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Osteoarticular Histopathological Features Associated with Avian Reovirosis – Review

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Abstract: Infection with avian reovirus (ARV) remains one of the leading causes of locomotor system disorders in poultry, resulting in substantial economic losses to the global poultry industry. This review aims to consolidate, analyze, and integrate current data from the international scientific literature regarding the gross and histopathological osteoarticular lesions induced by this viral agent. An evaluation of the published studies highlights a complex spectrum of lesions, in which severe periarticular edema and acute or chronic tenosynovitis represent consistent features of the infection. From an osseous perspective, the available literature confirms a close association between viral replication, malabsorption syndrome, and the development of systemic osteoporosis, characterized by reduced trabecular bone density, which predisposes affected birds to an increased incidence of femoral head necrosis. Furthermore, this review examines the biomechanical and structural mechanisms underlying severe tendon damage, frequently culminating in gastrocnemius tendon rupture and resulting in marked leg abnormalities in broiler chickens and breeders. By providing an integrated assessment of these pathological entities, this review offers a comprehensive overview of the destructive impact of reoviral infection on the avian skeletal system, while emphasizing the need to optimize histopathological diagnostic approaches in conjunction with current molecular techniques for improved monitoring of poultry flocks.

• Introduction

Avian orthoreoviruses represent important viral pathogens in the pathology of domestic poultry, with infection being associated with a broad spectrum of clinical manifestations and lesions, among which disorders of the musculoskeletal system are of particular significance. Depending on the viral strain, age of the birds, and husbandry conditions, infection may be associated with syndromes such as viral arthritis and tenosynovitis, as well as with other systemic manifestations. From both a clinical and morphopathological perspective, involvement of the musculoskeletal system may have a substantial economic impact, particularly in broiler chickens and breeding poultry.

Osteoarticular lesions associated with avian orthoreovirus infection exhibit a complex morphopathological spectrum involving the joints, tendon sheaths, tendons, periarticular musculature, growth plate, and epiphyseal and subchondral bone structures. Gross lesions are predominantly characterized by periarticular swelling, edema, hemorrhage, and the accumulation of serous exudate within the joints and tendon sheaths. Microscopic examination reveals inflammatory and degenerative changes of variable severity, depending on the stage and progression of the disease.

• Discussions

From a gross pathological perspective, musculoskeletal involvement is primarily characterized by marked swelling of the pelvic limbs, particularly in the tarsometatarsal joint region, torsion of the affected limbs, and hock sitting. However, these changes are not pathognomonic for avian orthoreovirus infection; therefore, their interpretation should be correlated with histopathological examination and etiological diagnostic methods.

All anatomical structures exhibiting morphopathological lesions are subsequently analyzed and illustrated in Figure 1.

