

Case Report

An Unusual Case of Equine Sarcoid of the Distal Limb in an Arabian Mare: A Case Report

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ABSTRACT

Sarcoids are the most common skin tumors in horses. A 12-year-old Arabian mare was examined for a significant solid soft tissue mass around the distal portion of the right metatarsal bone and the fetlock joint. The mass gradually increased nearly two years ago after the excisional surgery. Clinical examination showed a firm and painful lobulated mass upon palpation. Radiographic imaging showed bone involvement with severe soft tissue swelling on the dorsal and plantar aspects of the metatarsal bone and fetlock joints. Following histopathological examination, the mass was identified as sarcoid. The horse deteriorated and died. Recurrent growth of sarcoid masses is common, especially after frequent unprincipled interventions. Surgery alone may not be helpful, particularly in areas where the extent of the surgical margins can be limited during excision. This study highlights diagnostic challenges, emphasizing the need for histopathology for the definitive diagnosis of equine sarcoids.

Keywords: Equine, Histopathology, Mesenchymal tumor, Radiology, Sarcoid

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Case History

Equine sarcoids, the most common skin tumors in equids, were first characterized and described in 1936. (Jackson, 1936; Ogłuszka et al., 2021). Statistically, this type of tumor affects 1-11.5% of all horses. (Ogłuszka et al., 2021; Studer et al., 2007).

Furthermore, 12-67% of all neoplastic skin tumors in horses are known as sarcoid tumors (Ogłuszka et al., 2021; Sprayberry & Robinson, 2009).

Sarcoid tumors may cause discomfort and can result in ulceration, infection, and occasionally lameness based on the lesion's location. Bovine papillomavirus (BPV) types 1 and 2 are recognized as major causes of equine sarcoids. However, some studies have reported that up to a quarter of these tumors lack detectable DNA of either BPV1 or BPV2. These results suggest the possible involvement of other papillomavirus types (Munday et al., 2021). This possibility was recently demonstrated by the detection of BPV13 in an equine sarcoid in Brazil (Lunardi et al., 2013).

These lesions can appear in any part of the body. However, they usually affect the following locations: Head and neck, lower limb, distal to the stifle, upper limb, proximal to the stifle, flank, prepuce, groin, abdomen, and perineum (Karalus et al., 2023; Semik-Gurgul, 2021). Sarcoid tumors are classified according to their gross appearance and clinical behavior. Based on morphology, they are divided into six classes: Occult, verrucous, nodular, fibroblastic, mixed and malignant/malevolent (Allmang, 2022).

It should also be noted that the progression of the disease is dynamic, and less severe forms can rapidly develop into more aggressive types if disrupted by injury, biopsy, or inappropriate treatment (Allmang, 2022; Gysens et al., 2023; Taylor & Haldorson, 2013).

Several environmental and genetic factors are correlated with equine sarcoid frequency. It affects horses of all ages, although most cases first present between 2 and 9 years of age (Knottenbelt, 2019). However, a recent study by Ogłuszka et al. (2021) on 475 cases revealed neither sex nor age predisposition. However, some reports suggest that geldings may be overrepresented (Knottenbelt, 2005; Ogłuszka et al., 2021).

The definitive diagnosis of equine sarcoid relies on histopathology. Typical histopathological characteristics of equine sarcoids include epidermal acanthosis, hyperkera-

toxis, and hyperplasia with elongated rete pegs extending into dermal fibroblastic tissue. These lesions contain immature fibroblasts with mitotic figures, forming a whorled fibrocellular mass (Martens et al., 2000; Meuten et al., 2017; Hewes & Sullins, 2009). The histopathological examination indicated the existence of a loosely arranged fibrovascular stroma with a few lymphocytes. Additionally, the overlying epidermis exhibited hyperplasia, orthokeratotic hyperkeratosis, and variably sized keratohyaline granules clustered within keratinocytes (Rutland & Rizvanov, 2020; Thangapandiyar et al., 2022). Although histopathology is considered the gold standard for diagnosing sarcoids, there is a high risk of lesion exacerbation during biopsies (Allmang, 2022).

Differential diagnoses for equine sarcoids can be considered as follows: Granulation tissue, granuloma, papilloma, fibroma/fibrosarcoma, cutaneous lymphoma, squamous cell carcinoma (SCC), habronemiasis, mast cell tumor, melanoma, and staphylococcal folliculitis (Foy et al., 2002). Exuberant granulation tissue is a significant differential diagnosis for fibroblastic sarcoids (Bergvall, 2013). Rapid and sensitive molecular techniques, such as polymerase chain reaction, can be applied to differentiate between these skin lesions (Gysens et al., 2023). This paper describes an exceptionally large equine sarcoid on a limb and discusses its diagnostic methods.

