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

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Abstract

Sarcoid is the most common skin tumor 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 fetlock joint. The mass increased in size gradually nearly two years ago after the excisional surgery. Clinical examination showed the lobulated mass, which was firm and painful in palpation. Radiographic imaging showed the bone involvement with severe soft tissue swelling on the dorsal and plantar aspects of the metatarsal bone and fetlock joint. Following histopathology, the mass was identified as a 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 for those areas where the extent of surgical margins can be limited during the excision. The study highlights diagnostic challenges, emphasizing the need for histopathology for definitive diagnosis of equine sarcoid.

Key words: Equine; Histopathology; Mesenchymal tumor; Radiology; Sarcoid.

Case History

Equine sarcoid, known as the most common skin tumor in equids, was 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% to 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 the major causes of equine sarcoids. However, some studies report that up to a quarter of these tumors lack the detectable DNA of either BPV1 or BPV2. These findings 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 may appear on 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 behaviors. They are divided into six classes based on morphology: occult, verrucous, nodular, fibroblastic, mixed, and malignant/malevolent (Allmang 2022; Martens *et al.*, 2000)

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 correlate with equine sarcoid frequency. It affects horses of all ages, although most cases are first presented 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 predispositions. 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 sarcoid include **epidermal acanthosis, hyperkeratosis, and hyperplasia** with elongated rete pegs extending into the dermal fibroblastic tissue. These lesions contain immature fibroblasts with mitotic figures, forming a whorled fibrocellular mass (Martens *et al.*, 2000; Meuten *et al.*, 2020; 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, ortho keratotic hyperkeratosis, and variably-sized keratohyaline granules clustered within the keratinocytes (Funiciello *et al.*, 2020; *Thangapandiyan et al.*,2022).. Although histopathology is considered the gold standard for diagnosing sarcoids, there is a high risk of exacerbating the lesions during the biopsy (Allmang 2022).

Differential diagnoses for **equine sarcoid** 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**)** and **Exuberant granulation tissue** is a significant differential diagnosis for **fibroblastic sarcoid** (Bergvall, 2013). Rapid and sensitive molecular techniques, such as the polymerase

chain reaction (PCR), can be applied to differentiate between these skin lesions (Gysens *et al.*, 2023). This paper describes an exceptionally large equine sarcoid on the limb and discusses the diagnostic methods.

Clinical presentation

A 12-year-old Arabian mare was presented with severe lameness along with poor body condition and the presentation of a large mass (estimated 30cm length and 40cm width) on the right hindlimb (Figure 1). The respiratory rate, heartbeats, and rectal temperature were normal during the examination. The horse had a history of three parturition and, since the last one, 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 an edematous soft tissue located proximally to the mass. During palpation, severe pain was detected.

Moreover, there were multiple bleeding purulent ulcerations on the mass. The patient had been dealing with the aforementioned mass for about 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 one conducted two years ago, it has gradually increased in size from the cranial aspect with minimal response to earlier treatments with non-steroidal anti-inflammatory drugs (NSAIDs), anticancer drugs (such as cisplatin), and cold-hosing. Due to inadequate treatment efforts, the

lesion reached its current size. For further evaluations, radiography of the limb and biopsy were performed.

Diagnostic testing

Histopathology findings

The specimens were presented in formalin solution to the pathology department of the veterinary faculty of the University of Tehran. The mass appeared firm, irregular, and ulcerated with cream to white cut surfaces. Representative sections were precisely obtained and placed in cassettes. Formalin-fixed tissue underwent tissue processing and was then embedded in paraffin. The specimen was cut into sections, placed on the slides, and then stained tissue with hematoxyline and eosin (H&E).

Histopathological sections were composed of a thickened epidermis due to hyperkeratosis, parakeratosis, and acanthosis with prominent epithelial pegs extending into a dermal proliferation of spindle-shape cells arranged in holes and tangles (Figure 2) picket fense formation was also notised (Figure 3). Some parts of the lesion were ulcerated, and dermatitis additionally observed. The histopathological evaluation conclusively identified the presence of an Equine sarcoid lesion, and the clinical classification of this sarcoid was ‘mixed’.

