Fibrosarcoma over the tarsal groove of a 14-month-old Quarter horse

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Summary
A 14-month-old male Quarter horse was presented for evaluation of a grade 3 out of 5 (grade 0 = sound; grade 5 = non-weight bearing) right rear lameness. A firm, 8 x 16 cm mass was palpable at the caudal medial aspect of the distal tibia and proximal tarsal region of the right hind limb. A percutaneous needle aspirate contained mesenchymal cells that were moderate to large in size with single, oblong nuclei. Differential diagnoses included fibrous hyperplasia, fibroma, or well-differentiated fibrosarcoma. Excisional biopsy for both definitive diagnosis and treatment was offered and selected by the owner. A fibrosarcoma was confirmed by histological examination of the mass. One and a half years after resection signs of lameness or evidence of regrowth of the mass were not evident.

Keywords
Horse, tumour, fibrosarcoma

Introduction
Horses are rarely affected with soft tissue sarcomas (STS). Fibrosarcoma, rhabdomyosarcoma, leiomyosarcoma, and synovial cell sarcoma are among the tumours classified as soft tissue sarcomas. There are case reports in the literature of horses with varying forms of STS (1, 9, 19, 20). Despite their different cells of origin, these neoplasms are often considered collectively due to similar clinical behaviours (11). Soft tissue sarcomas tend to be pseudo-encapsulated, with poorly defined margins that may extend through fascial planes. Local recurrence after conservative surgical excision is common, and large neoplasms generally respond poorly to radiation or chemotherapy (11). Fibrosarcomas are common in dogs and cats, but uncommon in other species (25). The frequency and percentage of various histological types of skin tumours have been reported for domestic species. The incidence of equine fibrosarcoma ranged from 0.4% (12) to 46.4% (13). To the authors’ knowledge, there have not been any reports of a fibrosarcoma in close association with a synovial structure. This report describes a fibrosarcoma located over the tarsal groove in a young horse and the successful outcome after surgical excision.

Case history
A 14-month-old male Quarter horse was admitted for evaluation of a mass at the medial aspect of the right tarsus. The mass progressed through several cycles of enlargement and quiescence over a six-month period to reach the size at admission. The mass substantially increased in size in the three weeks before evaluation and lameness became apparent. The initial radiographic study, before admission, revealed soft tissue enlargement without apparent osseous abnormalities.

Clinical findings
At admission, the animal was bright, alert and in good body condition. Rectal temperature, pulse and respiration rates were within normal limits. The horse had a grade 3 out of 5 lameness (0 = sound, 5 = non-weight bearing) of the right rear leg. A firm, 8 x 16 cm mass was palpable at the caudal, medial aspect of the distal tibia and proximal tarsal region of the right hindlimb (Fig. 1). The mass had a uniform consistency and was not apparently associated with the skin, and the animal resented palpation of it. Ultrasonography and radiography revealed a homogenous soft tissue mass without any apparent tendinous or osseous associations. Cytological analysis of a percutaneous needle aspirate revealed mesenchymal cells in low numbers and peripheral blood. The mesenchymal cells were large to moderate in size with single oblong nuclei. Differential diagnoses included fibrous hyperplasia, fibroma, or a well-differentiated fibrosarcoma.

Clinical course
An excisional biopsy for both definitive diagnosis and treatment was offered and accepted by the owner. Ampicillin sodium (20 mg/kg IV), phenylbutazone (4.4 mg/kg PO) and tetanus toxoid were administered prior to anaesthesia and surgery. General anaesthesia was induced with xylazine (0.2 mg/kg IV), guaifenesin (5 mg/kg IV) and thiopental (6.5 mg/kg IV) and was maintained with isoflurane in oxygen in a semi-open system. The horse was positioned in right...
lateral recumbancy and the medial aspect of the right tarsus and distal tibial region were prepared for aseptic surgery. A 20 cm curvilinear incision was made along the dorsal aspect of the mass. Blunt and sharp dissection exposed a uniformly dense, smooth, white, non-encapsulated 8 x 16 cm mass, situated over the tarsal groove. The mass was attached to the deep digital flexor tendon (DDFT) and the tarsal synovial sheath. The close association between the mass, DDFT and the tarsal sheath made total resection unlikely, since wide tissue borders could not be achieved while maintaining structural integrity. All synovial structures remained intact after dissection of the mass. After removal of the mass, a positive suction drain was placed within the subcutaneous tissues of the dissection site. The subcutaneous tissue was closed with 3 metric (No. 2–0 USP) Polyglactin 910 in a simple continuous pattern and the skin was closed using 3.5 metric (No. 0 USP) Polidioxanone in an interrupted vertical mattress pattern alternating with a simple interrupted pattern. A Robert-Jones bandage was applied to the tarsus and the horse recovered from anaesthesia without complication.

