

MAMMARY BENIGN NEOPLASM DIAGNOSED BY FINE NEEDLE ASPIRATION BIOPSY IN A GUINEA PIG (*Cavia porcellus*)

[*Neoplasia mamária benigna diagnosticada por punção aspirativa por agulha fina em porquinho da Índia (Cavia porcellus)*]

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ABSTRACT - Cytology is a well established research technique in human and veterinary medicine, but it is rarely used in small rodents. Spontaneous tumors are relatively uncommon in guinea pigs and those described in literature include a variety of organs like skin and subcutis, respiratory and reproductive tract, endocrine and hematopoietic system, and mammary gland. The objective of this article was to describe the use of the fine needle aspiration biopsy technique (FNAB) on evaluation of a mammary neoplasm in a guinea pig and describe the main cytological findings for the first time in literature.

Keywords: Guinea pig, mammary gland, neoplasia, tumor, pathology, cytology.

INTRODUCTION

Cytologic examination has become recognized as a very useful tool for practicing veterinarians. In most situations, cytologic samples can be collected quickly, easily and inexpensively, with little or no risk to the patient. The primary goal of aspiration cytology is to distinguish inflammatory from neoplastic lesions, differentiate benign from malignant neoplasms and identify aetiologic agents of different infectious causes of inflammation (Cowell et al., 2008; Teske et al., 2008).

In human medicine, cytological diagnosis is well established and developed (Bibbo, 2009). In veterinary medicine, although exist many studies concerning cytologic diagnosis in domestic animals, there are few in exotic ones. The fine needle aspiration biopsy (FNAB) has been used in the diagnosis of a limited number of neoplastic diseases in guinea pigs (McEwan & Callanan, 1993; Osofsky et al., 2004; Steimber, 2000).

Spontaneous tumors are relatively uncommon in guinea pigs and have been reported as early as 4 months of age reaching an incidence of 30% over 3 years of age. Tumors described in literature include a variety of organs like skin and subcutis, respiratory and reproductive tract, endocrine and hematopoietic system, and mammary gland. The most common tumor of guinea pigs is bronchogenic papillary adenoma, followed by tumors of the skin and subcutis (Greenace, 2004; Suárez-Bonnet et al., 2010). There are few reports in literature regarding

mammary tumors in guinea pigs (Rogers & Blumenthal, 1960; Blumenthal & Rogers, 1967; Kitchen et al., 1975; Andrews, 1976; Andrews & Shively, 1976; Ediger & Kovatch, 1976).

The objective of this case report was to describe the use of the fine needle aspiration biopsy technique (FNAB) on evaluation of a mammary neoplasm in a guinea pig and document the main cytological findings since there are no reports in literature to date.

CASE REPORT

A male 10-years-old guinea pig (*Cavia porcellus*) was presented to the Laboratory of Investigative and Comparative Pathology of the College of Veterinary Medicine and Animal Science, Univ. Estadual Paulista, Botucatu-SP, Brazil, due to a mammary enlargement with unknown duration time. Physical examination revealed a firm mass located on the subcutaneous tissue of the right mammary gland, measuring 2,5 x 3,0 x 2,0 cm, attached to underlying tissues, non-haired, non-ulcerated and painless. The other organs revealed no significant alterations. Samples from the mammary mass for cytologic examination were obtained by fine needle aspiration technique using a 22 gauge needle and a 10 mL disposable syringe. The smears were air-dried, methanol fixed (Merck®) and Giemsa's (Merck®) stained. Microscopic examination of smears revealed high cellularity with large clusters of densely packed epithelial cells in a papillary, three

dimensional and acinar arrangements in a clear background (Fig. 1). The population was composed by round to columnar cells with discrete anisocytosis, distinct outlines, high nuclear to cytoplasmic rate and lightly basophilic cytoplasm with a fine granular basophilic secretory material scattered. Nuclei were round to oval with discrete anisokaryosis, regular contours, finely to coarse aggregate chromatin pattern and indistinct nucleoli (Fig. 2). The differentials diagnosis included typical hyperplasia, simple adenoma, benign mixed tumor, and benign fibroadenomas. The owner decided not to remove the mass due to animal's advanced age. Thus, histopathological evaluation was not possible.

DISCUSSION

Mammary tumors are described in guinea pigs of both sexes, but the males are the most affected (Andrews & Shively, 1976; Greenace, 2004; Teske, 2008) and the incidence of tumors has been reported as high as 30% over 3 years of age (Greenace, 2004) similarly to that described in this case.

