Scientific Works. Series C. Veterinary Medicine. Vol. LIX (1)
ISSN 2065-1295, ISSN CD-ROM 2343-9394, ISSN Online 2067-3663, ISSN-L 2065-1295

ACROPODIAL DISEASES IN HORSES DIAGNOSED RADIOGRAPHICALLY: RETROSPECTIVE STUDY OF 7 CASES

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Abstract

The lameness associated with pain localized within acropodial region is common in horses, which enforces the use of radiological equipment in tracking changes in bone level as well as in adjacent soft tissues level. The most common acropodial diseases are represented by traumatic processes, followed by degenerative and infectious, which can evolve acute or chronic. The purpose of this study was describing semiological aspects noticed in radiological examination of acropodial region in horses. Radiographic images from animals with acropodial diseases were selected and examined inside the radiology clinic inside the Faculty of Veterinary Medicine Bucharest. The assessment of radiological images has revealed changes in acropodial level in 7 horses, ages varying between 8 months and 11 years, of which 4 males and 3 females. Acropodial changes were represented by 3 cases with middle phalanx fracture and the rest with: distal interphalangeal luxation, degenerative processes of the proximal interphalangeal joint, hoof wall exongulation, proliferative processes in middle phalanx.

Key words: *acropodial diseases, horses, radiological examination.*

INTRODUCTION

Lameness is a manifestation of an inflammatory process or mechanical defect, including pain which determines abnormal movement characterized by lameness (Ross et Dyson, 2011). Frequent diseases which affect horses toes are represented by fractures – consecutive acute trauma, chronic disorders (desmitis, tendonitis, enthesopathy, degenerative joint disease) – caused by chronic repetitive traumas and infectious processes (Riedesel, 2007). Radiographic investigations in horses are carried out every year in some countries with horse breeding traditions, to discover limb disorders as a pre-purchase trial (Kane et al., 2003; Furniss et al., 2011). Such investigations are not carried out at the moment in our country. The purpose of this study was to identify imagistic aspects of acropodial disorders in 7 horses admitted for radiologic investigations.

MATERIALS AND METHODS

Radiographic examination, from standard and complementary views depending on the case, was carried out and radiographic images were evaluated for 7 mix-breed horses (3 females and 4 males), ages varying between 8 months and 11 years, which presented lameness. Information about data of every animal and medical history was taken from the owners.

RESULTS AND DISCUSSIONS

Radiologic examination carried out in horses taken into study has revealed traumatic disorders presence (4/7), inflammatory (1/7), degenerative (1/7) and proliferative (1/7). Traumatic disorders were represented by fractures (3/4) and luxation (1/4). Fractures were identified in middle phalanx (P2) level, affecting the left posterior limb (2/3) and right anterior limb (1/3).

Case 1 – an 8-month-old mix-breed male – severe lameness in posterior left limb, consecutive to a car accident. Four views were taken (standing dorsolateral-palmaromedial oblique, dorsoproximal-palmarodistal flexed and dorsal 15° lateral-palmaromedial oblique flexed). Radiographic examinations reveal comminuted fracture of P2. From dorsolateral-palmaromedial oblique view the following were identified: fracture in palmar lateral proximal eminence, monoarticular, complete; physeal fracture, oblique incomplete fracture towards medial condyle (Fig. 1). From dorso-palmar view, physeal and lateral proximal eminence fractures were confirmed.

Dorsoproximal-palmarodistal flexed view has revealed dorsal sagittal plain incomplete fracture, monoarticular and ventral sagittal plane fracture, incomplete, monoarticular (Fig. 2). In dorsal 15° lateral-palmar medial oblique flexed view physeal fracture and palmar eminence lateral proximal fracture was noticed.

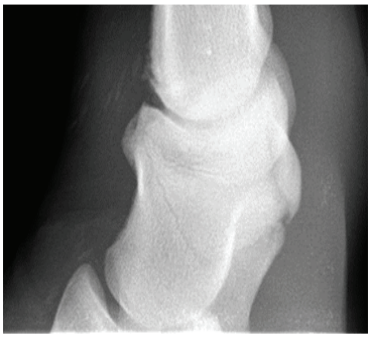

Figure 1. Comminuted fracture in P2

Figure 2. Sagittal plain incomplete fracture in P2

Case 2 – a 5-year-old mix-breed male – severe limping in right anterior limb, consecutive to a work accident. Two views were taken (lateromedial and dorsopalmar). Radiologic image has revealed P2 comminuted fracture. A number of fracture lines were noticed which resulted in multiple fragments varying in size. Also, enlargement of distal interphalangeal auricular space was noticed.

