



## CASE REPORT

### Infundibular keratinizing acanthoma (IKA) in a Terrier dog

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### Terier ırkı bir köpekte infundubular keratinize akantoma (IKA)

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#### Öz

İnfundibular keratinize akantom (IKA) köpeklerde kıl folliküllerinden köken alan iyi huylu deri tümörüdür. Bu çalışma 4 yaşlı erkek bir terrier köpekte IKA tanımlamaktadır. Makroskopik olarak birkaç aydır hayvanın arka tarafında, deride düzensiz yüzeyi ve ortası gözenekli yapıda olan kubbe şeklinde, 2-3 cm çapında sert kıvamlı yapı vardı. Histopatolojik incelemede lameller yapıda konsantrik keratinle dolu geniş bir kistin dermis ve hipodermis içerisine doğru uzandığı görüldü. Kistin duvarı çok katlı skuamöz keratinize eipitelle döşeliydi. Bir veya iki hücre kalınlığındaki epitel hücre kordonları kist duvarının perifer bölgesinden dışarıya doğru yayılmıştı. Epitel hücreleri iyi difensiye olmuştu. Mitoz nadirdi ve pleomorfizm yoktu.

**Anahtar kelimeler:** Deri tümörü, infundubular keratinize akantom, köpek

#### Abstract

Infundibular keratinizing acanthoma (IKA) is a benign cutaneous tumor in dog originated from the hair follicle. The present study describes IKA in a 4 year old, male terrier dog. Macroscopically, a cutaneous dome-shaped nodule, 2-3 cm in diameter, with firm consistency, irregular surface and a central pore was located on the back for several months. The histopathological examination revealed a large cyst filled with concentric lamellar keratin that extended into the dermis and hypodermis. The wall of the cyst was lined by the stratified squamous keratinizing epithelium. Cords of epithelial cells had one or two cells thickness expanded outward from the peripheral zone of the cyst wall. The epithelial cells were well-differentiated. Mitosis was rare and there was not polymorphism.

**Keywords:** Skin tumor, infundibular keratinizing acanthoma, dog





## Introduction

In the veterinary medicine, neoplastic proliferations are more prevalent in the small animals with a range from 15-30% in dogs and 26% in cats. Skin is the common site for tumors (Bongiovanni et al 2008, Fajardo et al 2013). Skin tumors are classified as epithelial and mesenchymal tumors. Epithelial tumors comprise tumors without squamous and adnexal differentiation (basal cell tumor and basal cell carcinoma), the epidermal tumor (papilloma, squamous cell carcinoma), adnexal differentiation and the melanocytic tumors. Follicular tumors with adnexal differentiation include infundibular keratinizing acanthoma (IKA), tricholemmoma, trichoblastoma, trichoepithelioma and pilomatricoma (Goldschmidt and Hendrick 2002).

Infundibular keratinizing acanthoma has been previously called as intracutaneous cornifying epithelioma, intracutaneous keratinizing epithelioma and keratoacanthoma. This tumor is a well-differentiated, encapsulated, non-metastasizing tumor that reported only in dog (Donald 2002, Romanucci et al 2005, Aroni et al 2007, Tavasoly et al 2014). However, IKA is known as a common cutaneous tumor, but scarce epidemiologic and pathologic information is available in the literature. In this study, macroscopic and histopathologic characteristics of IKA were described in a terrier dog.

A 4-year-old male terrier dog was referred to the Veterinary Hospital of Shahid Bahonar University of Kerman, Iran; with a cutaneous nodule located at the back for several months. The nodule was 2-3 cm in diameter, dome-shaped, with firm consistency, irregular surface and a central pore (Figure 1). Blood examination and biochemical profile were in the normal range. In radiographs from thoracic and abdominal cavities, no abnormal change or evidence of metastasis was observed. Using local anesthesia (Ring block) with lidocaine 1%, the nodular mass was completely excised. Ceftriaxone (Dana pharma co, Iran, 30 mg/kg, BID) was administered for three days after the surgery. Biopsy sample was submitted to Department of The Veterinary Pathology. It was performed routinely tissue processing and embedding paraffin wax after tissue fixed by 10% buffered formalin solution for 48h. Then sectioned at a thickness of 5  $\mu$ m and finally stained with haematoxylin and eosin. Tissue sample was evaluated using light microscopy. The histopathological examine showed a simple large cyst that extended into the dermis and subcutis and filled with concentric lamellar keratin. The wall of cyst was lined by stratified squamous keratinizing epithelium. Basophilic keratohyalin granules were present in the cytoplasm of keratinocytes. Keratinocytes had distinct borders, and no desmosomal junctions were seen between them. Cords of epithelial cells with one or two cells thickness extended outward from the peripheral zone of the cyst wall. These cords anastomosed with together and formed variable-sized cysts with concentric lamellar keratin. Islands of mucinous stroma

were considerable in the tumor. Collagenous fibers around the tumor produced a pseudocapsule. The epithelial components of the tumor were well-differentiated and few mitosis, and polymorphism was not present. According to the WHO guidelines, the mass was diagnosed as IKA in this case. Sur-



Figure 1. Infundibular keratinizing acanthoma appears as a dome-shaped nodule with irregular surface.

