

Cytologic Aspect of Keratoacanthoma with Granulomatous Inflammation in a Dog

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Abstract : A 5-year-old Pekinese dog was presented for evaluation of a back mass of 1 year duration. Fine needle aspiration cytology of the mass revealed numerous keratinocytes, and a lesser number of multinucleated giant cells along with a low number of spindle cells, which were suggestive of epidermal cyst or hair follicle tumor with secondary granulomatous inflammation. The mass was surgically removed and examined histologically. Microscopically there was partially encapsulated well-demarcated nodule in deep dermis and subcutis. The nodule consisted of central cyst and secondary cysts that were lined by a single or multiple layers of basaloid cells and squamous epitheliums with central laminated keratin. Multifocal aggregation of numerous macrophages and multinucleated giant cells were present. The final diagnosis was keratoacanthoma with granulomatous inflammation. The mass did not recur 5 months after surgery.

Key words : Keratinocyte, multinucleated giant cell, keratoacanthoma, cytology, dog.

Introduction

Keratoacanthoma is one of the follicular tumors with adnexal differentiation which include tricholemmoma, trichoblastoma, trichepithelioma and pilomatrichoma (4). This tumor has been referred to as an intracutaneous cornifying epithelioma, infundibular keratinizing acanthoma, and squamous papilloma (4). This tumor is uncommon in the dog and benign. Cause is unknown both in dogs and humans (8). These tumors usually occur in dogs less than 5 years of age, and male dogs are more commonly presented than female dogs. Norwegian Elkhound and Keeshound is predisposed breeds, especially to multiple forms. The common site is back, neck, thorax and limb. Solitary tumors do not recur after surgical removal but in multiple forms recurrence can be a problem. Spontaneous regression can occur in some cases (8,9). These tumors have a pore opening onto the skin surface that contains a keratinized plug. If the wall of the pore is ruptured, released keratin evokes pyogranulomatous and granulomatous inflammation (4).

Cytological diagnosis can be challenging because this tumor share similar findings with epidermal cysts, follicular cysts, and other forms of hair follicular tumors or well differentiated squamous cell carcinoma (6). Concurrent granulomatous inflammation makes cytological diagnosis more difficult and requires invasive procedures to obtain a confirmatory diagnosis.

This report describes a case of a keratoacanthoma with

secondary granulomatous inflammation with an emphasis on cytological features of this tumor and discusses the cytological pitfalls in diagnosing this kind of tumor.

Case

A 5 year old Pekinese dog was presented for evaluation of a back mass. The mass was of one year duration, and 3 cm in diameter. No clinical signs were found associated with the mass. For cytological evaluation, fine needle aspiration was performed using 23 g needle, smears fixed in methanol for 1 minutes, and stained with Diff-Quik stain. Cytologically predominant cell population was variably shaped keratinocytes with a few clumps of spindle cells along with micro-vessels. Notably a low number of multi-nucleated giant cells were also found. The cells contained numerous nuclei with abundant cytoplasm. Chromatin strands were dispersed in the background. Differential diagnosis included follicular cysts, epidermal cysts, and hair follicle tumors with granulomatous inflammation.

For histology and treatment the mass was surgically removed and fixed in 10% buffered formalin. Microscopically, there was partially encapsulated well-demarcated nodule in deep dermis and subcutis. The nodule consisted of central cyst and secondary cysts that interconnected by short cords and trabeculae of epithelial cells. The central cyst and secondary horn cysts were lined by a single or multiple layers of basaloid cells and squamous epitheliums with central laminated keratin. The cells had distinct cell border, a moderate

