



Histopathological lesion of Arthritis in *Mycoplasma synoviae* naturally infected breeder chicken in Egypt

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ABSTRACT

Avian mycoplasmosis consider one of the main poultry industry problems all over the world. The present short communication records the pathological lesions in *Mycoplasma synoviae* (MS) positive samples. Our study was applied to joint tissue samples collected from chicken suspected of mycoplasma infections during a previous study. Joint tissue samples positive MS infection; from broiler breeder flocks aging 46-57 weeks with clinical arthritis were fixed in 10% neutral buffered formalin. Histopathological examined sections from MS positive joint samples showed detachment of the synovial sheet, moderate to severe tendonitis with moderate intensive inflammatory cells infiltration. Infiltration in/and around the blood vessels with lymphocytes of the synovial sheet. Few cases showed mild inflammation in tendon sheet characterized by inflammatory cells infiltration. In was concluded from the study that te detection of histopathological changes can be of value in diagnosis of MS natural infection in chicken with clinical arthritis but not sufficient alone. Although, histopathological examination is an auxiliary diagnostic tool besides isolation and molecular identification techniques.

Key words: *Mycoplasma synoviae*, Histopathology, Broiler breeder and Joints.

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INTRODUCTION

The most common skeletal infection in breeder chickens are arthritis and tenosynovitis of the hock and stifle joints, with additional spondylitis and osteomyelitis lesions (Joiner et al. 2005). *Mycoplasma synoviae* (MS) is worldwide economically important pathogen of poultry, causing respiratory infection and synovitis in chickens and turkeys, The affected hocks are swollen, hot and affected birds are depressed, reluctant to walk and lameness, the synovial membranes of tendon sheaths become thickened and edematous, with fibrinous exudate within and around the tendon sheaths (McNamee and Smyth 2000; Shoaib et al. 2020). Swelling of the joints, especially of the hocks and a clear to turbid or caseous exudate may be present in the joints, bursae and in the tendon sheaths and in the sternal bursa (Ghazikhanian et al. 1973; Rehman et al. 2018).

Some MS strains have joint tropism and cause arthritis in chickens and turkeys (Landman and Feberwee 2012). MS infection can result in exudative synovitis in joints and tendon sheaths, and bursitis (Kleven 2008). MS alone or in combination with one or

more agents (REO virus, Staphylococcus spp or *E. coli*) induced variety arthritis or tenosynovitis (Moreira et al. 2017).

Edema in the synovial tissue with heterophil infiltration, and hyperplasia of synovial cells, followed by fibrosis and infiltration with lymphocytes, reticulocytes, plasma cells and heterophiles occurs (Jordan 1975). Histopathological examination showed intense, diffuse lympho-histiocytic inflammatory infiltrates with heterophil accumulation, primarily in the synovial capsule and digital flexor tendon, in all samples (Reck et al. 2019). Similar lesions were detected in diagnosis infectious arthritis (Bradbury and Garuti 1978). Synovial sheaths and joints of commercial chickens affected with MS showed a purulent exudate and associated inflammatory changes with histological features of a severe acute synovitis (Morrow et al. 1990). Synovial infiltration of heterophils and lymphocytes occurred in digital flexor and metatarsal extensor tendons of MS footpad infected chickens (Lockaby et al. 1998). Infiltrations of the subsynovia with heterophils, plasma cells and a few macrophages were observed (Landman and Feberwee 2001).

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This study was carried out to detect histopathological lesion in MS natural infection chicken lesions in breeder chickens with arthritis.

hematoxylin and eosin (H&E) stained, examined microscopically, and images were digitally recorded according to (Bancroft et al. 1996).

MATERIALS AND METHODS

RESULTS AND DISCUSSION

Ethical Approval

This study was approved by the Ethical Committee for Medical Research at the National Research Centre, Egypt and in accordance with local laws and regulations.

Field Samples

Broiler breeder flocks aging 46-57 weeks in Dakahlia, Egypt. Birds showing arthritis, depression, lameness and loss of weight with frequently 5-7% decrease in egg production and decrease in fertility and hatchability. MS were molecularly detected as cause of this condition (Amer et al. 2019). Joints were subjected to histological examination.

Histopathological Examination

Joint tissue samples showed only positive MS infection were fixed in 10% neutral buffered formalin, dehydrated by an ethanol solution gradient, paraffin embedded and cut into 4µm sections. Serial sections were

Recently, the appearance of arthropathic and amyloidogenic strains of MS has raised (Ferberwee et al. 2008). In our study, the recorded signs and lesions of breeder chicken naturally infected with MS included swollen, hot hock joint, depressed and lameness. Tendon sheaths were thickened and edematous, with fibrinous exudate. Histopathological examined sections on negative joints showed normal tendon (Fig. A) and Normal synovial sheet (Fig. B) while MS positive joint showed detachment of the synovial sheet (Fig. C). Some cases showed moderate tendonitis with inflammatory cells infiltration (Fig. F) and others showed severe inflammation in tendon sheet with intensive inflammatory cells infiltration (Fig. H). Severe inflammation in tendon sheet characterized by massive inflammatory cells infiltration was detected (Fig. D). Lymphocytic infiltration in and around the blood vessels of the synovial sheet is seen (Fig. E). Few cases showed mild inflammation in tendon sheet characterized by inflammatory cells infiltration (Fig. I).