Spontaneous tumors commonly described include bronchogenic papillary adenomas,

trichofolliculomas, carcinomas of the skin, teratomas involving the ovary, fibroadenomas of the mammary gland (Greenace, 2004), lymphoma (Steimber, 2000) and cutaneous vascular malformations (Osofsky et al., 2004). All these neoplasms can be readily accessed by FNAB, which is a highly indicated test as an initial diagnostic approach (Cowell et al., 2008). However, in only two cases (Steimber, 2000; Osofsky et al., 2004) the technique were used and cytological findings described. This is the first case reporting the use of FNAB in the evaluation of a mammary neoplasm in a guinea pig.

Guinea pigs possess a single pair of mammary glands in the inguinal area (Greenace, 2004). The glandular tissue has a characteristic microscopic appearance, composed predominantly of ducts and alveolar structures which may indicate the origin of the cytological sample (Raskin & Meyer, 2001) and thus help to differentiate subcutaneous enlargements in the mammary region.

In veterinary medicine, mammary tumors can be classified as simple or complex adenomas/carcinomas, special types of carcinomas, benign/malignant mixed tumors and fibrosarcomas based on the neoplasm cellular constituents (Misdorp et al., 1999).

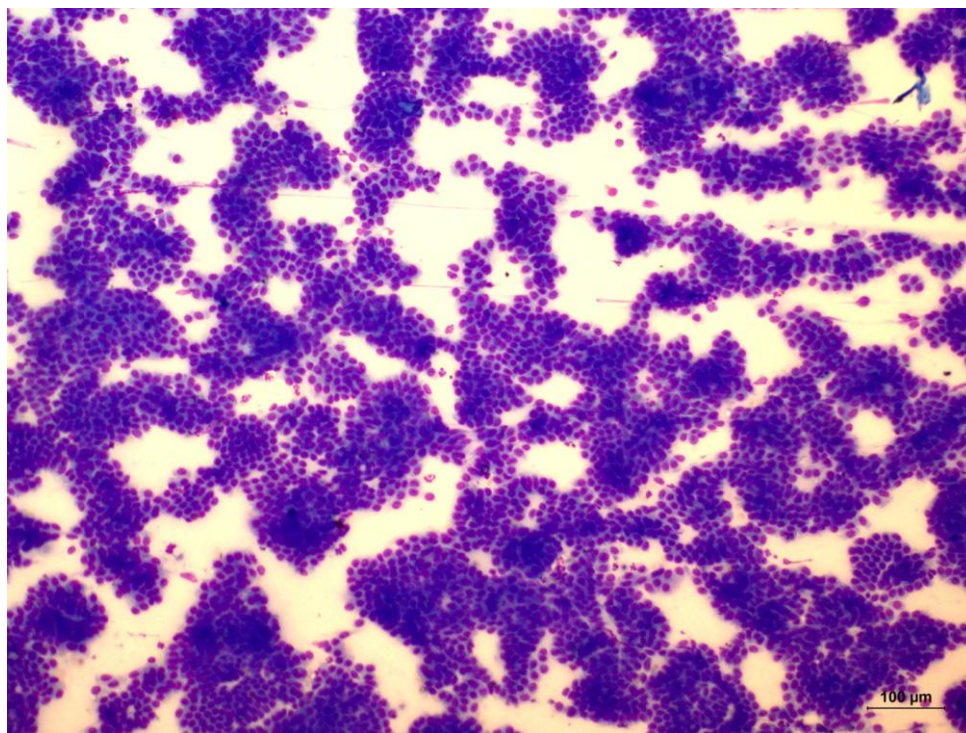


Figure 1. Cytology of a mammary neoplasm in a guinea pig. Large clusters of epithelial cells in a papillary, three dimensional and acinar arrangements. Giemsa's stain; bar=100µm.