Radiologic observations

There was a round well-defined soft tissue swelling around the distal aspect of right metatarsal bone which was started one third of distal diaphysis of metatarsal bone to mid aspect of first phalangeal bone (Figure 4). Irregular periosteal reaction were noted medial aspect of distal metatarsal bone and proximal of first phalanx(Figure 5).

Assessment

The animal's 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 sarcoid itself is 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 of euthanasia (Bergvall, 2013). Treating sarcoid tumors, with recurrence rates varying from 20% to 80%, is challenging (Curnow *et al.*, 2023 Curnow *et al.*, 2023).

Surgical procedures, including conventional excision and carbon dioxide (CO2) laser excision, as well as cryotherapy, hyperthermia, radiotherapy, chemotherapy, immunotherapy, topical immune modulation, and antiviral agents, are employed with varying degrees of success (Taylor & Haldorson, 2013). cis-diamminedichloroplatinum (II) (Cisplatin) can be considered one of the most effective anticancer agents utilized in the treatment of solid tumors in horses (*Mathewos et al.*,2020; Théon *et al.*, 2007).

According to Offer et al.'s study (2024), despite several effective treatments for equine sarcoid tumors, the regression rate of these lesions is still high. Surgical treatment is generally 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 patient's case, tumor regrowth has occurred due to inappropriate intervention s such as intralesional corticosteroid therapy and multiple excisional surgeries. Some studies offer the conducting surgical debulking prior to cryotherapy, electro-chemotherapy, or adding intra-lesional cisplatin to existing protocols may further enhance outcomes (Offer *et al.*, 2024; Pettersson *et al.*, 2020).

According to a study by Karalus et al. (2023), 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. The mentioned study emphasizes the importance of careful case selection and appropriate surgical technique utilization in reducing the recurrence rates (Karalus *et al.*, 2023; Ogłuszka *et al.*, 2021).

According to a study by Ahmadnejad et al. (2022), L. sericata larvae could be effective in tumor lesion by superficial debridement (Ahmadnejad et al., 2022)

Based on the findings 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

The early diagnosis of sarcoid is critical , and if the equine sarcoid isn't 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 intra-lesional cisplatin, appear to be effective for this type of tumor. However, no definite treatment has been suggested for this type of tumor in equine medicine.

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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, original draft preparation :All authors . Data collection and investigation: Ali Roustaei , Mahya Sotoudefar . Review & editing: All authors.

Conflict of interest

The authors declared no conflict of interest.

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تومور غیرمعمول سارکوئید اسبی در قسمت پایین اندام حرکتی یک راس مادیان عرب : گزارش موردی

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چکیده

سارکوئید شایع ترین تومور پوستی در اسب است. یک مادیان عرب 12 ساله به علت توده‌ای بزرگ و قابل توجه و سفت بافت نرم که در اطراف قسمت دیستال استخوان متاتارس راست و مفصل فتلاک قرار داشت مورد بررسی قرار گرفت. پس از برداشت جراحی در دو سال پیش، ابعاد توده به تدریج افزایش یافت. معاینه‌های بالینی، توده‌ای لوبوله را نشان داد که در ملامسه سفت و دردناک بود. رادیوگراف‌های تهیه شده درگیری استخوان را همراه با تورم شدید بافت نرم در قسمت پشتی و کف پایی از استخوان متاتارس و مفصل فتلاک را نشان داد. در بررسی‌های هیستوپاتولوژی، توده به عنوان سارکوئید شناسایی شد. حال اسب رو به وخامت رفت و حیوان تلف شد. رشد مکرر در توده‌های سارکوئید مخصوصا پس مداخله های غیراصولی معمول است . مداخله‌ی جراحی به تنهایی ممکن است مفید نباشد، به ویژه برای مناطقی که وسعت حاشیه‌ی قابل برداشت در طی جراحی محدود شود. این مطالعه چالش‌های تشخیصی را برجسته ساخته و بر ضرورت تهیه‌ی لام هیستوپاتولوژی برای تشخیص قطعی سارکوئید اسب تاکید دارد .

کلمات کلیدی: اسب، تومور مزانشیمی، رادیولوژی، سارکوئید، هیستوپاتولوژی.