P: ISSN NO.: 2394-0344 RNI No.UPBIL/2016/67980 VOL-3* ISSUE-9*(Part-1) December 2018
E: ISSN NO.: 2455-0817 *Remarking An Analisation*

Osteopathic Diseases of Equine in Hills of Uttarakhand and Their Management

Abstract

Equines are the back bone of draught power at high altitude and contribute significantly to hill economy. They are found to suffer from several osteopathic conditions which are attributed to the typical topography of hilly areas and abrupt variation in climate. The mineral status of soil water and pasture in hills is quite different from that of planes. The tortuous, wreathing terrain and uneven topography of mountains predispose equines for many pathological conditions of bones. The present article studies the various osteopathic conditions of equines in hilly area of Uttaranchal, their etiology, treatment & management and prognosis. The study was conducted during post graduate studies of author.

Keywords: Osteopathy, Equine, Hills, Uttarakhand, Degenerative Joint Disease.

Amit Sharma
Joint Director,
Export Inspection Council,
Ministry of Commerce & Industry
India

V.K. Sharma
Professor & Head (Retd)
Department of Surgery & Radiology,
College of Vety. & Animal Science,
GBPUA& T,
Pantnagar

Introduction

Man has always been inspired by the majestic gait and enormous power of horses. Whether it comes to describe the power of an engine as “horse power” or strength of army as” light horse” for “artillery with light guns” they form a part of our life. Horse embodies verse, hilarity and vim, which has fascinated man so much so that they are, revered as carrier of “Surya”, “God of light” in Hindu mythology.

Equines are used as pack animals in hill regions since ages and are suitably adopted accordingly, in due course of evolution, but still they suffer from many osteopathic disorders owing to the typical topography of hilly areas and abrupt variation in climate. The mineral status of soil water and pasture in hills is quite different from that of planes. Moreover, even in hilly regions, the mineral level of soil and water changes abruptly and abnormally with every 50-100 km area. Therefore the use of term mineral status/level is contextual and site specific. The tortuous, wreathing terrain and uneven topography of mountains predispose equines for many pathological conditions of bones. Equines are the sole source of transportation at high altitude; hence any defect of musculoskeletal system severely hampers the mobility. The hilly soil is reported to be deficient in phosphorus and rich in calcium as a result calcium phosphorus ratio in the body is disturbed to such an extent that Ca: P ratio reaches up to 9:1 which effects normal bone growth by effecting endochondral ossification. The abnormal ration of Ca: P also promotes bone resorption and osteoporosis.

Objective of the study

The present study aims atunderstanding the musculoskeletal disorders and osteopathic conditions in equines in Uttarakhand.

Review of Literature

There has been studies on the osteopathic diseases, orthopaedic conditions of equines in different parts of world and prevalence of various equine diseases in India. Singh *et al*., 2010 has surveyed the veterinary practitioners regarding diseases prevalent in equids in India. Mohsina *et al*., 2014 has conducted a retrospective study on incidence of lameness in domestic animals and recorded that right forelimb lameness is quite common in equines. Mendoza *et al*., 2016 has studied the impact of feeding and housing on development of osteochondrosis in foals and concluded that foals fed with concentrates show a high probability of developing OCD lesions. Chaubisa, SL, 2010 has studied the osteo- dental fluorosis in domestic horses and donkeys in Rajasthan while Broster *et al*., 2010 has studied the prevalence of pathological abnormalities associated with lameness in working horses in developing countries.

Discussion

Iodine deficiency induced hypothyroidism is common feature of hilly areas which results in delayed ossification of the carpus and tarsus or

incomplete development of the epiphysis of third or fourth carpal bones. It also results in angular limb deformities. Several cases of collapse of tarsal bone are reported as a sequel to iodine deficiency. Manganese deficiency is also reported in many tracts of hilly region resulting in limb deformities like enlarged joints, knuckled-over pastern, twisted forelimbs and weakened short bones in newborn foals resulting in lameness, stiffness, joint pain and reluctance to move.

Few isolated areas of high altitude are also reported to be deficient in selenium resulting in hoof deformities in foals associated with muscle damage, stiffness and pain. However, some areas may be rich in selenium content in the soil to such an extent that they cause selenium toxicity, resulting in swelling of coronet and formation of transverse grooves on the hoof. The grooves may crack and hoof may slough off. Animal walks with stiff leg with tenderness followed by pronounced lameness. Articular lesions may be evident in hock joint causing lameness and inability to walk. It is evident from facts that some regions are deficient in copper resulting in lameness, stiffness, spontaneous fracture, enlarged joints, epiphysitis and contracted flexor tendons in equines. While other regions are rich in copper level hinder in the uptake of zinc from the soil by the plants thereby reducing its blood level in the animals resulting in defective cartilage formation and abnormalities of various enzymes metabolic processes. The antagonistic action of various minerals affect their uptake and utilization in the body e.x. iron is antagonistic to low level of manganese and also hinders zinc metabolism.

