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A case of cutaneous melanocytoma in a 2-year-old Friesian bull

Melanocytic neoplasms account for approximately 5–10% of all bovine neoplasia in Australasia (Shortridge and Cordes 1971; Parkinson *et al*. 2010). Melanocytomas are benign melanomas (Smith *et al*. 2002; Patil *et al*. 2013) arising from the melanocytes in the epidermis, dermis, or adnexa (Goldschmidt and Goldschmidt 2016) and are an intermediate genetic stage between nevus and melanoma (Yeh 2020). They most often manifest in the skin of cattle aged between 1 and 2 years of age (Shortridge and Cordes 1971; Miller *et al*. 1995; Lucena *et al*. 2011), but can also be congenital (Misdorp 2002; Beytut *et al*. 2018). In New Zealand, the commercial veterinary laboratories make sporadic reports of bovine melanocytomas (Anonymous 2015, 2019, 2020), while peer-reviewed descriptions are rare. Melanocytomas tend to present as singular, well-defined masses of the skin, with a black and smooth appearance (Miller *et al*. 1995; Bhadaniya *et al*. 2015; Beytut *et al*. 2018). However, these masses can become necrotic and easily rupture when affected animals are handled or transported (Parkinson *et al*. 2010; Beytut *et al*. 2018). Melanocytes are cells derived from the neural crest which, during development, migrate to other locations, including skin, brain, eye, and gastrointestinal tract (Sulaimon and Kitchell 2003). Melanocytes produce a dark black-brown pigment called melanin, from which skin colour is derived, and which has an important role in protection against ultraviolet radiation (Tsatmali *et al*. 2002). This case report describes the diagnosis and removal of a cutaneous melanocytoma in a 2-year-old Friesian bull.

In January 2024, prior to being sent for slaughter, a rising 2-year-old, 660 kg Friesian bull was presented for veterinary transport certification for a reported abscess. The bull had arrived on the property over a year earlier with the mass already present on the back of the neck. Since then, it had grown substantially in size. The mass had not been previously seen by a veterinarian, and there was no history of treatment by the farmer. The health and body condition of the bull appeared unaffected by the mass.

On examination from a distance, the bull was agitated and flighty. There was a large 20-cm diameter, black, bulbous mass present dorsally on the left side of the neck, caudal to the ear. The bull was restrained in a head crush, and a halter tied to a bar. As the bull entered the crush, the mass was damaged, causing the overlying skin to burst open (Figure 1). Beneath the skin, the mass was very dark, wet-looking, and haemorrhagic. On palpation, it was firm, not pedunculated, and was freely movable beneath the skin, with well-defined margins between the tumour and normal tissue. There were no other abnormal findings on physical examination. The submandibular and prescapular lymph nodes were also palpated and did not appear enlarged: the former was approximately 2 cm in diameter, and the latter measured 1.0 × 3.5 cm.

Given the distinctive appearance from the black pigmentation, an initial, presumptive diagnosis of a cutaneous melanocytic neoplasm was made. The absence of lymphadenopathy implied that local metastasis had not yet occurred, suggesting this was a melanocytoma. Therefore, the decision was made to surgically remove the mass prior to transport of the bull for slaughter.

The bull was restrained in a head crush and held by a halter prior to administration of a local anaesthetic ring block subcutaneously around the base of the mass (20 mL Nopaine 2%; Phoenix Pharmaceutical Distributors Ltd., Auckland, NZ). The site was clipped and surgically scrubbed with chlorhexidine. A number 20 scalpel blade was then used to cut through the skin around the base, with a combination of blunt dissection and further incisions to remove the mass. Approximately 0.5–1.0 cm margins were allowed between the mass and normal tissue. During surgery, haemorrhage was controlled using haemostats. The SC layer was closed with 2 USP chromic catgut (Lux Sutures; Weiswampach, Luxembourg) in a simple continuous pattern. The skin was then closed with 3 USP supramid (SilverGlide; Sydney, Australia) using a cruciate pattern. Haemorrhage was minimal after skin closure. A topical oxytetracycline dressing (Tetravet Blue; Bayer New Zealand Ltd., Auckland, NZ) was applied generously over the wound. The bull was then given 15 mg/kg procaine penicillin and 15 mg/kg benzathine penicillin (Intracillin LA; New Zealand Ltd., Hamilton, NZ) by IM injection and 0.5 mg/kg meloxicam by SC injection

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Figure 1. Photograph of the neck of a Friesian bull showing the melanocytoma damaged after entering the cattle crush used to restrain the animal for examination.