Case 3 – a 6-year-old mix-breed female – severe lameness in left posterior limb. Two views were taken (lateromedial and dorsopalmar) which evidenced P2 comminuted fracture, complete, biarticular (Fig. 3).

Case 4 – a 3-year-old mix-breed male – severe lameness in anterior left limb. Lateral-medial view evidenced the hyperextension (luxation) of distal interphalangeal joint and dorsal movement of the distal phalanx (P3), with highlight of digital common extensor tendon insertion and separation of navicular bone from P2 and P3 (Fig. 4).

Case 5 – an 11-year-old mix-breed female – chronic lameness, neglected, anterior right limb. Two views were taken (latero-medial standing and dorsopalmar flexed). Radiographic images revealed the presence of a joint degenerative process in proximal interphalangeal joint level. Degenerative disorders were represented by periosteal reactivity on the cranial side of distal proximal phalanx extremity (P1), periosteal reactivity on the cranial side of P2 proximal extremity and joint space narrowing. Also, entesophites at the insertions site of superficial digital flexor on P2 and in sesamoidean oblique ligament insertion site on P1, lateral view (Fig. 5). Dorsal palmar view reveals entesophites presence in collateral medial/lateral ligament attachment site of proximal interphalangeal joint (Fig. 6).

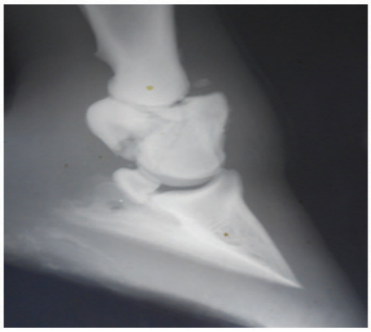

Figure 3. Comminuted fracture, complete, biarticular

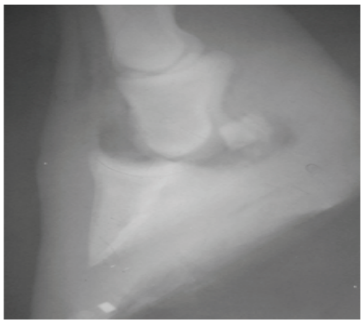

Figure 4. Luxation of distal interphalangean joint

Figure 5. Degenerative disorders in the proximal interphalangian joint

Figure 6. Entesophites in collateral medial/lateral ligament insertion site

Case 6 – an 8-year-old mix-breed female – lameness in posterior left limb consecutive to trauma, which resulted in hoof wall exongulation. Radiographic images (lateromedial flexion and dorso-plantar flexion revealed hoof wall separation from P3 and distal movement of P3. The presence of a radio transparent area was noticed between the hoof wall and soft tissue of the coriom which indicates air presence consecutive to hoof wall exongulation.

Case 7 – a 6-year-old mix-breed male – proliferative formation in pastern level, on the dorso-medial side of the anterior right limb (Fig. 7). Radiographic images taken from caudal 20° palmar-dorsomedial oblique view evidenced, in distal extremity level of P1, evidenced the presence of a bone-like radiopaque formation covered in soft tissue. Hyperostotic process was noticed on the caudal side of P1 (Fig. 8). Samples could not be taken for cytological or histopathological examination in order to identify lesion type, which lead to a general terminology of proliferative lesion.

