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Septic tarsitis in horses: clinical, radiological, ultrasonographic, arthroscopic and bacteriological findings

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Abstract

Septic arthritis is a major problem in horses causing severe lameness and poor performance. This study was carried out on 14 horses suffering from septic tarsitis. Full case history and thorough clinical examination were done. Bacteriological, radiological, ultrasonographic and arthroscopic examinations were carried out to record all the pathological changes in septic tarsitis. Joint lavage, either by arthrotomy or arthroscopy followed by intra-articular and systemic injection of antibiotics and anti-inflammatory drugs and hock bandage were applied for treatment. Trauma was the cause of tarsitis in all the cases. The age of the affected animals ranged between 21 days and 10 years, with 53.8% horses under one year of age. Clinical findings included hot and painful hock swelling with presence of external wound, peri-articular edema and cellulitis and severe lameness varying from 4^{th} to 5^{th} degree. Radiographic findings included soft tissue swelling, subchondral bone lysis and osteophytic reaction. Ultrasonographic examination revealed accumulation of anechoic fluid filled with hypoechoic masses or dots in the tibiotarsal joint or in multiple sacs. Arthroscopic examination showed erosions and irregularity of articular surface associated hypertrophic synovial villi. Culture and sensitivity test documented *Staphylococcus aureus* and Corynebacterum as causative agents which were sensitive to Ciprofloxacin and Cefoperazone, respectively. In contrast to the chronic cases, acute cases responded well to the treatment.

Keywords: Septic tarsitis; radiography; ultrasonography; arthroscopy; horses

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Introduction

Septic arthritis is a major problem in horses and can result from infection via three routes: haematogenous spread, percutaneous infection and invasion from adjacent tissue. The incidence of infective arthritis varied for each joint, tarsocrural joint was the most commonly affected one (Steiner et al., 1999; Meijer et al., 2000). Firth (1992) classified septic arthritis in foals into type S (septic arthritis), type E (septic arthritis and osteomylitis of the epiphysis), type P (septic arthritis and osteomylitis of the physeal area) and type T (involving central tarsal sheath).

Clinically, infective arthritis in horses is characterized by severe or non-weight bearing lameness, swelling, effusion in addition to thickening, edema, and pain during manipulation of the affected joint (Stashak, 2002; Haerdi-Landerer et al., 2009).

Soft tissue swelling and distention of the affected joint during the first or second day of the injury are consistent early radiographic findings in septic arthritis. Late radiographic findings include subchondral bone lysis and periosteal proliferation at the joint margins. The joint space may be increased at areas of subchondral bone lysis. Diminished joint space is evidence of the loss of the articular cartilage (Sande, 1998; Farrow, 2006).

Complete arthroscopic assessment was carried out by Parisien and Shaffer (1992). Fibrinous debris, necrotic synovium, loose cartilage fragments, or pockets of adhesions were seen and high speed motorized shaver was used to debride the involved compartments.

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Concerning treatment, Steiner et al. (1999) and Schneider (1999) reported that joint lavage is indicated in all the cases of septic arthritis. Flushing the joint removes fibrin, purulent material, and inflammatory mediators from the synovial space. In cases where subchondral osteomyelitis is present, the lesion is debrided under arthroscopic guidance. Bertone (1990) and Stashak (2002) advised the use of potent, broad spectrum antibiotics in infective arthritis before culture results are available.

The aim of the present study was to record clinical, radiographic, ultrasonographic, arthroscopic and bacteriological findings in septic tarsitis in horses.

Materials and Methods

The present study was carried out on 14 horses admitted to the surgery clinic at Faculty of Veterinary Medicine, Cairo University for treatment of unilateral septic tarsitis. Complete case history and thorough clinical examination were done in each animal.

Bacteriological examination

Sterile swabs were used to collect bacteriological samples from the joint capsules, which were used for conducting culture and sensitivity tests as per the standard methods (Bauer et al., 1966).

Radiographic examination

Plain radiographic examination was carried out using 58-70 kVp, 10 mAs and 90 cm focal spot film distance (FFD). Different radiographic projections including Dorsoplantar (DP), lateromedial (LM), dorsolateral plantaromedial oblique (DLPMO), dorsomedial plantarolateral oblique (DMPLO), flexed lateromedial and flexed dorsoplantar were made according to Connie et al. (2004).

Ultrasonographic examination

It was performed with a real time ultrasound system (Toshiba just vision 200, Toshiba Company, Japan), using multi frequency probes (7 MHz micro convex and 10 MHz linear probe). The hair over the affected tarsal region was clipped and shaved then sonographic contact gel was applied to the skin. The scans were frozen and photographs were taken on Polaroid films in both longitudinal and transverse scans. The examination was carried out according to Vilar et al. (2008).

