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Congenital melanoma in a 3-month old bull calf - a case report

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ABSTRACT

The clinical, intraoperative and pathological findings taken from a case of melanoma in a 3-month-old bull calf are reported here. The cattle holder did not notice anything unusual when the calf was born, but noticed tumescence on the Achilles tendon at the age of 9 weeks, which increased with time. During surgery, subcutaneous and tendonous invasion by tumorous tissue was detected. Histological findings indicated that the neoplasia was a melanoma, therefore the prognosis was considered reserved. Melanoma is a rare tumour in cattle, often congenital, although already reported in companion species (e.g. dogs and cats) and domestic animals (e.g. some breeds of pigs and horses).

Key words: melanoma, calf

Introduction

Melanomas are devastating neoplasms frequently encountered within both veterinary and human medicine. Since the terminology for this disease is not consistent in human and veterinary literature, it has become usual to use the term "melanoma" for all malignant melanocytic tumours, whereas "melanocytoma" refers to the benign forms (SMITH et al., 2002). It is also important to emphasise that, currently, there is not a single diagnostic technique capable of differentiating benign from malignant melanocytic neoplasms, or predicting the survival time of the patient (SMITH et al., 2002). Regardless of whether the neoplasm is caused by chemical cancerogens or ultraviolet light, melanomas in all species share similar biology, in that they recur frequently and are predisposed to

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metastasis to regional lymph nodes. Animal melanomas are common and provide a useful model for a deadly human disease (MacEWEN, 1990). The most common species affected by melanoma are dogs and horses. Such neoplasms are relatively common in dogs, accounting for 3% of all neoplasms and up to 7% of all malignant tumours (COTCHIN, 1955). Equine skin tumours are melanocytic in up to 15% of all skin tumours in horses. The vast majority appear in grey or white horses, at or before the age of 5, corresponding to the period in their lives when their coat changes colour (JOHNSON, 1998; LEVENE, 1971; McFADYEAN,1933). These neoplasms also occur in non-grey and non-white horses, such as bays and chestnuts, but are more likely to be malignant (JOHNSON, 1998). The fact that most Arabs, Lippizaners and Percherons are grey may result from the over presence of cutaneous melanoma in these breeds (JOHNSON, 1998; LERNER and CAGE, 1973; RODRIGUEZ et al.,1998). Melanocytic neoplasms occur in other domestic species, including cattle, sheep, alpaca, swine and cats (GOLDSCHMIDT and SHOFER, 1992; MILLER et al., 1995; STEBBINS et al., 1989; HAMOR et al., 1999; NAKHLEH et al., 1990; OXENHANDLER et al., 1979; REDDY et al., 1998; WIEBE and RANG, 1978), as well as spontaneously in laboratory animals and birds (ANDRE et al., 1993; DEERBERG et al., 1986). Of these species, swine are probably the most important, for two reasons. Firstly, the Sinclair miniature pig and Duroc breeds have a genetic predisposition to melanomas (OXENHANDLER et al., 1979; THIRLOWAY et al., 1977) and secondly the Sinclair miniature pig has served as a model for spontaneous cutaneous melanoma in humans (HOOK et al. 1982; MILLIKAN et al, 1974; OXENHANDLER et al., 1979; STRAFUSS et al., 1968; GRABAREVIĆ et al., 2002). In cattle, melanocytic tumours account for approximately 6% of all tumours, predominately affecting cattle with red, grey or black coats (MILLER et al., 1995).

Materials and methods

Since we were forced to operate in a cattle shed, the animal was pushed down onto the floor and restrained in a lateral recumbent position, lying on healthy limbs. The patient was sedated with xillazine (Vetoqinol, Swiss, Belp Bern) and local anaesthesia of the n. tibialis was achieved by administering 10 mL 2% lidocaine (Belupo, Croatia, Koprivnica), backed up by infiltrative subcutaneous anaesthesia of the lateral portion of the tumour by the application of 5 mL 2% lidocaine (Belupo, Croatia, Koprivnica). The neoplasm was extirpated totally and small melanin accretions in the cutis were carefully removed. A small melanin accretion incorporated deep in the Achilles tendon was not removed, so as to prevent damage to the Achilles tendon. The skin was closed using knotted cotton filament sutures. The animal was healthy 9 months after the operation and was slaughtered at the age of one.

Tumour samples were fixed in neutral buffered fomalin, embedded in paraffin, sectioned in 5-micrometer thick slides and stained with hemalaun and eosin. A few

heavily pigmented tumour slides were bleached with hydrogen peroxide (10% solution, for 48 hours) before staining.

Results

According to clinical observations, the tumour was located on the Achilles tendon (tendo solei) of the right hind limb. It was ovoid in appearance, measuring approximately 8×6 cm. The skin was thin, clinically altered, hairless and black (Fig. 1). The mass was not painful, untempered, of an elastic consistency and mobile on the surface. After removal of the neoplasm, it measured approximately 7×8 cm and fitted easily on a human palm (Fig. 2). The macroscopic findings clearly indicated on the melanoma and the histopathological findings were thus confirmed. Most tumour cells were heavily pigmented, with predominantly large melanin granules in the cytoplasm. The tumour was located in the dermis, with expressed junctional activity characterised by the juxtaepidermal position of neoplastic cells. The neoplastic melanocytes were arranged in a predominantly fusiform pattern (Fig. 3) with some parts arranged in small nests. Nuclear pleomorphism, an increased number of nucleoli, atypical mitotic activity (Fig. 4) and giant cells (Fig. 5) were noted. However, the mitotic index was less than 3 per high-power microscope field (average, 10 fields, × 400). In some parts of the tumour, highly vacuolated, non-pigmented cells were noted (Fig. 6).

