Anaplastic malignant melanoma of the tail in non-grey horses


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Anaplastic malignant melanoma of the tail in non-grey horses

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Keywords: horse; malignant melanoma; neoplasia
Summary

Information regarding signalment, clinical findings, treatment, and outcome of 5 previously reported cases of anaplastic malignant melanoma of the tail in non-grey horses and of 5 additional cases are summarized. Age was recorded for 9 horses and mean age was 16 years, range 8 to 23 years. Gender was recorded for 8 horses and 6 of these 8 horses were male horses over 14 years of age. The most common coat colour was bay (6 horses). Other coat colours were palomino (1 horse), chestnut (1 horse), and black (1 horse); coat colour of 1 non-grey horse was not specified. Follow up information was available for 9 horses and only 1 horse, a palomino, survived more than 10 months following diagnosis and tail amputation. Surgical excision, including tail amputation and medical therapy with oral cimetidine, was not effective in non-grey, non-palomino horses. Tumour recurred on tail tissue remaining after amputation in 2 horses, widespread metastases were documented in 4 cases, and metastasis was suspected at the time of death or euthanasia in 3 cases, including 1 case with amputation site regrowth. No subjective histopathologic differences were detected in the palomino that survived as compared to horses of other coat colours. Findings suggest that anaplastic malignant melanoma of the tail in bay, chestnut, and black horses is most often a very aggressive neoplasm, but that there are rare exceptions.
Introduction

Melanocytic tumors in horses are well-documented (Foley et al. 1991; MacGillivray et al. 2002; Moore et al. 2013; Schöniger and Summers 2009; Valentine 1995), although still not completely understood. Types of melanocytic neoplasms in horses are described as grey horse dermal melanoma, grey horse dermal melanomatosis, melanocytoma (melanocytic naevus), and anaplastic malignant melanoma (Valentine 1995).


Diagnosis of melanocytic neoplasia in poorly pigmented melanocytic neoplasms in non-grey horses can be challenging and relies on histopathologic or cytologic examination of tumour cells. Once a diagnosis of melanocytic neoplasia has been made in a non-grey horse it is vitally important to distinguish between melanocytoma, a benign neoplasm (Foley et al. 1991; Valentine 1995), and anaplastic malignant melanoma, which is typically very aggressive (Floyd 2003; Honnas et al. 1990; Kunze et al. 1986; LeRoy et al. 2005; Mostafa 1953; Pascoe and Summers 1981; Poore et al. 2013; Tyler and Fox 2003; Valentine 1995). Information regarding prognosis of different equine melanocytic tumours is very important when making decisions regarding therapy. The potential for malignancy, manifesting as metastatic tumours, has been documented in melanomas occurring in grey horses.
(MacGillivray et al. 2002; Moore et al. 2013; Valentine 1995). But, in many cases, surgical excision of grey horse dermal melanoma is curative (Valentine 1995), as is surgical excision of melanocytoma in grey and non-grey horses (Foley et al. 1991). There is a growing body of literature related to aggressive behavior of anaplastic malignant melanoma in non-grey horses (Floyd 2003; Honnas et al. 1990; Kunze et al. 1986; LeRoy et al. 2005; Mostafa 1953; Pascoe and Summers 1981; Poore et al. 2013; Tyler and Fox 2003; Valentine 1995). Location of reported cases of anaplastic malignant melanoma in non-grey horses varies, including 3 cases involving hoof wall or coronary band in chestnut, bay, and Paint horses (Floyd 2003; Honnas et al. 1990; Kunze et al. 1986) and 1 case in the nasopharynx of a dark brown horse (Tyler and Fox 2003). Five reported cases of anaplastic malignant melanoma in non-grey horses occurred in skin of the tail (LeRoy et al. 2005; Mostafa 1953; Pascoe and Summers 1981; Poore et al. 2013; Valentine 1995) suggesting that this may be a common site for anaplastic malignant melanoma in non-grey horses. This report summarizes the literature regarding anaplastic malignant melanoma of the tail in non-grey horses and describes 5 additional cases.

Cases

Cases of malignant melanoma of the tail of non-grey horses confirmed by histopathologic examination were collected by the first author over a period of 25 years, and the literature regarding malignant melanoma in non-grey horses was reviewed. Five previously reported cases and 5 additional cases are summarized in Table 1.