Figure 7. Prolipherative formation in pastern level

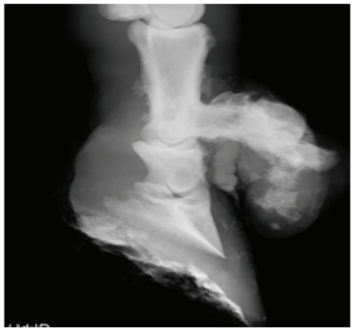

Figure 8. Hyperostotic process in P1

Obtained results highlight the presence of a large array of bone structure changes in acropodial level in horses. Acute trauma, which produces fractures in toes level, are the main causes common in horses (Riedesel, 2007), especially the ones used for work purposes. Under the action of external and internal forces, the bones respond with an elastic deformation, thereby, after the force stops, bones back to the original shape. The moment when force becomes excessive, fractures are produced (Riggs, 2002). Combined action of powerful compression and traction forces on the achropodium, when limbs are fixated on the soil sustaining body weight, determines varied structural modification. Bone fractures can be classified in three categories: traumatic fractures caused by transient overload, pathological fractures and fatigue fractures

caused by repeated stress to the bone (Riggs, 2002). Comminuted fracture was the most frequent lesion found in examined subjects, posterior limbs being the most affected. Owen et al. (2010), in a study carried out in UK noticed that traumatic lesions were frequent in posterior limbs (48%) compared with anterior limbs (17%), and Riedesel (2007) noticed that posterior limbs are twice more affected compared with the anterior limbs. Following analysis results obtained in the study shown here, P2 was considered to be the most affected site. This aspect can be attributed to intense stress on the respective segment during traction in work horses. Dates from literature sustain that phalanx fractures are common in sport horses and target especially the proximal phalanx and less regarding medial phalanx (Tanase, 2003). Ramza et al. (2011) in a study carried out on young race horses, noticed that fractures are most common in tibia level (20.7%) and proximal phalanx (14.5%). Variation can be attributed to the different number of cases taken into study, as well as different destination of animals (working vs. sport).

Hyperextension of interphalangeal distal joint can be congenital (in foals) or acquired (consecutive to trauma or distal phalanx infections) (Riedesel, 2007). Our case presented luxation of distal interphalangeal joint, with dorsal movement of P3 consecutive to avulsion of flexor digital profound tendon insertion and traction of extensor digital common tendon. Consecutive to major trauma, tendon laceration was produced as well as bone ray ratio and ligament structures were modified. Furniss et al. (2011), examining a number of 269 pure breed horses have revealed distal joint hyperextension presence in a reduced proportion (7.56%) in left limb compared with right limbs (9.66%).

Degenerative joint disorders are associated with limps and are chronic modifications characterized by osteophytes (new bone formation) on the periarticular edges of bone segments which form joints (Riedesel, 2007). It is known that the diseases evolve insidious, and bone disorders are produced way before noticing radiological changes (Brommer et al. 2003). In severe situations, new bone production can narrow articular spaces, subcondral sclerosis and osteophytes extension (Butler et al., 2000), in the past the term "high ringbone" was used (Edwards, 1984). Causes are varied, but traumas are frequently associated with periostitis and new bone production (Riedesel, 2007). In our examined case, degenerative disorders were represented by ostephytes, evident from lateromedial view and enthesophytes at ligament insertion sites, more obvious from dorsopalmar view. It appears that repeated trauma represented basis for degenerative disease occurrence in proximal joint level.

Exongulation is a disorder caused by the detachment of the hoof wall from the cheratogen membrane (Tănase, 2003) following the destruction between lamellae coriales and lamellae epidermalis. There are multiple causes (primary or secondary), trauma being the main cause, but infectious or circulatory disorders are not to be neglected. Our examined animal, from what the owner told, suffered an accident which leads to hoof wall avulsion. This phenomenon was probably produced following chronic circulatory processes, previously the animal presenting lameness in posterior limbs (possibly laminitis). Lameness presence, concurrent in a biped (pelvic/thoracic) or in all limbs pleads for laminitis presence (Tănase, 2003). As follows, in our case study, it can be stated that it was a mechanical exongulation of the hoof wall due to a chronic laminitis.

Neoplastic processes are extremely rare in toes level (Riedesel, 2007). Lack of histopathological examination of the formation from distal extremity of proximal phalanx makes enunciating a definitive diagnosis impossible.

CONCLUSIONS

Following obtained analysis results it was found that the middle phalanx represented the most affected segment; radiological examination allowed the establishment of type, localization and extends of lesion processes.

ACKNOWLEDGEMENTS

We would like to thank Dr. Bradea Adrian for his involvement in translating this paper.

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