Journal of
Advanced Veterinary Research
Volume 2 (2012) 271-275

Original Research

Traumatic Foot Fractures in Hard Working Donkeys

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(Recieved 26 March 2012/ Accepted 27 September 2012)

Abstract

The present study was carried out on 45 hard working donkeys suffering from different types of traumatic foot fractures. These animals were selected from the clinical cases admitted to the Veterinary Teaching Hospital, Assiut University during the period of 2007-2010. Based on history, clinical signs and radiographic examination, various types of traumatic foot fractures were diagnosed and recorded. These fractures were affect metacarpal bones (*N.* =16), metatarsal bones (*N.* =9), proximal phalanx (*N.* = 13), middle phalanx (*N.* = 3), distal phalanx (*N.* = 2) and proximal sesamoid bones (*N.* = 2). It could be concluded that fractures of the large metacarpal bones are the most common types followed by fractures of the proximal phalanx of the thoracic limb then fractures of the metatarsal bones. Fractures of the middle phalanx, distal phalanx and proximal sesamoid bone are less common in donkeys. Single fractures of the metacarpal and metatarsal bones are more common than comminuted one, in addition diaphyseal fractures of these bones are more common than metaphyseal or epiphyseal fractures. In the proximal phalanx, comminuted fractures are more common than single fractures.

Keywords: Traumatic foot; fractures; hard working donkeys

Introduction

Donkeys play an important role as an inexpensive means of transportation. The usefulness of these animals depends upon the condition of their feet. The feet are subjected to variable degrees of trauma, especially in hard working animals (Misk and Nigam, 1985). Every bone in an animal's body may be fractured if sufficient traumatic force is directed against it (Gillette *et al.*, 1977).

Fractures are caused by various types of trauma, kicks from another animals, automobile accidents and halter-breaking injuries (Turner, 1984; Steiner, 1998).

Fractures and dislocations of the extremities are by far the most common pathologic lesions seen radiographically (Gillette *et al*., 1977). The digit and metacarpo- phalangeal (metatarsophalangeal) regions are clinically important areas that are frequently examined radiographically (Smallwood and Holladay 1987). Diagnosis of fractures can usually be made from the clinical signs.

Radiographic examination is essential for characterizing the configuration of fractures and for determination of prognosis (Gillette *et al*., 1977; Jennings, 1984; Schneider and Jackman 1996). The present study deals with recording and description of traumatic foot fractures of hard working donkeys.

Materials and methods

The present study was carried out on 45 hard working donkeys suffering from different types of traumatic foot fractures. These animals were selected from the clinical cases admitted to the Veterinary Teaching Hospital, Assiut University during the period of 2007-2010. Diagnoses of the cases were depending on history, clinical signs and radiographic examination. Two radiographic projections were obtained, lateral and dorsopalmar (dorsoplantar).

Exposure factors were 15–20mAs and 48 – 50 K.V., according to the animal age; at distance of 90 cm. Standard speed film and intensifying screens were used.

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ISSN: 2090-6277/2090-6269, www.advetresearch.com

Results

Based on history, clinical signs and radiographic description, different types of foot fractures of hard working donkeys were diagnosed and recorded (Table 1).

Table1. Site of traumatic foot fractures of donkeys

Fractured bone	Number of animals
Fractures of the metacarpal bones	16
Fractures of the metatarsal bones	9
Fractures of the proximal phalanx	13
Fractures of the middle phalanx	3
Fractures of the distal phalanx	2
Fractures of the proximal sesamoid bone	2
Total	45

History of the cases indicated that the animals were hard working. Their ages were ranged from 1-5 years old and exposed to either accident or severe traumatic force at the level of the foot.

Clinical examination of metacarpus, metatarsus, proximal and middle phalanx revealed presence of local tenderness, crepitation, deformity and abnormal mobility at the site of fracture. The animal cannot bear weight on the affected limb.

Fracture of the proximal sesamoid bones is associated with an acute onset of severe lameness with considerable soft-tissue swelling and local tenderness. The clinical signs in case of distal phalanx fracture include severe degree of lameness, positive response to hoof testers and increased digital pulse.

Fracture of metacarpal and metatarsal bones:

Fractures involve metacarpus (Figs. 1, 2 and 3) and metatarsus (Fig. 4) were diagnosed in 25 hard working donkeys (16 metacarpus and 9 metatarsus). In 15 case the fracture was closed while in 10 cases it was opened of varying degree ranged from slight (6 cases) to severe injury of the skin (4 cases).