Signalment and clinical history

Age was recorded for 9 cases, and the mean age of affected horses was 16 years, range 8 to 23 years. The most common coat colour was bay (6 cases). Other coat colours were palomino (1 case), chestnut (1 case), and black (1 case). The only information available for 1 horse was that it was non-grey. Males
were most commonly affected (1 stallion, 5 geldings), with 2 affected mares. Gender of 2 horses was not reported. Locations within the tail were described as ventrum (5 cases), lateral (2 cases), dorsum (1 case), mid-tail (1 case) and end of the tail (1 case). Tumours on the tail were most often single tumours (8 cases). Case 1 had multiple tail tumours and case 9 had 2 tail tumours. Tumours were typically multilobular, white, pale tan, grey, black or dark brown in colour (Fig 1 and 2), and had a smooth (cases 1, 6, and 7) to ulcerated (cases 4, 8, and 9) skin surface. The tumour in case 5 progressed from being smooth surfaced to having an ulcerated surface 2 weeks later. The gross appearance of 3 tumours was not described. The tail was the only reported site of cutaneous mass lesions in 8 horses; case 1 also had perianal masses and case 4 had multiple similar nodules affecting skin of the face and of the shoulder.

**Treatment and outcome**

Tail amputation was the most common treatment and was performed in 5 horses (cases 2, 5, 7, 8, and 10). Oral cimetidine was given to 2 horses at a dosage of 2.5 mg/kg bwt *per os* t.i.d. for an unknown length of time (case 4) and 48 mg/kg bwt *per os* once daily for 3 days (case 9). No therapy was attempted in case 1, and details of therapy were not available for 2 horses (cases 3 and 6). Follow up was available for 9 horses, and all but the palomino mare (case 7) had died or been euthanized due to tumour complications from 1 day to 10 months following diagnosis of anaplastic malignant melanoma. Tumour recurred on remaining tail tissue following amputation in 2 horses (cases 5 and 8), widespread metastases were documented in 4 horses (cases 1, 3, 9, and 10), and metastasis was suspected in 3 horses (cases 2, 4, and 8). Sites of metastasis were not always described, but reported metastatic sites were thigh muscle, spleen, lung, peritoneum, mesenteric lymph node, liver, kidney, and bone marrow (Mostafa 1953), and spleen, lung, and thigh muscle in case 9. Case 7 is still alive at the time of this writing, 5.5 years after diagnosis of anaplastic malignant melanoma of the tail followed by tail amputation.
**Histopathologic findings**

Samples of all tail masses were diagnosed as anaplastic malignant melanoma based on histopathologic evidence of marked cellular and nuclear pleomorphism, mitotic activity (up to 6 mitoses per high power field), varying amounts of intracytoplasmic melanin (generally sparse), tumour necrosis, and epithelial, local, or lymphatic invasion. No subjective difference in histopathologic findings was detected in the tumour from the palomino horse that survived at least 5.5 years compared to other non-grey horses that died within 10 months of diagnosis (Fig 3 and Fig 4).

**Discussion**

Results of this study indicate that anaplastic malignant melanoma in non-grey horses often occurs on the tail and that, with rare exceptions, it is an aggressive tumour leading to death within a year of diagnosis. Surgical excision, including tail amputation, and medical therapy (cimetidine) do not appear to be effective in most cases of anaplastic malignant melanoma of the tail in non-grey horses. The 1 case in which the tumour did not have an aggressive behavior was a palomino mare. Interestingly, this was also the youngest horse in the study (8 years old at the time of diagnosis). Additional case studies of anaplastic melanoma of the tail in non-grey horses will be important to improve the ability to predict behavior and to treat these tumours.

**Authors’ declarations of interests**

No conflicts of interest have been declared.

**Acknowledgements**
The authors thank Dr. Ed Scott (deceased), Dr. Jason Errico, Dr. Lisa Poitras, Dr. Timothy Lammers, and Dr. Steve Sundholm for providing valuable information regarding cases in this study.
References


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Table 1: Summary of 5 previously reported and 5 new cases of malignant melanoma of the tail in non-grey horses.