Case Presentation

A 12-year-old Arabian mare presented with severe lameness, poor body condition, and a large mass (estimated 40 cm width) on the right hindlimb (Figure 1). Respiratory rate, heartbeat and rectal temperature were normal during the examination. The horse had a history of three parturitions and since the last one, had experienced a sudden weight loss. It was diagnosed with a significant, solid soft tissue proliferative mass located around the distal portion of the right metatarsal bone and fetlock joint. The lesion was observed as a lobulated, firm structure, along with edematous soft tissue located proximally to the mass. Severe pain was detected upon palpation.

Moreover, multiple purulent bleeding ulcerations were observed on the mass. The patient had been dealing with the mass above for approximately 5 years. In the first observation, the mass was approximately 3.5×4 cm. Despite receiving intralesional corticosteroid therapy, the growth process had not stopped, leading to the lesion undergoing two excisional surgeries. Since the last study was conducted two years ago, it has gradually increased in size from the cranial aspect with minimal response to



Figure 1. The lobulated, firm and ulcerative mass in the distal hindlimb of mare with focal hemorrhage

earlier treatments with non-steroidal anti-inflammatory drugs, anticancer drugs (such as cisplatin) and cold-hosing. Due to inadequate treatment, the lesion reached its current size. For further evaluation, radiography of the limbs and a biopsy were performed.

Diagnostic testing

Histopathology findings

The specimens were presented in a formalin solution to the Pathology Department of the Veterinary Faculty of the [University of Tehran](#), Tehran, Iran. The mass appeared firm, irregular, and ulcerated tissues with creams to white cut surfaces. Representative sections were prepared and placed in cassettes. Histopathological evaluation confirmed the presence of equine sarcoid lesions.

Histopathological sections comprise a thickened epidermis due to hyperkeratosis, parakeratosis, and acanthosis, with prominent epithelial pegs extending into the dermal proliferation of spindle-shaped cells arranged in holes and tangles ([Figure 2](#)). Some parts of the lesion were ulcerated, and dermatitis was observed ([Figure 3](#)).

Radiologic observations

A soft tissue mass was observed in the plantar and dorsal aspects of the metatarsophalangeal joint of the right hind limb, beginning from the mid aspect of the third metatarsal bone to the distal aspect of the first phalanx ([Figure 4](#)). The cortical layer of the plantar aspect of the distal sesamoid bone was not well visualized. An irregular cortical periosteal reaction was also noted on the metatarsal bone's medial, lateral and dorsal aspects ([Figure 5](#)).

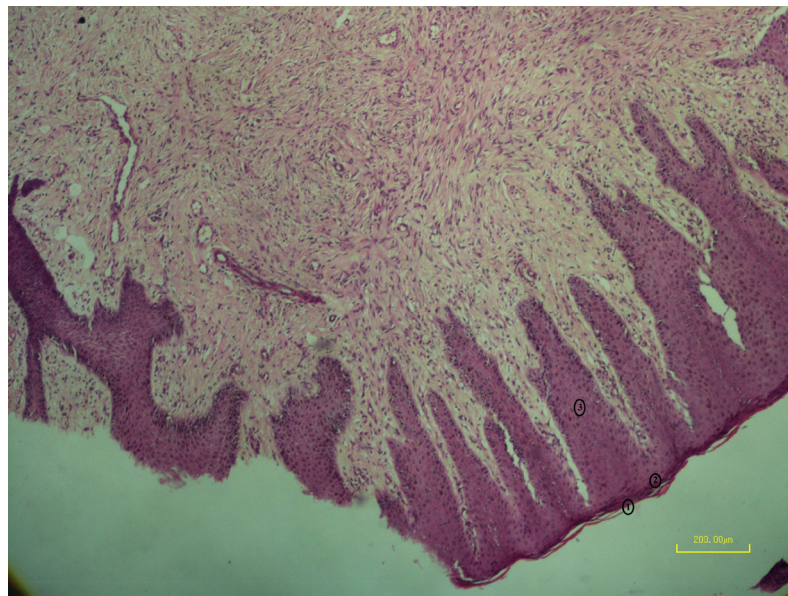


Figure 2. Microscopic image of the sarcoid with a mixed clinical appearance (H&E staining) (1) hyperkeratosis, (2) parakeratosis (2), and (3) acanthosis (rete pegs) with dermal vasculature, dermal fibroblast, and collagen proliferation with picket fence formation