Radiographic description of the fractured bones revealed presence of complete single transverse midshaft fracture (7 cases), complete single oblique midshaft fracture (5 cases), complete single oblique fracture at the distal third of diaphysis (4 cases), complete comminuted diaphyseal fracture (5 cases) and complete comminuted proximal metaphyseal fracture (4 cases).

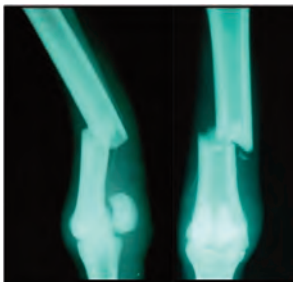

Fig. 1. Mediolateral and dorsopalmar radiographs showing complete single diaphyseal fracture at the distal third of the metacarpal bones.

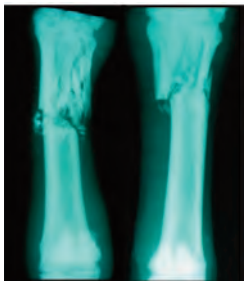

Fig.2. Dorsopalmar radiographs showing complete comminuted diaphyseal fracture at the proximal third of the metacarpal bones.

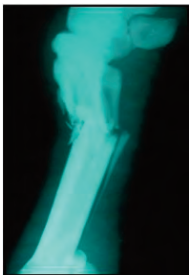

Fig. 3. Mediolateral radiograph showing complete comminuted diaphyseal fracture at the proximal third of the large and small metacarpal bones.

Fig. 4. Mediolateral radiograph showing complete comminuted diaphyseal fracture of the metatarsal bones.

Fracture of the proximal phalanx

Proximal phalanx fractures (Fig. 5 and 6) were diagnosed in 13 of hard working donkeys. Eight cases of proximal phalanx fractures were diagnosed in the thoracic limb and 5 cases in the pelvic

limb. In all cases the fracture was closed. Radiographic description of the proximal phalanx fractures revealed presence of complete comminuted fractures (9 cases) and complete single fracture (4 cases).

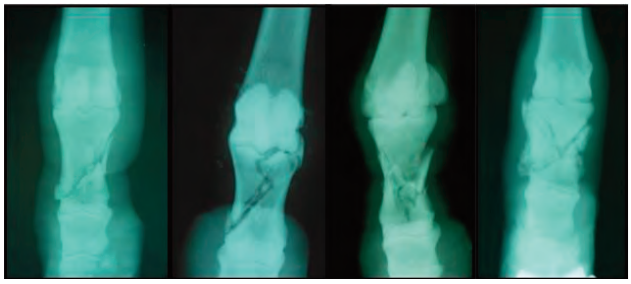

Fig. 5. Dorsopalmar radiographs of the phalangeal region showing complete comminuted fracture of the proximal phalanx.

Fig.6. Mediolateral radiograph of the phalangeal region showing complete comminuted fracture of the proximal phalanx.

Fracture of the middle phalanx:

This type of fracture was diagnosed in three hard working donkeys. In all cases the fracture was closed and affecting the middle phalanx of the thoracic limb (Fig. 7). Radiographic description revealed presence of complete single oblique fracture (2 cases) and complete comminuted fracture (one case).

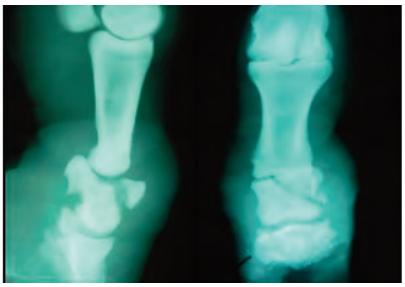

Fig.7. Mediolateral and dorsopalmar radiographs of the phalangeal region showing complete comminuted fracture of the middle phalanx.

Fracture of the distal phalanx:

Distal phalanx fractures (Fig. 8) were diagnosed in the thoracic limb of two hard working donkeys. Radiographic description revealed complete comminuted fracture of the distal phalanx.

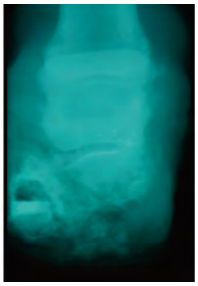

Fig.8. Dorsopalmar radiograph of the digit showing complete comminuted fracture of the distal phalanx.

