

Epidermoid Cyst in the Bitch Mammary Gland

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ABSTRACT

Background: An epidermoid cyst is a result of the growth of epidermal elements in the dermis. It might occur anywhere in the body, both in humans and animals. A few case reports have demonstrated these cysts in the human mammary gland, but in the bitch mammary gland, it is not a reality. The exact pathogenesis of mammary epidermoid cysts remains unknown. At first, this lesion is considered benign; however, a malignant transformation can occur leading to squamous cell carcinoma. This paper reports the 1st occurrence of epidermoid cyst in the bitch mammary gland.

Case: A mammary chain with the inguinal lymph node was received from a bitch mixed breed, 12 years old. Macroscopically, all glands had tumors, ranging from 0.7 cm to 3.5 cm along their longest axis. At the caudal thoracic gland (M2), a well-defined lump, measuring 2.0 x 1.8 x 1.4 cm, soft to firm consistency, with intact skin, was noted. After sectioning, a cystic cavity measuring 1.5 x 1.2 cm filled with a white-yellow caseous material, was observed. Samples were collected and submitted for routine histopathology. Microscopic analysis revealed tissue from the mammary gland covered by intact epithelium. Between the mammary glands, a large cystic cavity was observed, filled with lamellated keratin, acantholytic keratinocytes, neutrophils, foamy macrophages, and cellular debris. A thick layer of stratified squamous epithelium covered the cyst with some points of rupture infiltrated by neutrophils, macrophages, lymphocytes, and plasma cells, also with keratin released to the mammary stroma. The adjacent glands showed a few spots of ductal ectasia. Malignant criteria were absent.

Discussion: Epidermoid cysts, commonly, arise from the infundibular portion of the hair follicle, are lined by squamous epithelium with a granular layer, and filled with laminated keratin. In humans, this entity might be found in the breast and could be a challenge to differentiate them from other benign and malignant conditions. As these lesions grow slowly through the accumulation of keratin over time, it can lead to complications by spontaneous rupture, release of non absorbable keratin that acts like an irritant material, stimulating secondary foreign body reactions, granulomatous reactions, or abscess formation. The inflammatory reaction results in local swelling and pain. The exact pathogenesis of mammary epidermoid cysts remains unknown; however, a few proposals exist: (a) congenital, arising from cell nests remaining from cells such as the embryonal mammary ridge; (b) obstruction of the hair follicle in the mammary dermis; (c) damage to the epidermis which gets implanted deep within the breast tissue and may occur in any type of trauma and/or previous procedures; (d) cystic ectasia of the infundibulum of hair follicles; and (e) squamous metaplasia of normal columnar cells within a dilated duct in fibroadenoma or fibrocystic change. The final diagnosis in this case was established by histopathological examination stained with hematoxylin and eosin. Epidermoid cyst is a benign lesion that occurs anywhere in the body, they are more common on the face, trunk, neck, extremities, scalp and has been described in the human mammary gland. In the authors' assessment, this is the 1st description of epidermoid cyst in the bitch mammary gland. Although it is a very rare entity, pathologists need to be aware and should be considered as a differential diagnosis during mammary gland examination.

Keywords: canine, squamous cells, epidermal inclusion, ductal metaplasia, laminated keratin, morphology.

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INTRODUCTION

In general, infundibular cysts (epidermoid cyst, epidermal cyst, epidermal inclusion cyst (EIC) arise from the infundibular portion of the hair follicle, are lined by squamous epithelium with a granular layer, and filled with laminated keratin. The term epidermal inclusion cyst refers specifically to an epidermoid cyst as a result of the growth of epidermal elements in the dermis. In humans, such cysts can occur anywhere in the body although they are more common on the face, trunk, neck, extremities, and scalp [7,9] as well as in animals. However, in humans, this lesion has also been described in the mammary gland [1,3,4,7-9].

Clinically and radiologically EIC can be mistaken as benign or malignant tumors. In addition, inflammation, infection, and malignant transformation are potential risks[3,4]. The presence of a lesion localized in the breast parenchyma may be differentiated from benign and malignant breast neoplasm [9]. Malignant transformation can occur in EIC of the breast, and this may be associated with squamous metaplasia of the mammary duct epithelium [9]. To our knowledge, in veterinary medicine, so far there have been no reports of epidermoid cysts in the bitch mammary gland. This paper reports the 1st occurrence of this lesion.

CASE

A mammary chain, with the inguinal lymph node, was received from a 12-year-old bitch, mixed-breed. Grossly, all glands had tumors, ranging between 0.7 cm to 3.5 cm along their longest axis. At the caudal thoracic gland (M2), a well-defined lump, measuring 2.0 x 1.8 x 1.4 cm, soft to firm consistency, with intact skin, was noted. After sectioning, a cystic cavity measuring 1.5 x 1.2 cm filled with a white-yellow caseous material, was observed (Figure 1A). Samples were collected and submitted for routine histopathology.

