BRIEF COMMUNICATIONS

Neuroendocrine Carcinoma of the Skin in a Dog

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Tumors of the skin occur more frequently in domestic animals than any other tumors [17]. Most are classified easily by their histologic appearance. In 1972, five undifferentiated carcinomas were reported in man and the term “Trabecular carcinoma of the Skin” was introduced [16]. At that time the histogenesis of the tumor was uncertain, but in recent years electron microscopy has revealed the neuroendocrine nature of these neoplasms [1, 2, 11-15, 18]. It has been suggested that these tumors originate from the cutaneous Merkel cell [8]. The following case report presents evidence of a similar tumor in a dog with ultrastructural studies and necropsy.

A 14-year-old female Boston terrier had three cutaneous nodules. A 1.5 X 1 X 1-cm mass was present on the ventral thorax and two 1 X 0.5 X 0.5-cm masses were seen in the lateral neck. These were removed surgically and all were similar histologically. Within a four-month period the dog became symptomatic, was euthanized, and necropsy was done. The findings revealed clear lungs but multiple metastases in abdominal lymph nodes, and large nodular metastases in the liver and adrenal glands.

All three skin lesions were similar. They were composed of subepidermal nodular infiltrates with slight infiltration into underlying subcutaneous fat. The overlying epidermis was uninvolved. The tumor cells were fairly uniform small cells with ovoid and rounded nuclei [fig. 1]. Cytoplasm was scanty and cell borders were ill defined. Mitotic figures frequently were seen, but nucleoli were not prominent. The tumor cells were grouped compactly into irregular solid sheets, trabeculae, and cords with a scanty supporting stroma. No true rosettes were present but pseudorosettes around small blood vessels were noted.

Electron microscopy revealed the tumor cells to be joined by occasional desmosomal junctions and the cytoplasm to be filled with frequent dense core secretory granules [figs. 2, 3]. Although some granules were present in cell processes, most were present within the main portions of cytoplasm without evidence of frequent microtubules. Nuclei were oblong-shaped or round without deep indentations.

This case report demonstrates a neuroendocrine carcinoma of the skin in a dog. While there are numerous reports in man [1, 2, 7, 11-15, 18], the tumor has not been described previously in a dog. While the cell of origin is not established definitely, the most likely origin is from the epidermal Merkel cell, first described in 1875 [8]. These cells have been described as showing contacts with peripheral axons and containing numerous dense-core secretory granules measuring 100 to 200 nm in diameter each [3, 6, 9, 10]. It has been suggested that Merkel cells are of neural crest origin [6]. Recently metenkephalin was demonstrated in Merkel cells in rats and pigs [3-5]. Some reports have demonstrated melanosomes in tumors of these cells—another support for the origin from neural crest [2, 18]. Human Merkel cell tumors tend to spread through lymphatics and involve regional lymph nodes [16]. Although not uniformly fatal, some patients die from disseminated disease [18].
Neoplasms of Merkel cells should be suspected whenever essentially undifferentiated small cell tumors are located in the dermis. By light microscopy the diffuse sheets of small cells may be mistaken for malignant lymphoma. Electron microscopy demonstrates desmosomal junctions and numerous secretory granules—features not seen in lymphoma.

Differential diagnosis also should include skin adnexal tumors, such as sweat gland carcinomas, basal cell tumors, and metastatic carcinomas, such as mammary gland carcinomas. Skin adnexal and basal neoplasms can be excluded in this dog because of the neuroendocrine features on electron microscopy and the absence of squamous characteristics.
Mammary carcinoma is excluded because of the absence of glandular characteristics. A metastatic neuroendocrine tumor cannot be excluded totally, and some features suggest this. These include the lack of regional node involvement, the presence of more than one skin lesion, and the widespread abdominal involvement. The lungs were negative for tumor, thereby excluding a small cell lung carcinoma. A neuroblastic adrenal tumor is a possible primary diagnosis, but electron microscopy did not demonstrate neurites or definite neural characteristics.

References


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