Fig. 1. Caudo-lateral view of the tumour before the operation

Fig. 2. Extirpated neoplasm

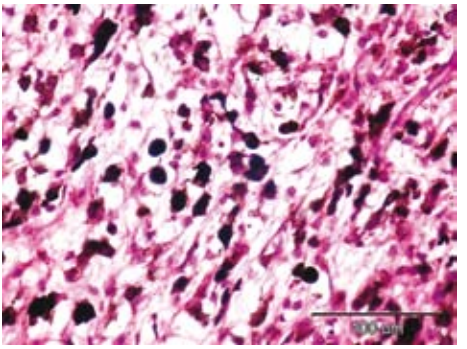

Fig. 3. Fusiform pattern of the neoplastic growth. Giant cells (arrows) Bleached and stained with H&E. Scale bar = 100 μm.

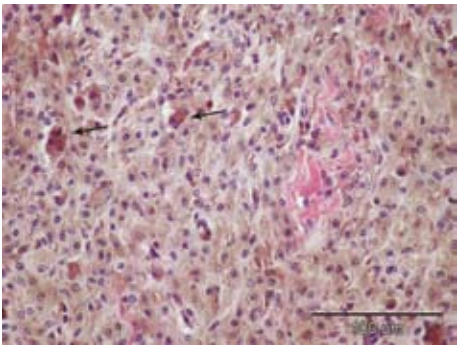

Fig. 4. Atypical mitosis (arrow), nuclear pleomorphism, increased nucleoli. Bleached and stained with H&E. Scale bar = 20 μm.

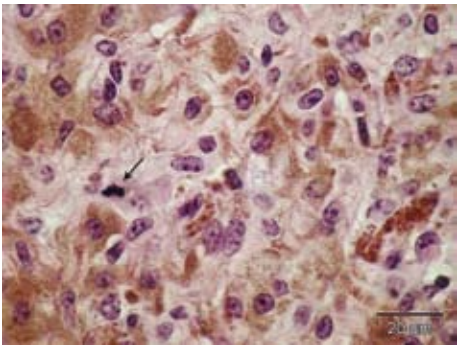

Fig. 5. Giant cell (arrow) in the centre. Bleached and stained with H&E. Scale bar = 100 μm.

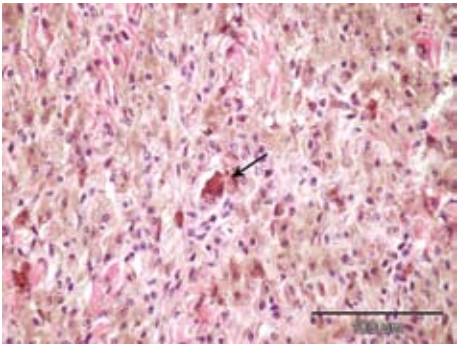

Fig. 6. Cells without melanin are heavily vacuolated. H&E. Scale bar = 100 μm.

Discussion

WAYNE et al. (1973) stated that in their investigation, performed on a total of 96 skin and subcutaneous tumours in cattle, over 12 years, on post-mortem and biopsy samples, melanin-containing tumours were noted in 23-24% of all cases. Only two of them were evaluated as malignant melanomas. Thus, because of the scarcity of cases of these tumours in cattle, all melanocytic tumours in this species should be examined histopathologically and evaluated. Although we operated in rather primitive circumstances, this was the only way the calf's owner would agree to surgical treatment. Even so, we succeeded in removing the tumour and the patient lived for the next 9 months without any signs of

recurrent or metastatic changes. The main feature of malignancy is metastatic tumour property. In this case, metastases were not apparent at the time of slaughter, 9 months after surgery. The mitotic index was low, less than 3 per HP microscope field, thus indicating that the tumour was a pigmented melanocytoma. However, all other histopathological characteristics, including junctional activity, pleomorphism, giant cells and cytoplasmic vacuolisation, were indicative of malignant melanoma (GOLDSCHMIDT and HENDRICK, 2002). It can be concluded that, at least in cattle, due to the relative scarcity of cases, the histopathological differentiation between melanocytomas and melanomas requires further clinicopathological evaluation.

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SAŽETAK

Opisani su klinički, intraoperacijski i patohistološki nalazi melanoma uočenoga na tromjesečnom muškom teletu. Vlasnik nije primijetio ništa neobično prilikom teljenja, ali je u dobi od devet tjedana opazio oteklinu na samoj Ahilovoj tetivi koja se postupno povećavala. Tijekom operacije uočeno je da su potkožje i tetiva zahvaćeni tumoroznim tkivom. Histološki nalaz upućivao je da je novotvorina melanom pa je stoga prognoza bila suzdržana. Melanomi su rijetki tumori u goveda, često su urođeni, a opisani su u kućnih ljubimaca (npr. u pasa i mačaka) i drugih domaćih životinja (npr. u nekih pasmina svinja i u konja).

Ključne riječi: melanom, tele