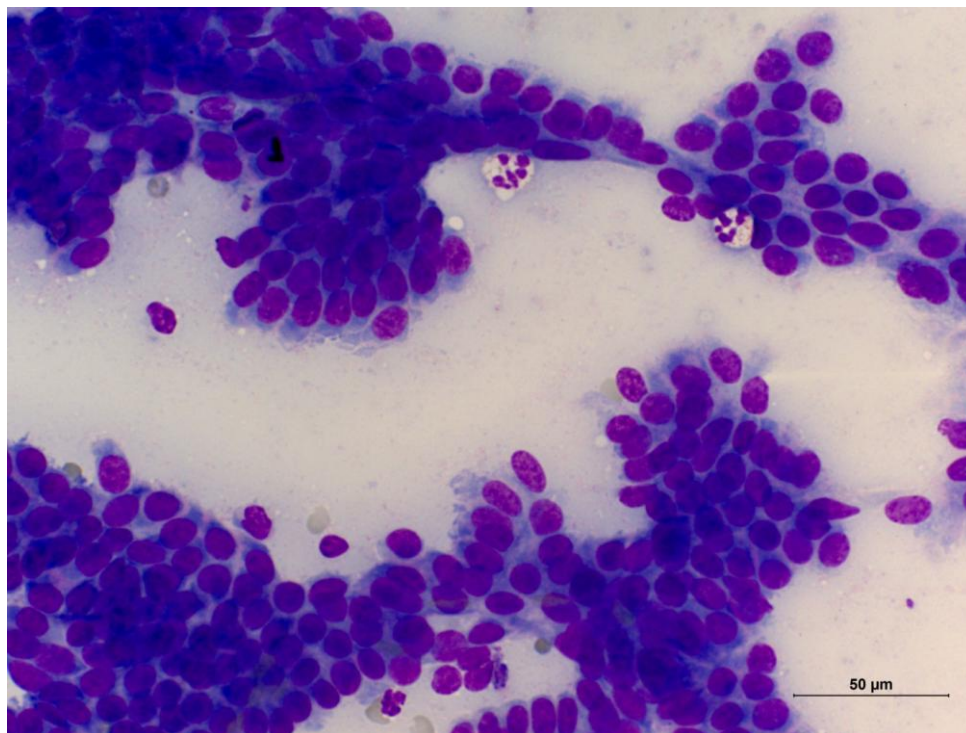


Figure 2. Cytology of a mammary neoplasm in a guinea pig. Round to columnar cells with distinct outlines and lightly basophilic cytoplasm with a fine granular basophilic secretory material. Giemsa's stain; bar=50 μ m.

Smears of aspirates from these lesions may contain spindle-shaped cells associated with a background matrix and/or clusters of epithelial cells. Cells observed in this case were exclusively epithelial with a round and basophilic cytoplasm containing basophilic amorphous secretory material. However, lack of spindle-shaped cells or matrix do not rule out a complex or mixed tumor (Raskin & Meyer, 2001; Cowell et al., 2008).

The arrangement of mammary neoplasms varies from papillary and/or acinar to three dimensional clusters. A papillary arrangement is composed of a stromal or vascular axis, and a mono or multilayered epithelial layer. The term three dimensional cluster are reserved to those cases that the central axis are lacking (Masserdoti, 2006). The presence of those patterns in cytological samples of a guinea pig in this study suggests an epithelial proliferation originating in the mammary tissue since papillae exfoliate mostly from intratubular epithelial proliferation, such as in mammary tumors (Wied et al., 1992).

Cytologic criteria that correlate with mammary malignancy include anisokaryosis, macrokaryosis, cellular pleomorphism, mitotic activity, high nuclear to cytoplasmic rate, nuclear molding, variable

nucleolar number and shape and the presence of macronucleoli. Cells described in this case do not fill three or more malignancy criteria to be classified as carcinoma, as proposed in literature and therefore the diagnosis was restricted to a benign mammary neoplastic lesion, more likely an adenoma. Smears made from adenomas tend to have uniform cells, exhibiting little or no pleomorphism with fine chromatin pattern and occasional distinct nucleoli. In some cases benign and well differentiated malignant mammary tumors tend to form a continuous morphological aspect making the cytological differentiation difficult. In those cases, histopathological confirmation is required to establish the correct diagnosis (Raskin & Meyer, 2001; Cowell et al., 2008). Histopathological evaluation was not possible due to no permission from the owner.

Although there are no studies concerning cytologic and histologic correlation in guinea pig mammary tumors, we believe that features like arrangement, cell type and malignancy criteria used for other species, can also be applied to this one. Thus, based on histological subtypes of mammary neoplasms previous described in literature for guinea pigs (Rogers & Blumenthal, 1960; Blumenthal & Rogers, 1967; Kitchen et al., 1975; Andrews, 1976; Andrews

& Shively, 1976; Ediger & Kovatch, 1976) and the cytopathological findings the differential diagnosis include simple adenoma (papillary type), benign mixed tumor and benign fibroadenomas. Although, mammary hyperplasia has not been described in literature to date, this type of proliferative lesion must be considered in the differential cytological diagnosis.

Cytology is a diagnostic tool of great importance to clinicians due to the potential to establish an initial diagnosis and provide important information related to the nature of the lesion. It can also assist in prognostic analysis, treatment and in differential diagnosis. Despite the existence of a classification system for mammary neoplasms in dogs and cats, there are no one specific for guinea pigs. According to that, additional cytopathologic and histopathologic studies are needed on mammary neoplasms of guinea pigs to establish a correlation between these two diagnostic modalities and to establish a classification system to this species.

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