

## REVIEW

# A systematic review and meta-analysis of animal-type melanoma

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**Background:** Animal-type melanoma is a rare subtype of melanoma with heavily pigmented dermal epithelioid and spindled melanocytes. Its classification as a subtype of melanoma versus a borderline melanocytic tumor is debated.

**Objectives:** Our primary objective was to characterize the demographics, clinical presentation, histopathology, management, and outcomes of patients with animal-type melanoma.

**Methods:** We performed a systematic review and meta-analysis of the English-language literature on animal-type melanoma.

**Results:** We identified 190 cases of animal-type melanoma. They occurred equally in men and women, with Caucasians (53.7%) most commonly affected. The median Breslow depth was 3.8 mm; ulceration was reported present in 15.8%; and dermal mitoses greater than or equal to 1/mm<sup>2</sup> was reported in 27.4%. The most common initial management was wide local excision with sentinel lymph node biopsy (55.7%). In all, 78 patients underwent sentinel lymph node biopsy with 41.0% positivity rate. A total of 32 patients underwent completion lymph node dissection with 34.4% positivity rate. Locoregional recurrence was reported in 15 patients, recurrence with distant metastases in 6 patients, and death in 5 patients.

**Limitations:** Data were obtained from small studies with limited follow-up. There is no universally accepted definition of animal-type melanoma.

**Conclusion:** Prospective studies with complete staging information and molecular profiling may allow further characterization of this tumor. (J Am Acad Dermatol <http://dx.doi.org/10.1016/j.jaad.2015.08.016>.)

**Key words:** animal type melanoma; equine-type melanoma; melanoma with prominent pigment synthesis; pigment synthesizing melanoma; pigmented epithelioid melanocytoma.

In 1832, Dick<sup>1</sup> first described heavily pigmented nodular melanomas in horses and named these “equine melanotic disease.” Almost 100 years later, in 1925, Darier described similar-appearing melanocytic tumors in human beings and named them “melanosarcoma.”<sup>2</sup> The term “animal-type melanoma” was first proposed by Clark and Guerry in 1990 to describe this same entity.<sup>3</sup> Since then, the terms “animal-type melanoma,” “pigment

#### Abbreviations used:

CLND: completion lymph node dissection  
EBN: epithelioid blue nevus  
SLNB: sentinel lymph node biopsy

synthesizing melanoma,” “melanoma with prominent pigment production,” “equine-type melanoma,” and most recently, “pigmented epithelioid

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melanocytoma” have been used to describe this subtype, and some controversy exists regarding its histologic classification. Some reports suggest animal-type melanoma is less aggressive than common types of melanoma; however, animal-type melanoma is not well characterized.

Our primary objective was to conduct a systematic review and meta-analysis of published cases of animal-type melanoma to describe the demographics, clinical presentation, histopathology, management, and outcomes of patients with animal-type melanoma.

## METHODS

### Data source

An independent literature search was conducted using the following databases: PubMed, EMBASE, CINAHL, Cochrane library, Web of Science, [Clinicaltrials.gov](http://Clinicaltrials.gov), and psycINFO from inception through May 22, 2015. The following search terms were used: “animal-type melanoma,” “pigmented epithelioid melanocytoma,” “pigment synthesizing melanoma,” “melanoma with prominent pigment synthesis,” and “equine-type melanoma.”

### Study selection

All articles reporting original cases of animal-type melanoma were selected. Only English articles were included. Meeting abstracts were excluded. References of selected articles were also reviewed for potential cases. Some cases were reported in the literature multiple times; we only counted these cases once.<sup>4-6</sup> As mucosal melanomas may have distinct behavior as compared with cutaneous melanomas, 7 cases of mucosal animal-type melanoma were excluded.<sup>5,7-11</sup> In addition, the histology of ocular melanomas can be very spindled and heavily melanized similar to animal-type melanoma; therefore, 1 case of ocular animal-type melanoma was excluded.<sup>12</sup>

### Statistical analysis

Data were derived from prospective and retrospective case series and case reports and therefore analyzed using descriptive statistics; common statistical measures were combined for meta-analysis. Medians were reported in preference to means.

## RESULTS

### Demographics and clinical features

There were 39 studies identified, with 190 cases reported.<sup>4,5,7,13-48</sup> Table 1 summarizes the demographics and clinic presentations of animal-type melanoma in these cases. The median age was 27 years, ranging from newborn to 92 years. Of

those studies that reported sex, male and female individuals were affected at equal frequency. Race was reported in 54 cases; in these, animal-type melanoma most commonly presented in Caucasians (53.7%), followed by Hispanics (18.5%), Asians/Persians (18.5%), and blacks (9.3%). The most common site of occurrence was an extremity (38.3%), followed by the head and neck (30.8%) and trunk (30.8%). The most common presenting feature was a blue-black or blue nodule.

In the 29 cases where lesion duration was noted, 10 cases (34.4%) reported having preexisting lesions present since birth or childhood that were then noted to expand. The lesion duration was between 1 to 5 years in another 9 cases (31.0%).

Several studies described the dermoscopic characteristics of animal-type melanoma, and a common feature was a homogenous blue-black or blue appearance with blue-white veil or irregular white areas.<sup>26,28,46,48</sup> Satellite lesions on clinical examination were reported in 12 patients (6.3%). Four patients had clinically palpable lymph node metastases at presentation. Two patients had distant metastases at presentation: 1 with a scalp primary had liver metastases, and 1 with an extremity primary had liver and lung metastases. A 44-year-old woman had 2 separate primary animal-type melanomas on the shoulder and the vaginal vestibule as described by Zembowicz et al<sup>5</sup>; the vaginal animal-type melanoma was not included as noted above. A family history of melanoma was reported in 1 patient with animal-type melanoma who also had a history of 2 superficial spreading melanomas.<sup>14</sup> No other patients were reported to have multiple primary melanomas.

### Histopathology

Animal-type melanoma is a predominantly dermal melanocytic proliferation of heavily pigmented

### CAPSULE SUMMARY

- Animal-type melanoma is a rare subtype of melanoma with heavily pigmented dermal epithelioid and spindled melanocytes.
- A comprehensive literature search identified 190 cases of animal-type melanoma; we report clinical findings, histology, management, and outcomes.
- Animal-type melanoma appears to have different clinical, histologic, and prognostic features compared with other subtypes of melanoma.

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