Arthroscopic examination

The affected horses were anesthetized by using a regimen composed of Xylazine HCl (1mg/kg) as a sedative, ketamine HCl (2 mg/kg) for induction of anesthesia and triple drip (ketamine HCl 1g+ ½ g xylazine+ 25 g Guiaphenesine in 500ml glucose 5%) for maintenance of general anesthesia as continuous I/V drip during the operation.

The Tarsus was clipped circumferentially from distal tibia to the proximal metatarsus, cleaned and draped with sterile towels immediately prior to arthroscopy. The horse was placed in dorsal recumbency and hooves were suspended on a bar for ease of control of the degree of hock flexion.

Arthroscopic examination was carried out according to McIlwraith and Forner (1990). The horses were given anti-tetanus serum and systemic antibiotics and anti-inflammatory drugs for 5 days post-surgery.

The affected animals were treated by joint lavage with sodium chloride 0.9% through arthrotomy in ten horses and through arthroscope in 4 animals, selected randomly. Arthroscopic removal of fibrin and hypertrophic villi was followed by washing of the joint by normal saline. After joint lavage, intra-articular injection of gentamycin sulphate 80 mg (Garamycin 80 mg®, Scherring- Plough), Benzyl penicillin (Penicillin G sodium®; MISR CO.), Amikacin sulphate 250 mg (Amikin®, Smithkline Beecham) and 10 ml DMSO 20% were applied twice a week for 2 weeks. Hock bandage was applied after completion of the procedure every time. Systemic procaine penicillin Dihydro-streptomycin sulphate, gentamycin and Phenylbutazone were administered for one week until sensitivity test completed.

Results

Out of 14 horses, nine horses suffered from right limb lameness and the other horses suffered from left limb lameness. Eight horses were males and six were females. The age of the affected animals ranged between 21 days and 10 years with a percentage of 53.8% horses under one year of age.

The history revealed that septic tarsitis was caused by saddle trauma, motor car accident, kicking from another animal or hitting against the wall of the stable.

Clinical examination revealed severe hot painful hock swelling with presence of external wound in all the cases. Peri-articular edema and cellulitis were also seen (Fig. 1 A&B). Severe lameness varying from 4^{th} to 5^{th} degree was observed. Spavin test resulted in severe pain and increased lameness. Some animals had fever and high respiratory and heart rates. Arthrocentesis revealed turbid fluid with a high cellular count (Fig. 1C). Radiographic examination showed soft tissue swelling (Fig. 2A), subchondral bone lysis (Fig. 2B), osteophyte reaction at the dorsal aspect of talus and osteophytes formation at site of sustentaculum tali (Fig. 3A). Osteophytes at lateral and medial aspect of the talus bone and occlusion of the joint spaces (Fig. 3B) with signs of bone resorption at distal tibia, seen in two horses (Fig. 4A). Osteophytic reaction at the plantar aspect of the proximal 4^{th} metatarsus (Fig. 4B) and at dorsal aspect of proximal intertarsal joint, distal intertarsal joint spaces, sub-chondral osteolysis and osteomyleitis were seen in another two horses.

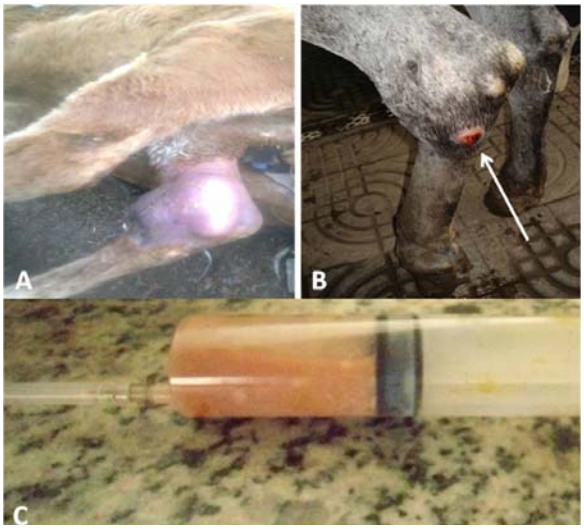

Fig. 1: (A) Septic arthritis in a 21-day-old filly showing severe tarsal swelling with peri-articular edema and cellulitis; (B) Septic arthritis in a 3-year-old mare showing severe tarsal swelling with external wound at lateral aspect of the tarsus; (C) Arthrocentesis revealing turbid and highly cellular synovial fluid

Ultrasonographic examination demonstrated accumulation of anechoic fluid containing hypoechoic masses or dots in the tibiotarsal joint (Fig. 5A&B). Multiple sacs filled with hypoechoic fluid were seen in 3 cases (Fig. 6). On ultrasonographic examination, septic arthritis was found associated with collateral ligament desmitis in 5 horses, thorough pin in 4 horses and curb in 2 horses. Arthroscopic examinations revealed erosions and irregularity of articular surface associated hypertrophic synovial villi (Fig. 7).