Because of synovial compartment exposure, gentamicin sulphate (6.6 mg/kg IV one time daily) was empirically added to the antibiotic schedule. Phenylbutazone was continued (1.1 mg/kg, once daily). The intravenous antibiotics and oral phenylbutazone were administered for six days. Trimethoprim/sulfamethoxazole (15 mg/kg PO every 12 hours) was initiated for an additional seven days. The continuous positive suction drain was maintained for three days after surgery. At this time, fluid aspiration was minimal, the drain was removed and, to reduce the potential for seroma formation a pressure bandage was maintained over the tarsus for two weeks (changed at 24–48 hour intervals).

Histological examination revealed an unencapsulated, invasive, variably cellular mass of neoplastic fibroblasts. The cells were arranged in irregular interlacing bundles in an eosinophilic collagenous matrix. The neoplastic cells were spindle-shaped with indistinct borders, scant eosinophilic cytoplasm and mildly pleomorphic oval nuclei with coarsely stippled chromatin. Mitotic figures numbered 3 per 10 high power microscopic fields (Figs. 2, 3). Masson’s trichrome stain of the neoplasm revealed moderate to abundant mature collagen in the extracellular space. Immunohistochemical staining was performed for vimentin, desmin, glial fibrillary acidic protein, smooth muscle actin, factor VIII, and S-100. The neoplastic cells stained strongly for vimentin, and were negative for desmin, glial fibrillary acidic protein, smooth muscle actin, factor VIII, and S-100. The histopathological diagnosis based upon the characteristic histological architecture, presence of well differentiated collagen in the extracellular space, and immunohistochemical staining was fibrosarcoma.

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Fig. 1 A photograph of a firm mass on the caudal, medial aspect of the distal tibia and proximal tarsal region of the right hindlimb.

Fig. 2 Low magnification photomicrograph of the fibrosarcoma showing neoplastic fibroblasts arranged in broad irregularly intersecting bundles. Haematoxylin & Eosin stain.

Fig. 3 High magnification photomicrograph of the fibrosarcoma showing spindle cells arranged in parallel arrays suspended in fibrillar collagen. A mitotic figure is present in the center of the image. Haematoxylin & Eosin stain. Bar = 50 µ.
Equine fibrosarcoma in tarsal groove

staining results was that of a well differenti-
ated fibrosarcoma.

The colt was re-evaluated six months
after discharge from the hospital. The right
hindlimb was visibly and palpably enlarged
throughout the plantar tarsal and distal tibial
region. The swelling was firm, diffuse, non-
painful and there was not any apparent tarsal
sheath nor joint effusion. The animal did not
resist palpation or flexion of the region, and
was sound at the walk and trot. Radiographic
evaluations were normal. Ultrasound
evaluation revealed a slight
thickening of the soft tissues, however, re-
currence of fibrosarcoma was not evident.
The enlargement of the limb at the tarsus
was likely due to incisional and dissection
site healing. One and a half years after sur-
gery, the colt is sound and in training for
western performance competition.

Discussion

Fibrosarcomas are common in dogs and
cats, but uncommon in other species (25).
Soft tissue sarcomas collectively comprise
15% of dogs and 7% of cats experiencing
skin and subcutaneous neoplasms (11). In
dogs and cats, fibrosarcomas are commonly
found on the head, particularly in the oral
region (3). In horses, the most commonly
reported site for fibrosarcoma is the head, in-
cluding periocular (6), premaxilla, and na-
somaxillary regions (2, 5, 17). Other single
reports of fibrosarcoma in horses include
sites in the epaxial muscles, the subcutis of
the flank and rib regions, the omentum, kid-
ney and mediastinum (7, 8, 10, 15, 16, 24)
and one tumour on the hip, secondary to par-
tial thickness burns over the gluteal region
(18).

The incidence rate of fibrosarcoma in
horses has been reported to be as high as
46.4% (13), and as low as 0.4% of reported
neoplasms (4, 12) The main inconsistenc-
y in these reports is the classification of the
equine sarcoïd in the same category as fi-
 brosarcoma. Equine sarcoïds are very com-
mon spindle cell tumours that may affect
horses of all ages, breeds and colours (25).
Additionally, horses referred to veterinary
 teaching hospitals for evaluation are some-
times of higher economic worth and may
bias the overall estimates of incidence of fi-
brosarcoma in the general equine popula-
tion (13).