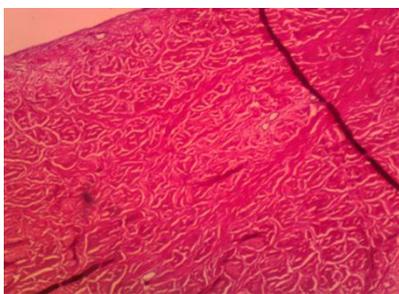


Fig. A: Normal tendon (H&E X 200).

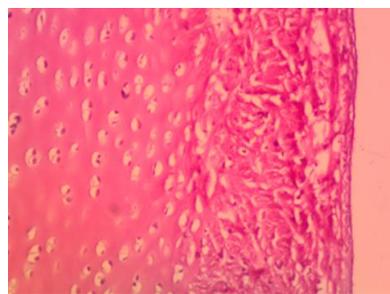


Fig. B. Normal synovial sheet (H&E X 400).



Fig. C. Detachment of the synovial sheet (Arrow) (H&E X 200).

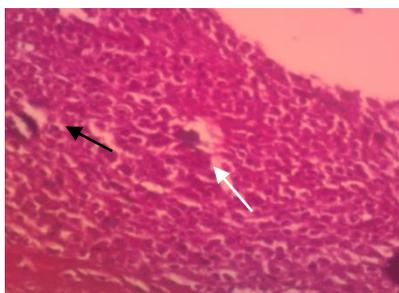


Fig. D. Severe inflammation in tendon sheet with intensive inflammatory cells infiltration (Arrow) (H&E X 400).

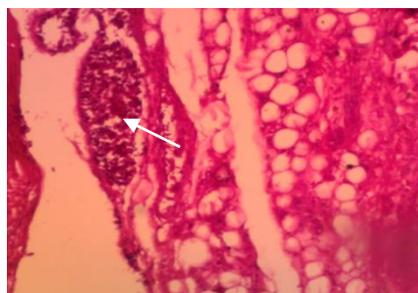


Fig. E. Lymphocytic infiltration in and around the blood vessels of the synovial sheet (Arrow) (H&E X 400).

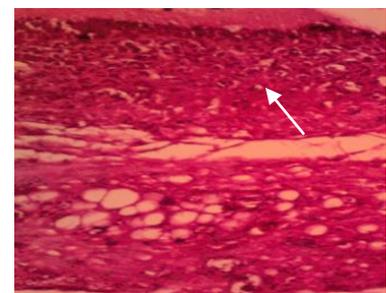


Fig. F. Moderate tendonitis showing inflammatory cells infiltration (Arrow) (H&E X 200).

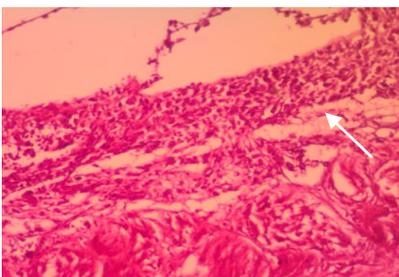


Fig. H. Severe inflammation in tendon sheet with massive inflammatory cells infiltration (Arrow). (H&E X 200).

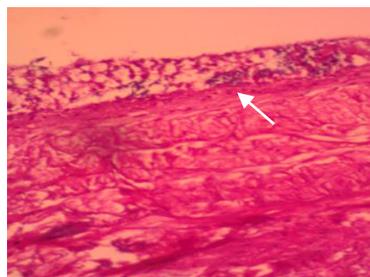


Fig. I. Mild inflammation in tendon sheet with inflammatory cells infiltration (Arrow) (H&E X 200).

The gross lesions and histopathological findings in this study were compatible with that of previous workers. Infections with arthropathic strains of MS cause synovitis and followed by lameness. The affected joints, especially the hock and foot pads joints appear warm, swollen with accumulation of fibrinopurulent exudate (Ferguson-Noel and Noormohammadi 2013). Many authors had clarified similar microscopic findings in chickens infected with arthropathic strains of MS which mainly comprised from infiltration of inflammatory cells and also hyperplasia of the affected synovial membranes (Reck et al. 2019).

The lesions and microscopic alteration obtained in our study could be utilized only as a proposal factor of possible MS infection. These results were confirmed with isolation and PCR results which discovered and identified the causative organism (Amer et al. 2019).

Conclusion

Detection of histopathological changes can be of value in diagnosis of MS natural infection in chicken with clinical arthritis but not sufficient alone. Although, histopathological examination is an auxiliary diagnostic tool beside isolation and molecular identification techniques.

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Competing Interests

The authors declare that they have no competing interests.

Author's Contribution

Mohamed A Bosila and Mohamed M Amer designed the study. Hoda M Mekky, Hanaa S Fedawy, and Kh M Elbayoumi shared in samples collection, performing the tests. Manuscript writing and data analysis. All authors drafted and revised the manuscript as well as read and approved the final manuscript.

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