Treatment of acute cases resulted in complete recovery within 21 days but chronic cases showed improvement in lameness from 5^{th} to 4^{th} degree after 10 days and then gradual improvement on long run without complete recovery. Lameness improved from 5^{th} degree to sound movement within one week after arthroscopic surgery in the four treated horses.

Culture and sensitivity documented that *Staphylococcus aureus* and Corynebacterum were the causative agents, which were sensitive to Ciprofloxacin and Cefoperazone, respectively.

Two complications, including decubital ulcers and flexural deformity of the sound limb were recorded after 10 days of the treatment possibly due to prolonged recumbency time.

Discussion

Septic arthritis is a serious problem in horses that can result in irreversible cartilage damage and unsoundness, if the infection is not eliminated rapidly from the synovial space (Schneider, 1998a). Septic arthritis may also result

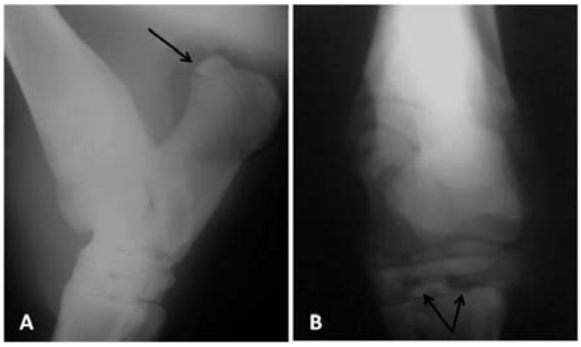

Fig. 2: (A) Lateromedial radiograph of a one–year-old horse showing soft tissue swelling and radiolucent area at the site of wound (arrow); (B) Dorsoplanter view of a 21-days-old filly showing subchondral bone lysis within the distal raw of the tarsal bones and increased space between the bones

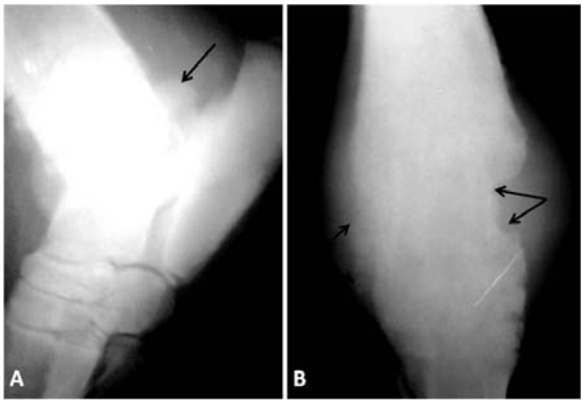

Fig. 3: (A) DLPMO view of a two-month-old colt showing soft tissue swelling and osteophyte reaction at the site of sustentaculum tali and distal tibia (arrow); (B) DP view of a 10-year-old horse showing osteomyleitis, osteophytes reactions at lateral and medial aspect of the talus and occlusion of the joint spaces

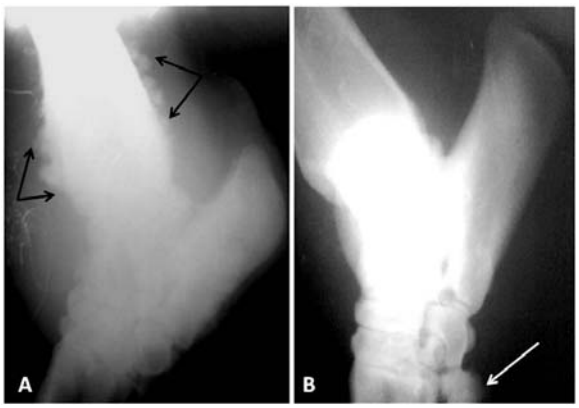

Fig. 4: (A) LM view of a 10-year-old horse showing osteophytes at lateral and medial aspect of distal tibia (arrows); (B) DLPMO radiograph of a 3-year-old mare showing osteophyte reaction at plantar aspect of proximal 4^{th} metatarsus (arrow)

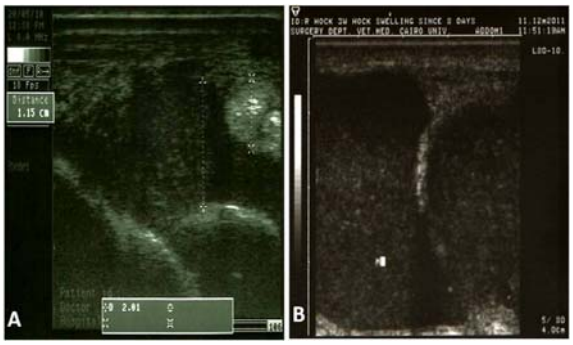

Fig. 5: Longitudinal ultrasonogram of dorsomedial recess (A) and medial pouch (B) in septic arthritis of tibiotarsal joint showing accumulation of anechoic fluid filled with hypoechoic dots and synovial proliferation

Fig. 6: Longitudinal scan of the lateral pouch of the tarsocrural joint of 21 -days-old filly showing multiple sacs filled with hypoechoic fluid

in decreased performance or, in severe cases, euthanasia of the animal (Butt, 2002).