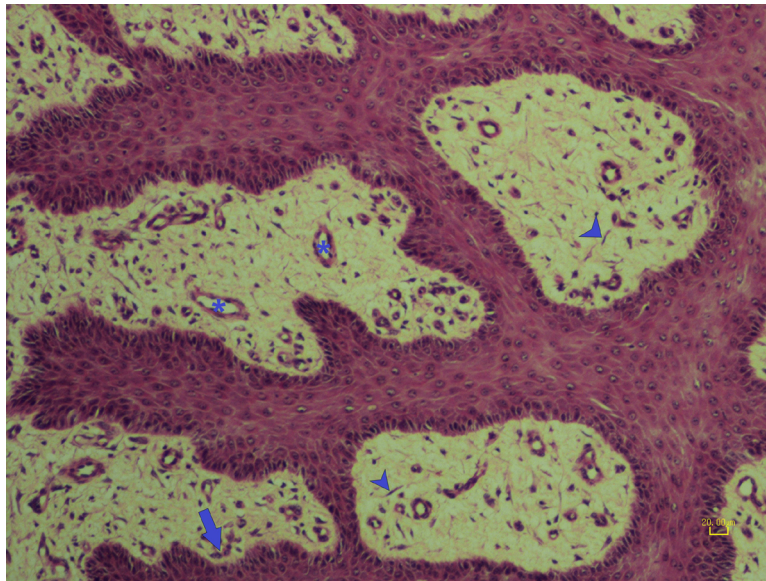


Figure 3. Microscopic image of the lesion (H&E staining)

Note: Arrows show picket fence formation, arrowheads show dermal fibroblast proliferation (spindle-shape cells), and asterisks show dermal vasculature.



Figure 4. Lateromedial radiographic view of right distal hindlimb

Note: A well-defined soft tissue mass is evident on the dorsal and plantar aspects of the distal metatarsal bone and the proximal aspect of the first phalanx. Multiple small mineralizations are visible in the soft tissue mass.



Figure 5. Dorsoplantar radiographic view of right distal hindlimb

Note: A soft tissue mass can be seen on the medial and lateral aspects of the distal metatarsal bone. Chronic and active cortical involvement of the bones is also evident. The Fetlock joint shows sign of osteoarthritis.

Assessment

The animals' health progressively deteriorated, marked by ongoing emaciation and debilitation. Clinical examinations revealed a decline in body condition score, muscle mass, and overall physical well-being over time. Due to the poor body condition and development of the mass, the patient died without any new interference. Although equine sarcoids are not lethal, the size and distribution of the tumor can significantly compromise the use and value of the horse, which may lead to the difficult decision to euthanize (Bergvall, 2013). Treating sarcoid tumors, with recurrence rates varying from 20% to 80%, is challenging (Curnow et al., 2023).

Surgical procedures, including conventional excision, carbon dioxide laser excision, cryotherapy, hyperthermia, radiotherapy, chemotherapy, immunotherapy, topical immune modulation, and antiviral agents, are employed with varying degrees of success (Taylor & Halderson, 2013). Cis-diamminedichloroplatinum (II) (cisplatin) can be considered one of the most effective anticancer agents used in the treatment of solid tumors in horses (Mathewos et al., 2020; Théon et al., 2007).

According to Offer et al.'s study, despite several effective treatments for equine sarcoid tumors, the regression rate of these lesions is still high. Surgical treatment is not recommended for sarcoid masses in horses, and surgical debulking does not significantly reduce the rate of sarcoid regression (Offer et al., 2024). It also should be considered that surgical interventions may exacerbate the risk of tumor regrowth (Curnow et al., 2023; Knottenbelt et al., 1995). In the current case, tumor regrowth occurred due to inappropriate interventions, such as intralesional corticosteroid therapy and multiple excisional surgeries. Some studies suggest that surgical debulking before cryotherapy, electrochemotherapy, or adding intralesional cisplatin to existing protocols may enhance outcomes (Offer et al., 2024; Pettersson et al., 2020).

According to a study by Karalus et al., the recurrence rates of sarcoid tumors after surgical excision were notably lower than previously reported, with only a quarter of cases recurring. This difference can be attributed to several factors, including meticulous case selection, surgical margin width, and novel treatment approaches. This study emphasizes the importance of careful case selection and appropriate surgical technique utilization to reduce recurrence rates (Karus et al., 2023; Ogłuszka et al., 2021).

Based on the results presented, offering one definite treatment for sarcoid tumors over another is still impossible. Appropriate treatment should be chosen considering multiple factors, including sarcoid type, location, size, patient condition, and the surgeon's ability (Offer et al., 2024; Pettersson et al., 2020).

Conclusion

Early diagnosis of sarcoids is critical and if the equine sarcoid is not diagnosed at the right time, it could cause an extended lesion and a high amount of pain, which can eventually lead to anorexia and even death in some cases. Surgical excision alone is not an appropriate treatment for removing sarcoid tumors and new methods of treatment, such as debulking along with cryotherapy or electro-chemotherapy or adding intralesional cisplatin, appear to be effective for this type of tumor. However, no definitive treatment has been suggested for this type of tumor in equine medicine.

Ethical Considerations

Compliance with ethical guidelines

The patient's owner provided written informed consent for the treatment and diagnostic work-up, follow-up of their pet, and participation in this case report.

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Authors' contributions

Conceptualization, methodology, investigation, resources, and writing: All authors; Data collection and investigation: Ali Roustaei and Mahya Sotoudefar.

Conflict of interest

The authors declared no conflict of interest.

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