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Breed</th>
<th>Colour</th>
<th>Age (yrs)</th>
<th>Gender</th>
<th>Site on tail</th>
<th>Treatment</th>
<th>Follow Up</th>
</tr>
</thead>
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<tr>
<td>1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Arabian</td>
<td>Bay</td>
<td>15</td>
<td>Stallion</td>
<td>Ventrum</td>
<td>None</td>
<td>Died in 1 day with metastatic disease</td>
</tr>
<tr>
<td>2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Unknown</td>
<td>Non-grey</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Middle</td>
<td>Amputation</td>
<td>Died 6 months post-surgery, no necropsy</td>
</tr>
<tr>
<td>3&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Morgan</td>
<td>Chestnut</td>
<td>23</td>
<td>Gelding</td>
<td>End</td>
<td>Unknown</td>
<td>Died in 10 months with metastatic disease</td>
</tr>
<tr>
<td>4&lt;sup&gt;d&lt;/sup&gt;</td>
<td>Thoroughbred</td>
<td>Bay</td>
<td>14</td>
<td>Gelding</td>
<td>Ventrum</td>
<td>Cimetidine</td>
<td>Suspected metastatic disease at time of diagnosis</td>
</tr>
<tr>
<td>5&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Irish Draught</td>
<td>Bay</td>
<td>16</td>
<td>Gelding</td>
<td>Lateral</td>
<td>Amputation</td>
<td>Regrowth at surgical site at 9 months</td>
</tr>
<tr>
<td>6</td>
<td>Morgan</td>
<td>Bay</td>
<td>20</td>
<td>Unknown</td>
<td>Lateral</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>7</td>
<td>Quarter horse</td>
<td>Palomino</td>
<td>8</td>
<td>Mare</td>
<td>Ventrum</td>
<td>Amputation</td>
<td>Alive and well</td>
</tr>
<tr>
<td></td>
<td>Breed</td>
<td>Color</td>
<td>Age</td>
<td>Sex</td>
<td>Location</td>
<td>Condition</td>
<td></td>
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<tr>
<td>8</td>
<td>Peruvian Paso</td>
<td>Bay</td>
<td>18</td>
<td>Gelding</td>
<td>Dorsum Amputation</td>
<td>Euthanized 8 months post-surgery with regrowth at surgical site and suspected metastatic disease</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Crossbred</td>
<td>Bay</td>
<td>20</td>
<td>Gelding</td>
<td>Ventrum Cimetidine</td>
<td>Euthanized at 7 months with metastatic disease</td>
<td></td>
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<tr>
<td>10</td>
<td>Friesian</td>
<td>Black</td>
<td>12</td>
<td>Mare</td>
<td>Ventrum Amputation</td>
<td>Died at 9 months post-surgery with metastatic disease</td>
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\(^{a}\) Mostafa 1953

\(^{b}\) Pascoe and Summers 1981

\(^{c}\) Valentine 1995
165  d LeRoy et al. 2005
166  e Poore et al. 2013
167
Figure Legends

Fig 1: Amputated tail from case 8, an 18-year-old bay Peruvian paso gelding. There is a multilobular extensively ulcerated black pigmented mass within the skin. Image courtesy of Dr. Ed Scott and Dr. Jason Errico, Oregon State University College of Veterinary Medicine.

Fig 2: Section of the tail mass from case 9, a 20-year-old bay mixed breed gelding. The mass is fleshy, pale tan, and multilobular. Image courtesy of Dr. Carol A. Lichtensteiger, University of Illinois College of Veterinary Medicine.

Fig 3: Photomicrograph from the anaplastic malignant melanoma on the tail of case 7, an 8-year-old palomino Quarter horse mare that survived at least 5.5 years following diagnosis and tail amputation. Beneath the epidermis (E) there is a poorly defined tumour composed of sheets of plump and pleomorphic epithelioid cells. There is no discernible intracytoplasmic melanin in this field. Mitoses are frequent (arrows). Haematoxylin and eosin. Bar = 25 µm.

Fig 4: Photomicrograph from the anaplastic malignant melanoma on the tail of case 8, an 18-year-old bay Peruvian paso gelding that was euthanized 8 months following diagnosis and tail amputation due to local tumour regrowth and suspect internal metastases. Beneath the epidermis (E) there is a poorly defined tumour composed of sheets and small nests of plump and pleomorphic epithelioid cells. Mitoses are present (arrows) and 1 cell containing melanin pigment is present (arrowhead). Haematoxylin and eosin. Bar = 25 µm.