The high concentration of zinc in some regions decreases calcium and copper absorption and causes secondary deficiency of calcium and copper which in turn may result in alteration in endochondral ossification. Tarsocrural effusions, chronic epiphysitis, articular cartilage detachment from underlying bone, stiffness and lameness are most commonly observed clinical signs.

Following are some common osteopathic conditions usually encountered in hilly regions of our country.

Fracture

This is most commonly encountered conditions of skeletal system characterized by dissolution of bony continuity with or without displacement of the fragments. It is always accompanied by soft tissue damage of varying degrees, there are torn vessels, bruised muscles, lacerated periosteum and contused nerves. Sometimes condition may be accompanied by injury of the internal organs and lacerated strain. In hill regions, avulsion fractures are commonly observed due to biomechanical changes in the gait animal during locomotion induced by abnormal topography of high altitude.

Etiology

There may be extrinsic or intrinsic causes of fracture:

1. Extrinsic causes-Any form of trauma may be direct or indirect violence may develop fracture due to bending, torsional shearing or compression forces.
2. Intrinsic causes-Fractures due to mineral imbalance, hormonal or vitamin deficiency or increased muscular action i.e., violent contraction of muscle may lead to complete or partial or avulsion. Avulsion fracture is more common in hilly region.

Types of Fractures

Treatment of fracture depends on its type so its classification is essential. Basically fractures may be of following types:

1. Incomplete fracture-In this type of fracture bone is not divided into two fragments. Its most common examples are green stick fracture, fissure fracture and depression fracture.
2. Complete fracture- In this case bone is divided completely into two or more than two fragments. The most common examples of this type of fractures are transverse fracture, oblique fracture, spiral fracture, comminuted fracture, multiple fracture, impaction fracture and compression fracture.

Diagnosis of Fracture

Once a bone is fractured it is diagnosed by observing following sings:

1. Dysfunction: This may include lameness and paralysis.
2. Pain: Pain over the site of fractures is a common finding.
3. Local trauma: Area around a fracture may demonstrate swelling, haematoma, contusion, or laceration particularly in cases where fracture is open (compound fracture).
4. Crepitus: Crepitus is a sign of fracture that is considered pathognomic. Bony crepitus is the gritting sensation transmitted to the palpating fingers by the contact of the broken bone end on each other.
5. Radiographic signs: The important radiographic sings include

a. A break in the continuity of bone.
b. A line of radiolucency when the fragments are distracted.
c. A line of radio-opacity when fragments are compressed or super imposed.
d. A line of radiolucency when fragments are distracted.

Treatment

Treatment of fracture is done by good anatomic reduction and its fixation. Fixation is done either by external or internal fixation devices.

Osteoporosis

Localized Osteoporosis

Generalized osteoporosis is seen with under nutrition rather than actual deficiency of calcium, phosphorus or vitamin D. It is also observed due to copper deficiency. This usually occurs in foals. It is characterized by fractures of proximal sesamoid bones. Lameness and fractures of other bones may also occur in this type of osteoporosis.

Localized Osteoporosis

This type of osteoporosis is limited to a particular part of skeletal system. Following are the common types of this form of osteoporosis.

1. Disuse osteoporosis: It is common in horses with rigid external immobilization devices on their limbs. With the lack of stress there is increased resorption of bone and less bone formation. Bone cortices become thinner and more porotic.
2. Stress protection is another example of localized osteoporosis. It is sometimes seen in case of limb paralysis.

Fluorosis

It is occasionally seen in hilly regions having high content of fluorine in water and feed. Horses taking such feed and water suffer fluorosis. It produces osteoporosis. Fluorine has great affinity for bone and triggers fibrin deposition in the bone leading to exostosis. The horse may be intermittently lame and show signs of generalized unthriftiness. Periosteal hyperostitis, joint enlargement, roughening and thickening of bones are the classical features of fluorine toxicity. The gait may be stiff and bones are easily fractured. There is usually classic mottling of teeth. The diagnosis depends on the clinical and radiographic signs and is confirmed by analysis of fluorine in bone and urine. The treatment is directed towards prevention as well as general symptomatic treatment of the affected horse.