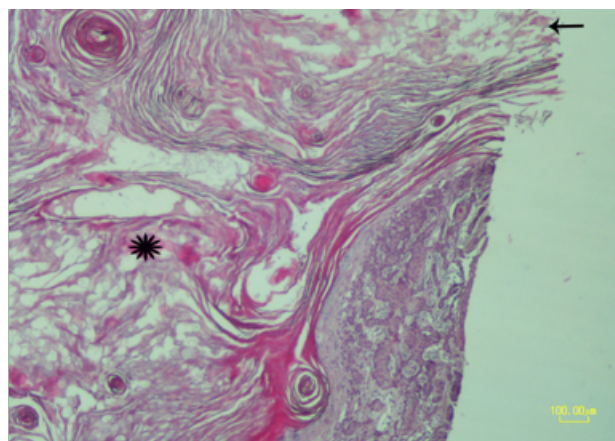


Figure 2. The histopathology of infundibular keratinizing acanthoma shows a large cyst filled with concentric lamellar keratin (asterisk) and central pore (arrow) (HE, Bar:100  $\mu$ m).

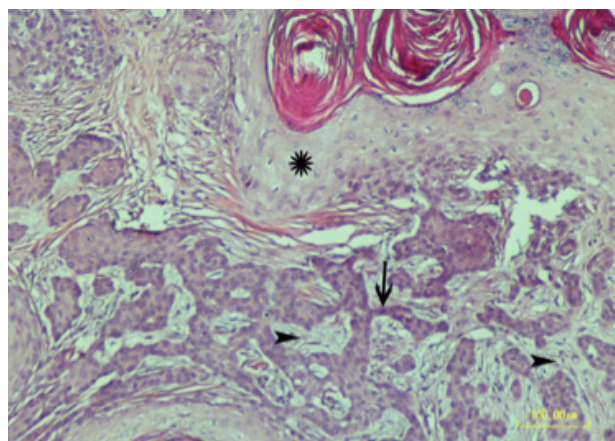


Figure 3. Infundibular keratinizing acanthoma has a wall lined by stratified squamous epithelium (asterisk). Cords with one or two cells rows originate from the wall tumor (arrow) as well as mucinous islands of stroma (arrowheads) (HE, Bar:100  $\mu$ m).



gical sutures were removed after one week. No recurrence of the tumor was noted during the follow-up period.

Infundibular keratinizing acanthoma (IKA also called intracutaneous cornifying epithelioma) is a benign cutaneous adnexal tumor raised from the upper part of the hair follicle (Donald 2002, Gross et al 2005, Romanucci et al 2005). IKA was compared with keratoacanthoma in human. Both tumors have two clinical forms, including solitary and generalized but some differences are present in their behaviors such as the epithelium of origin, of growth rate, infiltration and spontaneous involution (Stannard and Pulley 1975, Rudolph et al 1977, Gross et al 2005).

In the present study, solitary form of IKA was identified in a 4-year-old male terrier dog. Grossly, a firm domical appearance nodule with irregular surface was located on the back of dog. Histopathologic examination showed a large cyst that covered by stratified squamous epithelium and filled with concentric lamellar keratin. Epithelial cells as one or two rows originated from the large cyst as well as mucinous stroma was other characteristics of tumor. Tavasoly et al (2014) reported generalized type of IKA in a female brown splash Boston terrier. Multiple nodules were found on the dorsal trunk, back, neck, head, shoulder and thorax. Observed pathologic findings were in agreement with our study and previous reports (Della Salda et al 2002, Donald 2002, Romanucci et al 2005, Aroni et al 2007).

In accordance with the literature, the mean age of affected dogs is slightly different, including 5.3 years in Stannard and Pulley (1975), 6 years in Abramo et al (1999), 7.3 years in Goldschmidt and Shofer (1992) and 4 years in our study. The tendency of occurrence IKA in male dogs was mentioned by Stannard and Pulley (1975) is in consistence with our study but some authors believed that any sex predilection could be considered (Doland 2002, Tavasoly et al 2014).

Similar to the present case, the most common location for IKA was reported at the back of dog (Stannard and Pulley 1975, Abramo et al 1999). Contrary, limbs were mentioned as the common site of IKA in another study (Goldschmidt and Shofer 1992). Yorkshire terrier has high risk after Norwegian elkhounds (Goldschmidt and Shofer 1992, Goldschmidt and Hendrick 2002, Jubb et al 2007), but breed predilection was not clearly identified in this study.

IKA should be distinguished from well differentiated squamous cell carcinoma (WDSCC) and other follicular tumors, including trichoepitheliomas, isthmus tricholemmomas, epidermal inclusion cysts and inverted viral papilloma (Stannard and Pulley 1975, Gross et al 2005). WDSCC appears as erosive, plaque-like lesions and formed from extended islands and trabeculi of squamous cells into the dermis (Gross et al 2005). In contrast, IKA growth as solitary or multiple

firm cystic nodules filled with keratin (Rudolph et al 1977, Jubb et al 2007). IKA is not an invasive or metastatic tumor. Therefore, microscopic features such as high mitotic index and invading behavior can be effective in differentiation of this tumor from WDSCC (Romanucci et al 2005, Aroni et al 2007, Bongiovanni et al 2008). IKA is a self-limiting benign tumor. This tumor regresses spontaneously but surgical excision could be curative, especially about solitary mass (Donald 2002, Aroni et al 2007).

In conclusion, this study described histopathology characteristics of canine cutaneous IKA. More investigations needs for understanding the pathogenesis and the risk factors of this tumor.

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