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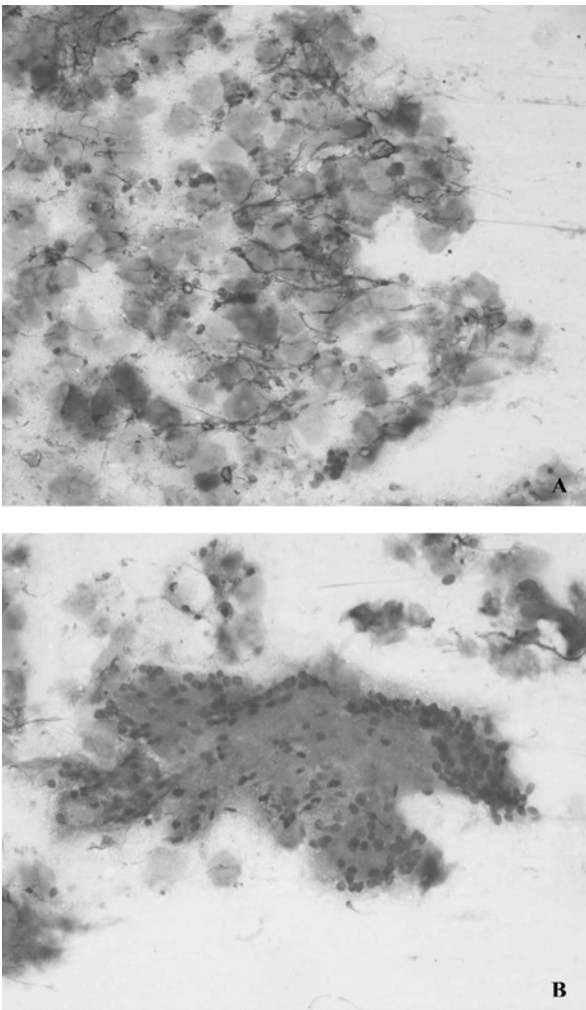


Fig 1. Fine-needle aspirate of the back mass. Note numerous keratinocytes (A) and a syncytial multinucleated cell (B). (Diff-Quik, $\times 40$).

of amount of eosinophilic cytoplasm. Mitotic figure was rare. Multifocally, mineralization and aggregates of numerous macrophages and a few neutrophils, lymphocytes, plasma cells and multinucleated giant cells were present due to partially ruptured cyst. The histologic diagnosis was infundibular keratinizing acanthoma. No signs of recurrence observed after surgical removal of the mass.

Discussion

Keratoacanthoma usually occur in dogs 5 years of age or younger and male dogs are more frequently affected than females. Collies, Lhasa apsos, and Yorkshire terriers are reported to be at risk for the solitary form (8,9). The clinical findings of this report, male Pekinese dog of 5 year old, is consistent with the previous reports, although Pekinese dog was not mentioned in the risk breeds (8).

Cytologic description of keratoacanthoma has rarely been defined in dogs (6). Cytologically keratinocytes, keratinous

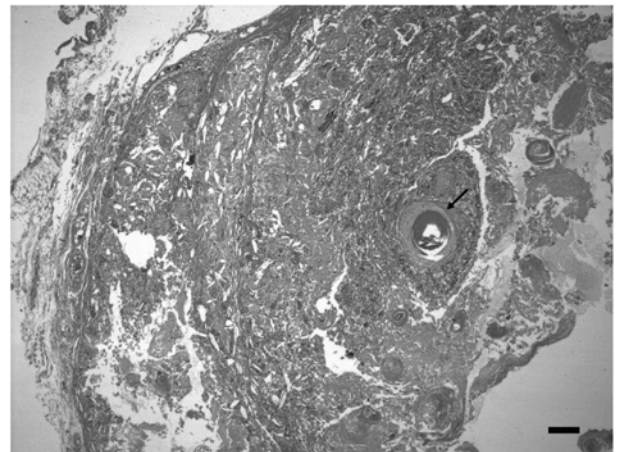


Fig 2. Subcutaneous nodule in a 4-year-old male Pekinese dog. Note secondary cyst (arrow) and infiltration of numerous macrophages. HE. Bar = 200 μm .