Degenerative Joint Disease

Degenerative Joint disease (DJD) are important musculoskeletal disorder of domestic and wild horses. Both osteoarthritis and degenerative joint disease have been used synonymously. It is defined as disease of diarthrodeal joint characterized by variable degree of articular cartilage destruction, sub-chondral bone sclerosis, marginal osteophyte formation and sometime eburnation. Joint effusion and synovitis are often associated with disease. DJD commonly affects aged horses and major weight bearing joints appear to be primarily involved. Rapidly growing and young horses are more susceptible and may have inherent basis. Etiology of DJD is not clear, but it is considered secondary to synovitis, capsulitis, sprain, joint luxation, intra articular chip fractures, intra articular fractures, osteochondrosis dissecans, subchondral bone cyst and septic arthritis. If these conditions are left untreated or under treated my lead to development in DJD. The signs of DJD include swelling, lameness and progressively stiffness develops in the tissue leading to dysfunction in the joint. In advance stages, there is loss of joint space on the radiograph and formation of osteophyte as well as mineralization within joint capsule. The extent of cartilage damage can be confirmed by newer imaging techniques such as arthroscopy, bone scintigraphy etc. There are three basic principles of treatment of osteoarthritis:

1. Prevention or treatment of the primary cause (e.g.synovitis and capsulitis, intra articular chip fracture).
2. Treatment of any synovitis in joint to minimize progressive deterioration of the articular cartilage due to inflammatory mediators and
3. Treatment of the articular cartilage damage.

Treatment of DJD

The treatment of DJD includes physical, rest and use of NSAID, corticosteroids polysulfated glycosaminoglycan, dimethylsulfoxide or hyaluronic acid as per need. Besides medicinal therapy, surgery may also be indicated at many times, to stop further deterioration of articular cartilage. Once DJD is developed, it is very difficult to control or completely cure the disease. Hence improvised manage mental practices should be adopted to prevent degenerative joint diseases in equines specifically specifically in hill region.

Hip Dislocation

One of the most common sequel to aberrant fall of equines in mountain regions is partial or complete dislocation of hip joint. The animal remains recumbent if left untreated and may die. Hip dislocation is a condition in which femoral head is displaced from its normal anatomical position. The condition may occur in any age group of animals. Hip dislocation is invariably caused by trauma in many cases, it occurs during oestrus and after mounting by another animal or when animal slips on a concrete floor. Direction of displacement is determined by the displacement of greater trochanter from it's normal position relative to the ischiatic tuber and tuber coxae of the pelvis. Depending on direction of femoral head displacement, condition is classified as:

1. Craniodorsal dislocation
2. Cranioventral dislocation
3. Caudodorsal dislocation
4. Caudoventral dislocation

Clinical signs include lameness and in some case animal become recumbent affected side of pelvis looks asymmetrical, swelling at greater trochanter area and pain. Diagnosis is based on the basis of history of trauma, clinical signs and radiographic examination.

Treatment has been tried with various methods like closed reduction method open reduction method, excision arthroplasty, extra-articular stabilization technique. Experimentally, repair by fabricated prosthetic round ligament has also been done. Overall prognosis of hip dislocation is poor. So, prevention is considered best. Preventive measures include:

1. Provision of optimum feeding especially in those weakened by metabolic dysfunction.
2. Additional support should be given to weak and atoxic animals to prevent limb splaying.
3. Possible isolation to prevent trauma inflicted by other animals.

Prognosis

Prognosis of hip dislocation is considered poor but depends on the direction and duration of dislocation, age and weight of animal and whether animal is ambulatory or recumbent. Those animals which are unable to stand after serious injuries poses a very poor prognosis. Degree of muscle contraction make the replacement of femoral head to it's normal position more difficult. Younger and light weight animals have a better chance of recovery after treatment than old and heavy animals.

Conclusion

To summarize, it could be concluded that the osteopathic disorders of equines in hill regions are the cumulativeoutcome of various geographical, topographical, climatic, biomechanical and ecological factors. On one hand, the uneven topography of hill regions predispose equines for various pathological conditions like avulsion fractures or degenerative joint diseases and on the other hand abnormal mineral status and antagonistic action of various mineral (specifically trace elements) hampers their assimilation and uptake, although in some places normal concentration of minerals may be present

References

1. *Broster, C E; Burn, C C; Barr, R. S.; Whay H R; 2009; Eq Vet Journal; 41 (5) 474-481*
2. *Choubisa S L; 2010; Res Rep Flu; 43 (1) 5-12*
3. *Cicchitti, L.; Martelli, M; Cerritelli, F; 2015; PLoS One; 10 (3); 0121327*
4. *Hendrickson,H.S.; Lykkjen, S; Dolvik, N.I.; Olstad, K; 2018; BMC Vet. Res.; 14:390*
5. *Mendoza, L; Lejeune, J P; CAudron, I; Detilleux, J; Deliege, B; Serteyn, D; 2016:Prev. Vet. Med.; May 1;127:10-4.*
6. *Mohsina, A; Zama, M M S; Tamilmahan, P.; Gugjoo, M B; Singh, K; Gopinath, K; Gopi, M; Karthik, K; 2014; Veterinary World 7 (8): 601-604*
7. *Singh, B.R.; Chauhan, M.; Sindhu, R K; Gulati B.R.; Khurana, S K; Singh, B; Yadav, H S; Yadav, R P; 2010; Asian J. of Ani. & Vet. Adv., 5:143-153*