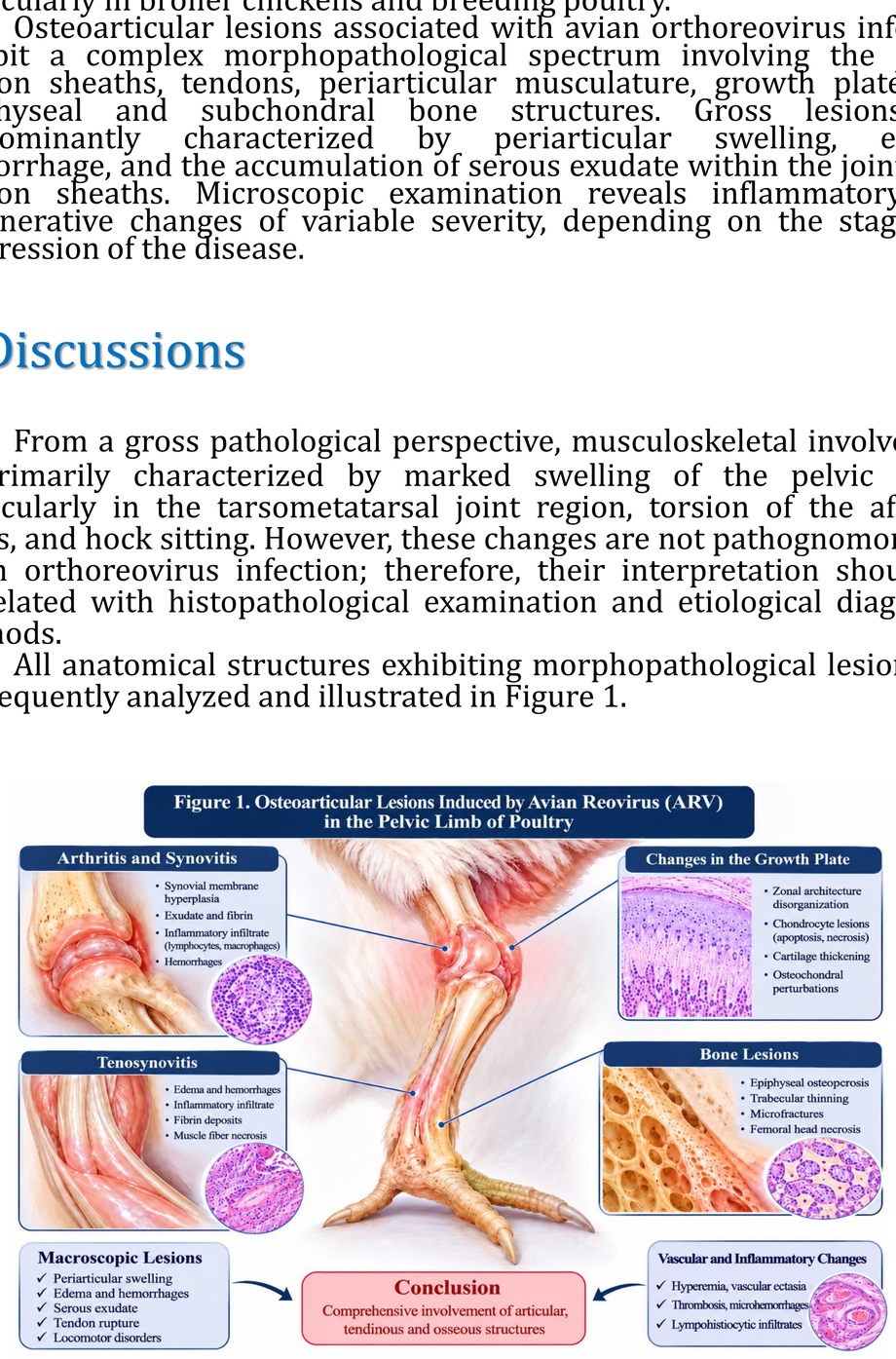
Articular lesions are characterized by synovial membrane hyperplasia and hypertrophy, edema, fibrin deposits, and cellular debris, accompanied by mixed inflammatory infiltrates composed of heterophils, lymphocytes, macrophages, and plasma cells. These changes may progress to marked synovial hypertrophy, cellular proliferation, and increased fibrous tissue deposition.

Lesions affecting the tendinous and musculotendinous structures are characterized by edema, hemorrhages, and predominantly mononuclear inflammatory infiltrates, associated with muscle fiber necrosis and extension of the inflammatory process into the tendon sheaths. These changes may impair the mechanical strength of the tendons and, in advanced cases, lead to rupture of the gastrocnemius tendon.

Epiphyseal and growth plate lesions consist of disorganization of the zonal architecture, predominantly involving the prehypertrophic and hypertrophic regions, chondrocyte degeneration and necrosis, with cytoplasmic vacuolation, nuclear pyknosis, and karyolysis, as well as erosions, fissures, delamination, and alterations in articular cartilage thickness. Collectively, these changes are associated with impaired endochondral ossification.

Bone involvement is characterized by epiphyseal and juxta-articular osteoporosis, thinning of the subchondral bone trabeculae, and the development of microfractures. In advanced cases, these lesions may culminate in femoral head necrosis and compromise the structural integrity of the bone.

The vascular component is characterized by passive hyperemia, vascular ectasia, thrombosis, and microhemorrhages, accompanied by predominantly perivascular lymphohistiocytic inflammatory infiltrates.



• Conclusions

The concurrent involvement of articular, synovial, tendinous, muscular, and osteochondral structures highlights the complexity of the morphopathological profile associated with avian orthoreovirus infection and provides a structural basis for the development of locomotor disorders, ranging from postural abnormalities to severe impairment of weight-bearing and locomotion. Gross and histopathological examinations allow the identification, characterization, and assessment of the severity of osteoarticular lesions. However, confirmation of avian orthoreovirus involvement requires the supplementation of morphopathological investigations with viral detection methods, such as polymerase chain reaction (PCR).

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