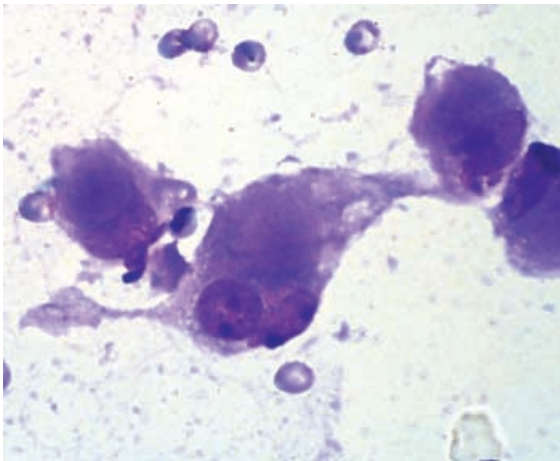


Figure 2. Fine needle aspiration cytology (FNAC) of breast tumour (MGG, × 1000).

lungs and respiratory insufficiency. An autopsy was not performed and the question of primary localization of the tumour remains unsolved.

### Discussion

FNA smears were composed of bizarre cells which showed cellular discohesiveness and pronounced anisocytosis. The cytoplasm was abundant, well defined, with a granular appearance. Round or oval, eccentrically located nuclei were hyperchromatic with coarse chromatin and prominent nucleoli (Figures 1 and 2). The smears were easily classified as malignant

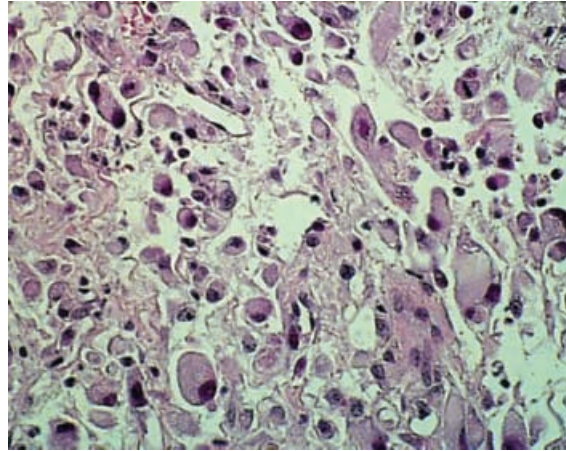


Figure 3. Tissue specimen (H & E, × 400).

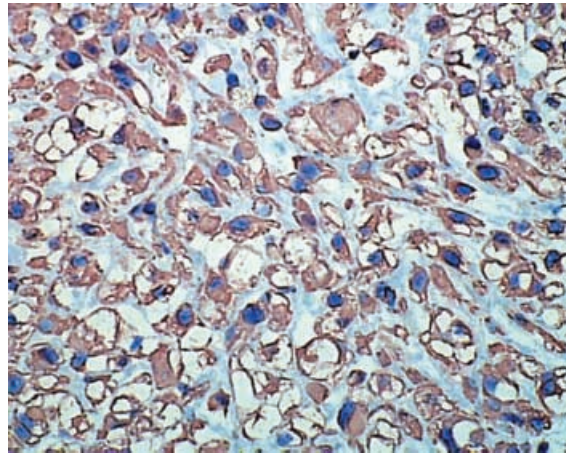


Figure 4. Tissue specimen (Anti S-100, haematoxylin, × 400).

but the major challenge resided in distinguishing it from other types of malignant tumours.<sup>20–23</sup>

The main differential diagnosis was between amelanotic malignant melanoma, poorly differentiated carcinoma and sarcoma.

Amelanotic malignant melanoma also shows polymorphic cytological findings. Single individual cells are large and pleomorphic and can have an epithelioid appearance. The pleomorphic nuclei have prominent nucleoli. They are positive for HMB 45 as well as other melanoma-associated antigens. Poorly differentiated carcinoma shows a wide spectrum of cytological features, which can be classified by using immunocytochemical stains (positivity for cytokeratins,

vimentin and CD 34, while S-100 protein is usually negative).

Staining cytological smears for S-100 protein for distinguishing from sarcomas (fibrosarcoma, synovial sarcoma, leiomyosarcoma) may provide an additional diagnostic aid because sarcomas are typically negative, while schwannomas may be variably positive. Dood *et al.*<sup>19</sup> described an epithelioid schwannoma in which the cytological findings were similar to ours but Reis-Filho *et al.*<sup>18</sup> described smears composed of small clusters and isolated epithelioid cells with vesicular and pleomorphic nuclei, presenting distinct nucleoli, eosinophilic plasmacytoid cytoplasm and microvaculation, disposed in a mucinous extracellular matrix. Due to the absence of immunocytochemistry we were not able to classify the tumour.

Immunohistochemistry showed that 80% of these tumours are strongly and diffusely positive for S-100 protein.<sup>3</sup> They do not express melanoma-associated antigens, and only rarely is keratin present. Despite the limited number of reported cases, there is no doubt that they are fully malignant tumours and should be treated accordingly. At least half of the patients reported in the literature developed distant metastases, usually in the lung.<sup>3</sup>

The epithelioid variant of MPNST is difficult to classify correctly by FNA samples alone (due to lack of experience because it occurs very rarely in the breast; also due to the heterogeneity of the constituent cells and the misleading differential diagnoses), but it may be achieved by associating the cytological features with a correct immunohistochemical panel.

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