In the present study, septic arthritis and open joints were detected in 14 horses caused by trauma from saddle, motor car accident and kicking from other animals. Similar causes were mentioned by Bertone (1990) and Stashak (2002). In the present study, 53.8% of the affected horses were under one year of age, making them vulnerable to trauma. This could be attributed to trauma from dam, early putting of young horses to work and careless management by some owners.

Clinical examination revealed severe hot painful hock swelling associated with external wound and peri-articular edema and cellulitis. Lameness varied from 4^{th} to 5^{th} degree. Similar clinical signs were mentioned by Haerdi-Landerer et al. (2009). Aspiration of synovium from the tibiotarsal joint revealed the presence of turbid fluid with high cellular count, which indicated sepsis.

In radiographic findings, only soft tissue swelling without bony changes was evident in acute stages while

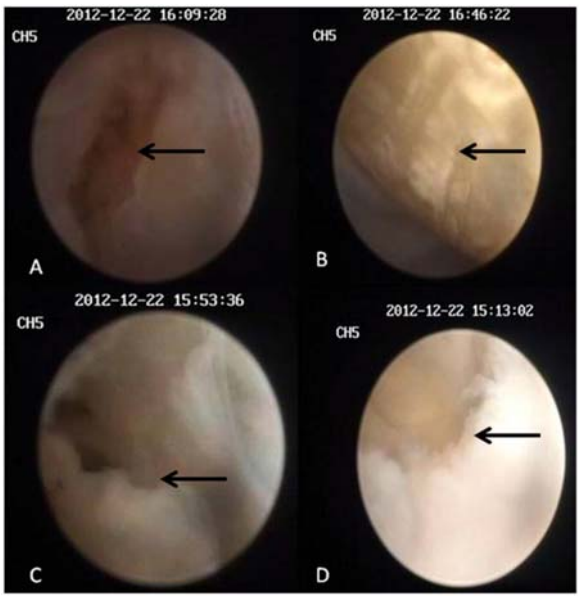

Fig. 7: Digital arthroscopic images of tarsocrural arthritis, viewed from dorsomedial portal, in a 13-month-old horse showing erosions and irregularity of articular surface (A) (arrow), fissure (B) (arrow), articular degeneration (C) (arrow) and hypertrophied villi covered the medial malleolus of tibia (D) (arrow)

subchondral bone lysis and osteophyte reaction were seen in the chronic stages. Osteophyte proliferation takes about one month (Farrow, 2006). Osteomyelitis is a serious infectious orthopaedic condition of foals and often seen in association with septic arthritis (Stashak, 2002). So, radiographic examination of foals with septic arthritis is recommended. On ultrasonographic examination, accumulation of anechoic fluid containing hypoechoic dots in the tibiotarsal joint indicated septic arthritis as reported earlier by Reef (1998). Collateral desmitis, thorough pin and curb could also be diagnosed by ultrasonography. Even pathological fractures at the level of the tarsus, occurring secondarily to septic processes in the surrounding soft tissues, have been mentioned (Bolt et al., 2002).

Arthroscopy is a good tool for diagnosis and treatment of septic arthritis in horses because it facilitates removal of fibrin and hypertrophic villi and thorough washing of the joint by normal saline solution. In addition, it helps in prognosis and assessment of septic arthritis through visualization of intra-articular changes.

Treatment in early cases may result in complete recovery however, chronic cases may show decreased success rate of treatment. Stashak (2002) mentioned that infected arthritis tends to persist and horses with radiographic changes limited to soft tissue developed osseous lesions within 9 weeks. Furthermore, Schneider (1998b) reported that septic arthritis showed irreversible cartilage damage, fibrosis and unsoundness when the

infection is not rapidly eliminated. Accordingly, the decreased success rate of treatment in the present study might be attributed to the irreversible cartilage damage. It is worthy to mention that arthroscopic surgery is better than arthrotomy and joint lavage in treatment of septic arthritis.

In conclusion, clinical, radiographic, ultrasonographic and arthroscpic examinations should be considered together for diagnosis, prognosis and treatment of septic arthritis in horses. Moreover, arthroscopy is a successful tool for removal of fibrin and hypertrophic villi and joint lavage, which is helpful in treatment of chronic septic arthritis in horses.

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