debris, and cholesterol crystals can be found in FNA smears along with or without a low number of basal epithelium. According to the fact that these tumors frequently evoke granulomatous inflammation when the pores rupture and the keratin contents are released into the surrounding tissues (4), multinucleated giant cells, macrophages, and/or mesenchymal cells can be found (4,9). In this report, smears were consistently characterized by the presence of keratinocytes, mostly anucleate and cornified, a low number of large multinucleated cells and some aggregates of spindle cells. These features can also be found in epidermal cysts, well differentiated squamous cell carcinoma, pilomatrixoma, and other types of hair follicle tumors (3,6). Among these epidermal cysts and well differentiated squamous cell carcinomas are major differentials both in cytology and histology (2,6). Because epidermal cysts are more frequently encountered in clinics (10), these tumors can be easily misdiagnosed as non neoplastic cysts, especially when this tumor do not communicate with the surface of the skin. There is no known features to differentiate between them. In histology complex wall structure of the cysts of keratoacanthoma can be used for this purpose (9).

In well differentiated squamous cell carcinomas malignant squamous cells should carry more atypical appearance and clinical invasiveness of the lesion besides cytological appearance, which can be helpful for correct recognition of this tumor. According to the literature MIB1 immunostaining, and AgNoR staining can be used to differentiate between keratoacanthoma and well differentiated squamous cell carcinoma (2). The proliferation index of well differentiated squamous cell carcinomas by both methods are usually distinctly higher.

Another feature of this case, infiltration of multinucleated giant cells and aggregates of spindle shaped cells can be found in various inflammation such as calcinosis circumscripta, foreign body reaction, chronic inflammation, fungal infection, and fat necrosis (1). Careful inspection, culture, and/ or some special stains such as rubeanic acid stain may be needed for

identification of the cause and differentiation. However, like in this case, absence of inflammatory cells such as neutrophils and predominance of keratinocytes with multinucleated giant cells can only be found in keratoacanthoma. So this feature can be used as a discriminating feature to differentiate this tumor from other inflammatory lesions where multinucleated giant cells can be found (1,6).

For the solitary forms, surgical excision, cryotherapy, electrotherapy, and observation without specific treatment can be applied. Prognosis is good with no reports of recurrence or metastasis. In multiple forms, recurrence may be a problem. Retinoids can be used for management of multiple forms with reports of success in some dogs (8). In the dog of this report the tumor was surgically excised.

Canine keratoacanthoma differs from human keratoacanthoma, and differences include the epithelium of origin, rate of growth, infiltration, lymphocytic and histiocytic infiltration, and affected age (7).

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개의 육아종성 염증이 동반된 keratoacanthoma의 세포학적 고찰 증례

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요 약 : 5세령의 페키니즈 견이 발생된 지 1년 된 등쪽 종괴의 평가를 위해 내원하였다. 종괴의 세침흡인 도말 표본의 세포학 검사에서 많은 수의 각화 상피세포와 거대 다핵 세포, 소수의 방추 세포가 관찰되었다. 세포학 검사결과 육아종성 표피낭 또는 모낭 종양이 의심되었고, 결절은 외과적으로 절제한 후 병리조직학적 검사를 실시하였다. 피하의 결절은 부분적으로 결합조직에 둘러싸여 있었으며, 주변조직과 경계가 명확하였다. 그 결절은 중심의 큰 낭과 주변의 작은 낭으로 이루어져 있었으며, 그 낭은 중심부에 층판상의 케라틴이 존재하였고 단층 또는 중층의 기저세포와 편평 상피세포로 둘러싸여 있었다. 다소성으로 다수의 대식구와 소수의 다핵거대세포가 관찰되었다. 이에 기초하여 육아종성 염증이 동반된 keratoacanthoma로 진단하였다. 종괴는 수술 제거 후 재발되지 않고 있다.

주요어 : 각화 상피세포, 다핵 거대 세포, keratoacanthoma, 세포학, 개.