Cytological and Pathomorphological Studies on Basal Cell Carcinoma in Skin of New Zealand White Rabbit

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Abstract

An adult male New Zealand White rabbit showed firm, whitish yellow neoplastic growth with necrotic foci. Based on cytological examination, the neoplastic growth was diagnosed as epithelial cell in origin with vesicular nucleus with anisokaryosis. The histopathological examination revealed the palisading neoplastic basaloid cells were showing solid, uniform with hyperchromatic and or vacuolated in appearance formed islands with abundant eosinophilic homogeneous ground substances and it was diagnosed as basal cell carcinoma.

Key words: Rabbit, Basal cell carcinoma, Cytology, Histopathology

Introduction

Basal cell carcinoma (BCC) is a distinct undifferentiated low-grade malignant epithelial tumors of skin. Basal cell tumours are made up of almost entirely of basal cells (Moulton, 1999). It is common in the cat, uncommon in the dog and rare in all other domestic animals including rabbits (Goldschmidt et al., 1998; Goldschmidt and Hendrick, 2002). The tumor cells are nevertheless able to invade and destroy the surrounding tissue (Buechner et al., 1997) unlike those seen in the dog and cat, which are found in the thorax, head and neck (Walder and Gross, 1992; Goldschmidt et al., 1998; Goldschmidt and Hendrick, 2002). Basal cell carcinomas are the result of sun damage to the skin. Basal cell carcinomas enlarge slowly and steadily and can invade neighboring tissue, like the eye, but they usually do not spread to distant parts of the body (metastasize). A basal cell tumor has been already reported in domestic animals such as buffaloes (Sadana et al., 1978) dog (Roberts et al., 1986; Seiler, 1982), cats (Jorger, 1988), wildlife Indian lion (Brown and Davis, 1972), the DeBrazza monkey (Fisher and Robinson, 1976), the Virginia opossum (Toft II et al., 1973), the African lion (White, 1975), and the Japanese monkey (Yanai et al., 1995). Cape clawless otter (Nakamura et al., 2002) and blue-fronted Amazon parrot (Tell et al., 1997). One malignant basal tumor case has been reported in a Djungarian hamster (Nakao et al., 1999) and Variable squirrels (Callosciurus finlaysoni floweri) (Kesdangsakonwut et al., 2003). The haired skin of the thorax, head and neck are the predilected sites. These tumors are locally invasive but in a few cases they form metastases and can recur (Goldschmidt et al., 1998; Goldschmidt and Hendrick, 2002; Walder and Gross, 1992). It is also recorded in eye lid (Roberts et al., 1986) ear (Nayak et al., 1989). However no literature was available about the BCC in neck region of rabbit.

Materials and Methods

A 3 year-old male New Zealand White rabbit carcass was presented for post mortem examination with the history of severe dysponea and anorexia for 4 days before death and had a progressive skin mass with an open wound in the dorsal part of neck area for the last three months. A complete necropsy was performed. Samples of the skin growth was collected for cytological examination by Leishman stained and for histopathological examination tissues from various locations were collected and fixed in 10% buffered formalin, embedded in paraffin and stained with H&E staining.

Results and Discussion

Grossly, the subcutaneous mass in the dorsal portion of neck area was 5.35 x 3.65 cm in size, firm in consistency, whitish yellow in color and had multiple necrotic foci on its cut surface with foul smelling.

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Cytological examination of the growth revealed cells of epithelial cells in origin with anisocytosis and anisokaryosis with vesicular nucleus. Histologically, various areas of hyperplastic to neoplastic changes of basal cell in the skin were observed. The infiltrative mass in the neck area composed of multifocal proliferative cells resembling the basal cells of the epidermis. Initially, in the peripheral layer of the growth in skin revealed proliferation and clumps of neoplastic nuclei with scanty cytoplasm which were surrounded by mild fibrous tissue proliferation (Fig.1).

Fig.1. Basal cell carcinoma in rabbits: Islands of vesicular neoplastic cells embedded in eosinophilic ground substances H&E X100

The palisading neoplastic basaloid cells were showing solid, uniform with hyperchromatic and or vacuolated in appearance formed islands with abundant eosinophilic homogeneous ground substances. (Fig.2).

Fig.2. Basal cell carcinoma in rabbits: Islands of vesicular neoplastic cells infiltrating the basement membrane H&E X400

The dermis was completely filled with the neoplastic cells lined with palisading basaloid cells. The neoplastic cells were in cuboidal with a round to oval, vacuolated nuclei and scanty cytoplasm which showed anisocytosis and anisokaryosis (Fig.3).

Fig.3. Basal cell carcinoma: Vesicular neoplastic cells with anisocytosis and anisokaryosis H&E X400

Moreover, the nuclei contained multiple nucleoli. The nuclei at the periphery of the mass tend to be palisaded with the nuclei arranged so that their long axes were perpendicular to the surrounding connective tissue. The tumour cells were arranged into a solid sheath and separated from the surrounding tissue by a compressed zone of fibrous tissue. Necrotic areas could be observed at the center of the cluster of tumor cells. Mitotic figures were commonly observed throughout the mass. Multiple retraction spaces between the tumor cells and the connective tissue were also seen. Anisocytosis, anisokaryosis with vacuolated nucleus recorded in the present study was also reported in a Japanese monkey (Yanai et al., 1995) and Variable squirrels (Kesdangsakonwut et al., 2003). Necrotic areas could be observed at the center of the cluster of tumor cells. Mitotic figures were commonly observed throughout the mass.

Present case was classified as a solid pattern of BCC situated locally in skin. BCC has been rarely reported in wildlife (Toft II et al., 1973; Nakao et al., 1999; Nakamura et al., 2002), especially in conjunction with metastasis. In humans, BCC is believed to be caused by ultraviolet exposure but the majority of cases seen in the cat occur in non sun-exposed locations of the body (Walder and Gross, 1992). Facial BCC in human-beings does not correlate with site specific, UV-exposure and genetic and environmental factors appear to be involved in the onset of these tumor (Heckmann et al., 2002). In this case, the tumour occurred in the neck area which is a sun-exposed area and the rabbit had...
history of sun exposure as grazing in the rural areas. Nilsson et al. (2000) reported that increased GLI-1 expression is central to and probably sufficient for, basal cell carcinoma development. In experimental mice, increased expression of platelet derived growth factor receptor (PDGFR)-α may be an important mechanism by which, mutation in the hedgehog pathway, causes basal cell carcinomas (Xie et al., 2001). Based on clinical signs, macroscopical, cytological and microscopical lesions, the neoplastic growth in the skin of the male New Zealand White rabbit was diagnosed as a invasive basal cell carcinoma with highly proliferative in nature.

References