Microscopic analysis revealed tissue from the mammary gland covered by intact epithelium. Between the mammary glands, a large cystic cavity was observed, filled with lamellated keratin, acantholytic keratinocytes, neutrophils, foamy macrophages, and cellular debris (Figure 1B). A thick layer of stratified squamous epithelium lined internally the cyst with some points of rupture infiltrated by neutrophils, macrophages, lymphocytes, and plasma cells, also with keratin released to the mammary stroma. The adjacent glands showed a few spots of ductal ectasia. Malignant criteria were absent (Figure 2).

DISCUSSION

Epidermoid cysts in the breast are an entity found in humans and could be a challenge to differentiate them from other benign and malignant conditions. Imaging exams and fine needle aspiration cytology are needed for an accurate preoperative diagnosis [8]. As these lesions grow slowly through the accumulation of keratin over time, it can lead to complications by spontaneous rupture, release of non absorbable keratin that acts like an irritant material, stimulating secondary foreign body reactions, granulomatous reactions, or abscess formation [9]. Also, in some cases, malignant transformation can occur, that can progress to squamous cell carcinoma[2,5]. Malignant transformation appears to occur more frequently in the breast as opposed to EIC affecting other areas of the body, and this may be associated with the pathogenesis of breast EIC from squamous metaplasia of the mammary duct epithelium [9]. Excision of the entire cyst to avoid potential complications is the choice of treatment[8].

The exact pathogenesis of mammary epidermoid cysts remains unknown; however, a few proposals do exist: (a) congenital, arising from cell nests remaining from cells such as the embryonal mammary ridge; (b) obstruction of the hair follicle in the mammary dermis; (c) damage to the epidermis which gets implanted deep within the breast tissue and may occur in any type of trauma and/or previous procedures; (d) cystic ectasia of the infundibulum of hair follicles; and (e) squamous metaplasia of normal columnar cells within a dilated duct in fibroadenoma or fibrocystic change [3,4,6-8,10]. In our case, the patient had no history of previous trauma/procedure in the mammary chain; the microscopic analysis showed no association and/or obstruction in the hair follicle; there was absence of foreign body within the lesion; and no benign or malignant tumors were associated. However, ductal ectasia adjacent to the cyst was observed. We believe that the mechanism involved in this case was congenital inclusion or, more likely, squamous metaplasia of an ectatic duct.

An epidermoid cyst is a benign lesion that occurs anywhere in the body and has been described in the human mammary gland. To our knowledge, this is the 1st paper to describe grossly and microscopically an epidermoid cyst in the bitch mammary gland. Although it is a very rare entity, it should be considered as a differential diagnosis during mammary gland examination.

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Declaration of interest. The authors alone are responsible for the content and writing of the paper. The authors report no conflicts of interest.