(Melovem 30; Agrihealth NZ Ltd., Auckland, NZ). The owner was instructed to remove the skin sutures 10 days after surgery. Pictures of the wound site, taken by the owner at suture removal, showed that the wound appeared to be healing well. Five weeks after surgery, the bull was sent for slaughter.

While the gross appearance of the mass was strongly suggestive of a melanocytoma, for interest, further diagnostics were pursued without cost to the owner. An impression smear from the centre of the mass was made for cytology, and a tissue sample, also from the centre of the mass (no margins included) was preserved in 10% neutral buffered formalin and sent for histology.

On cytological examination, there were numerous well-differentiated polygonal to spindle-shaped cells with numerous dark green to brown intracytoplasmic granules and round to oval nuclei. There was minimal anisocytosis, but anisokaryosis could not be assessed due to the presence of intracellular pigment. Histologically, the mass extended from the dermis into the SC tissue, infiltrating and distorting the normal dermal architecture. Neoplastic cells were polygonal to spindle-shaped, with well-defined cell borders and contained numerous dark brown granules in the cytoplasm (melanin). Nuclei were round to oval, with finely stippled chromatin and single to multiple nucleoli (Figure 2). Anisocytosis, anisokaryosis and nuclear atypia were not a prominent feature of this tumour, and mitotic figures were present at less than

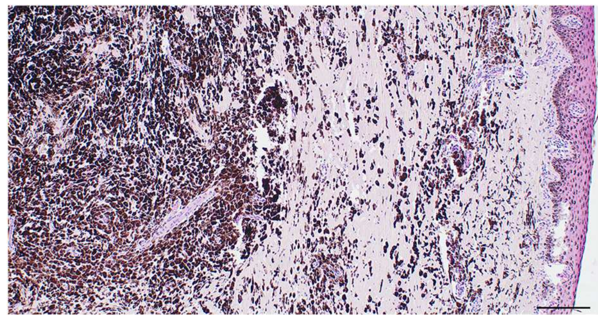

Figure 2. Photomicrograph of a histological section from the melanocytoma removed from the neck of a Friesian bull showing neoplastic melanocytes infiltrating and distorting the normal dermal architecture. Neoplastic cells contained numerous dark brown granules in the cytoplasm (melanin). H&E stain, bar = 200 µm.

one in 2.37 mm^2. Occasional binucleated or multinucleated cells were present. Due to the morphological characteristics of the tumour, including minimal cellular pleomorphism, and rare mitoses, a diagnosis of benign melanocytic neoplasia was made.

At the initial examination and given the clinical history and presentation (slow and localised growth, with no clinical signs of systemic effects or spread), a presumptive diagnosis of cutaneous melanocytoma had been made. Descriptions of the gross appearance of cutaneous melanocytomas are very consistent throughout the literature (Miller *et al*. 1995; Parkinson *et al*. 2010; Beytut *et al*. 2018). It is important to note that palpation of lymph nodes is not always a reliable method for the detection of metastasis, and the use of fine needle aspiration would have been better, although this technique is also not 100% accurate. However, the lack of detectable enlargement of the neighbouring lymph nodes and the strong clinical and histological evidence that this was a localised and non-invasive tumour, supported the diagnosis of melanocytoma rather than a malignant melanoma.

Wide surgical excision, preferably wider than was done in this case, is the typical treatment for cutaneous melanocytomas (Parkinson *et al.* 2010; Madheswaran *et al.* 2019; Polton *et al*. 2024). For benign neoplasia, this is normally effective, and recurrence is not seen (Miller *et al*. 1995). Post-operative medication is rarely necessary in reported cases, although treatment with systemic antibiotics and non-steroidal anti-inflammatory drugs was employed by Kaarthick *et al*. (2024). In the current case, prophylactic antibiotic treatment was also deemed appropriate, as achieving surgical sterility under field conditions was not possible. Any post-operative wound infection would have delayed healing, consequently further delaying the slaughter date.

The bull appeared to show no ill effects from the tumour, but the fact that the bull had been noticed with an abnormality more than a year before it was first presented for veterinary assessment and treatment,

and then only to get a transport certificate, rather than to mitigate any pain or discomfort it might have been experiencing, is unfortunately a common scenario in New Zealand, especially in the beef industry. This behaviour would not be seen as reaching an acceptable welfare standard in many other countries and needs to be addressed in New Zealand.

In conclusion, the management of the cutaneous melanocytoma in this case was consistent with the literature. Practitioners should be confident that wide surgical excision of cutaneous melanocytomas, with post-operative pain relief, carries a good prognosis.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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