Fibrosarcomas are typically grey-white,
multinodular, and poorly demarcated neo-
plasms. Although there appears to be a
predilection for the subepithelial connective
tissue of the nose, mouth and skin, they
may occur at any anatomical location. These tu-
mours tend to be large, invade deeper struc-
tures such as tendons, fascia and muscles,
and frequently ulcerate the overlying epider-
mis (11). Their locally invasive nature
makes complete excision difficult, and after
surgical excision, recurrence is common.
Metastasis is uncommon, reportedly occur-
rng in 10–35% of the cases in small ani-
mais. Regional lymph nodes and lung are
the most common sites of metastases (3,
25).

Cytology is of limited value for confir-
mation of a diagnosis of fibrosarcoma. This
is due in part to the similar cytological ap-
pearance of reactive tissue and benign neo-
plasms. Additionally, few cells are available
to evaluate since the number of exfoliated
cells from sarcomas is usually low. There-
fore, biopsy and histopathology are usually
necessary for a definitive diagnosis. Radi-
ography, ultrasonography, computed to-
ography, magnetic resonance imaging and
angiography may also assist diagnosis.
These technologies are currently used more
frequently in small animals for neoplastic
staging purposes (11). Although staging of
tumours is not frequently used in equine
practice, a thorough understanding of the
tissues involved and the extent of the in-
volvement are important prognostic and
therapeutic indicators.

Histologically, fibrosarcomas consist of
randomly intersecting bundles of plump
spindle cells which have marked variation
in nuclear size and shape. Mitotic figures are
common, and multinucleated giant cells
may be present. Collagen is often apparent
and can be abundant but this may not differ-
entiate fibrosarcoma from other sarcomas.
Fibrosarcomas can also be difficult to dif-
ferentiate from fibrous dysplasia, reactive
granulation tissue, or a fibroblastic stromal
reaction elicited by other invasive carcino-
mas. Recurrence after excision, or metasta-
sis, are most common in those neoplasms
with high mitotic indices and extreme cellular
pleomorphism (25).

Tumour diagnosis is largely based on the
morphological aspects of tissues and cells.
However, in certain instances, additional
techniques are applied to obtain information
relevant to the tumour type and the tissue of
origin (14). Immunohistochemistry per-
formed with well-defined monoclonal anti-
bodies complements morphological studies
in order to more accurately classify tumour
types (14). Immunohistochemistry for fi-
brosarcomas is characterized by staining
positive for vimentin, and negative for des-
min, actin, factor VIII, S100 protein (14).

When fibrosarcoma in the horse does
metastasize, foci have been observed in: the
humerus, lung, liver, adrenal gland, regional
lymph nodes, diaphragm, peritoneum, verte-
bral column, myocardium, pericardium,
pleura, kidney, spleen, intestines and skel-
etal muscles (10, 15). Within these reports,
the lung and liver are the two most com-
monly reported sites for metastases. The age
of onset of fibrosarcoma in the horse ranges
from birth to 13 years, with a median of four
years. The diagnosis and treatment options
for the horse are similar to those for small
animals.

The surgical excision of soft tissue sarco-
mas in small animals is the treatment of
choice, because these neoplasms tend to
grow in the path of least resistance and ag-
gressively invade surrounding tissues,
usually forming a pseudocapsule comprised
of compressed tumour cells (11). The pres-
ence of viable neoplastic cells within the
‘capsule’ makes wide surgical margins, at
least 3 cm when possible, highly desirable.
It has been recommended that excisional
dissection should be through surrounding
normal tissue, which may necessitate limb
amputation (11). In small animals, adjunct
therapy may include radiation, chemother-
apy and immunotherapy (11). There are re-
ports of chemotherapeutics and radiation
therapy for some tumour types in the horse
(16, 20–23), however, the expense and diffi-
culties of administration of these therapies
make them inaccessible for most equine pa-
patients. Additionally, amputation is not a rea-
sonable option for equine patients. In the
current case, the successful outcome may
indicate long-term resolution of clinical signs is possible without the benefit of wide dissection margins during surgical excision. This may suggest that the biological behaviour of fibrosarcoma is different in horses than in other species. Alternatively, recurrence may take longer than the year and a half during which the horse in this report has been free of clinical signs. Either explanation offers encouragement for surgical excision as the treatment of choice for horses with fibrosarcoma.

References

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