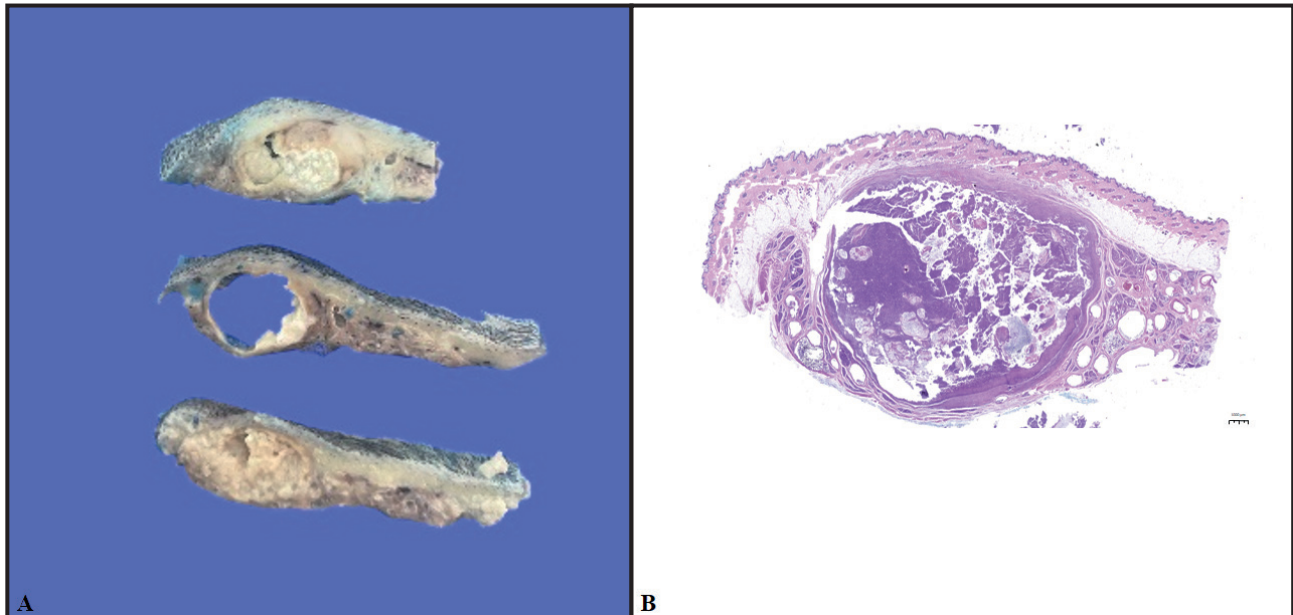


Figure 1. Epidermoid cyst in the bitch mammary gland. A- Well-defined lump with central cavity filled with caseous material and some solid areas. B- Mammary gland covered by intact epithelium, a large cystic cavity filled with lamellated keratin and cellular debris [HE; 1,0x].

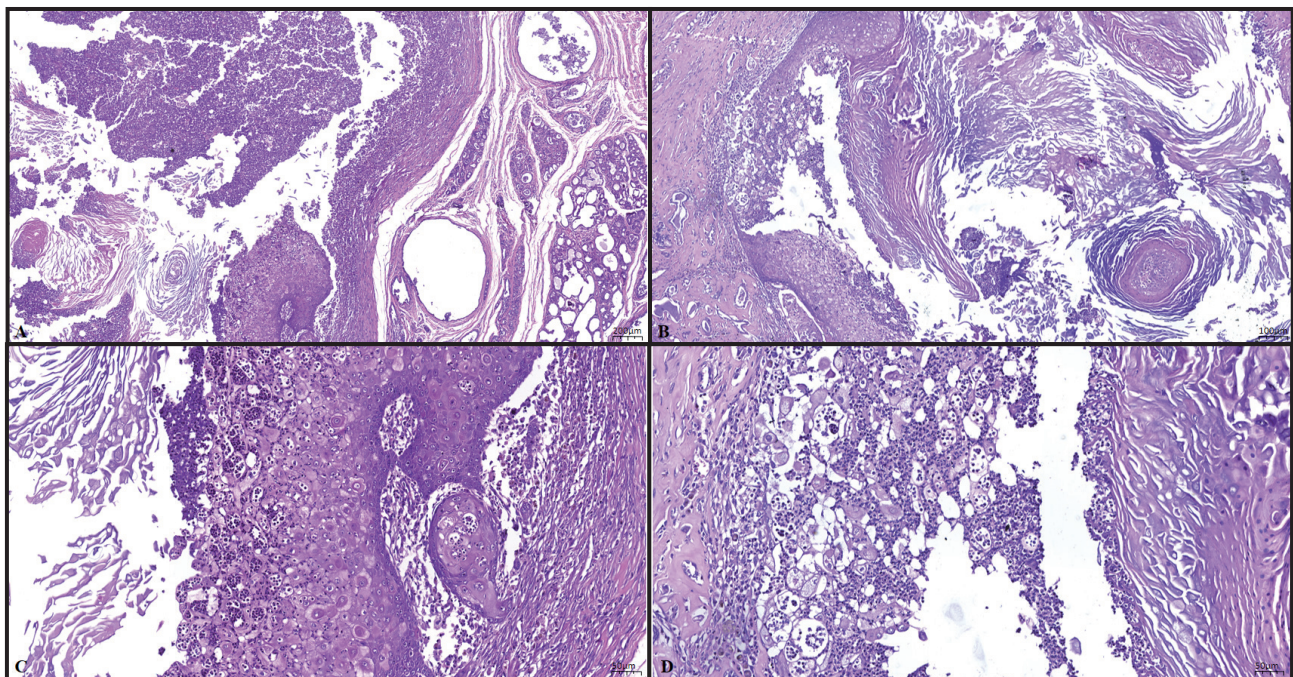


Figure 2. Epidermoid cyst in the bitch mammary gland. A- Cystic cavity with thick layer of stratified squamous epithelium. Adjacent mammary gland with ductal ectasia [HE; 7,6x]. B- Cystic cavity with rupture areas and inflammatory infiltrate [HE; 10,2x]. C- Thick layer of stratified squamous epithelium, acantholytic keratinocytes, neutrophils, cellular debris, and keratin [HE; 23,3x]. D- Acantholytic keratinocytes, neutrophils, cellular debris [HE; 28,9x].

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