Fractures of the proximal sesamoid bones:

These fractures were diagnosed in two cases of hard working donkeys. The fractures were closed and affecting proximal sesamoid bones of the thoracic lambs (Fig. 9). Radiographic description showed presence of complete mid-body fractures of the bones.

Fig. 9. Dorsopalmar radiograph of the fetlock region showing complete midbody fracture of the proximal sesamoid bone with chip fracture of the proximal phalanx.

Discussion

Bone fractures, particularly the limb fractures in horses usually occur either as a result of direct trauma from a fall, kick or knock or during strenuous exercise (Ozyigit and Ozcan, 2010). In the present study all types of fractures were traumatic as a result of accident or severe trauma from a fall during work.

Fractures of the metacarpal or metatarsal bone are common in horse because of their vulnerability (Mcilwraith, 1987).In the present study fractures of the metacarpal bone are the most common type of foot fractures in hard working donkeys due to exposure of these areas to external violence either from accident or trauma.

Fractures of the metacarpal bone can assume a variety of configurations, ranging from simple

transverse fractures to severely comminuted fractures with many pieces (Jenning, 1984). In the present study, clinical and radiographic description of metacarpal and metatarsal fractures revealed presence of several types including simple fractures, compound fractures, single fractures, comminuted fractures, diaphyseal fractures and metaphyseal fractures.

Diaphyseal fractures of the third metacarpal bone compose 22% of all horse limb fractures. This ratio increase to 33% when the diaphyseal fractures of the metatarsal bone are included (Ozyigit and Ozcan, 2010). According to our investigation, diaphyseal fracture of the metacarpal and metatarsal bone is the most common type. Also single fractures were more common than comminuted fractures. The fractures vary in their types and location on the bone according to the severity, direction and site of the traumatic factor on the bone part.

Large metatarsal bone has stronger construct than metacarpal bone especially in dorsal and plantar bendings (Ozyigit and Ozcan, 2010). In the present study fractures of the metacarpal bones were prevalent than those of metatarsal bones.

Proximal phalangeal fractures in horse can occur in a variety of configurations ranging from very small hair line fissures to severely comminuted fractures with many pieces (Jenning, 1984). Single and comminuted fractures of the proximal phalanx were recorded in the present study. Comminuted fractures were more common than single fractures (Kraus *et al*., 2004).

Fractures of the middle phalanx are common especially in horses (Jenning, 1984; Rose *et al*., 2005). In the present study, fractures of the middle phalanx in hard working donkey were diagnosed in three cases out of 45 cases suffering from traumatic foot fractures. Single fracture recorded in two cases while comminuted fracture in one case.

Fractures of the distal phalanx occur most frequently in horses and cattle. They probably occur in sheep, goats and pigs but do not appear to be as clinically important as in horses and cattle (Jenning, 1984; Honnas *et al*., 2005). Fractures of the distal phalanx in hard working donkeys were diagnosed in two cases only out of 45 cases of foot fractures.

Fractures of the proximal sesamoid bones occur as racing injuries in thoroughbreds, quarter horses and standardbreds. Fractures are occasionally seen in hunters, jumpers and eventing horses (Jenning, 1984).

Proximal sesamoid bone fractures are classified according to the location and orientation of fracture into apical, basilar, midbody, axial, abaxial and comminuted. Apical fractures are the most common type of sesamoid bone fractures (Spurlock and Gabel 1983; Fretz *et al*., 1984; Ruggles and Gabel 1998). According to our investigation two hard working donkeys were recorded affected by midbody fracture of the proximal sesamoid bones of the thoracic limb.

The radiographic appearance of a fracture is usually manifest as a break in the uniform density and continuity of the bone. Usually this takes the form of a line of decreased density, less commonly it appears as a line of increased density due to compression (Gillette *et al*., 1977 and Thrall 1994). Radiography is essential for diagnosis of fracture and for description of its configuration, shape, degree and location.

Conclusion

Hard working donkeys were exposed to traumatic factors as accident especially at the foot of the thoracic limbs leading to various types of fractures. Fractures of the large metacarpal bones are the most common types followed by fractures of the proximal phalanx of the thoracic limb then fractures of the metatarsal bones. Fractures of the middle phalanx, distal phalanx and sesamoid bones are less common in donkeys. Single fractures of the metacarpal and metatarsal bones are more common than comminuted one. In addition, diaphyseal fractures of these bones are more common than metaphyseal or epiphyseal fractures. In the proximal phalanx, comminuted fractures are more common than single fractures. Radiography is essential for diagnosis and description of fractures.

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