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كلية الطب البيطري - جامعة أسيوط
رئيس القسم : أ.د/ حمدي عبدالعزيز سالم

دراسة الناحية الباثولوجية للأورام المتكونة في الدجاج
على مفصل الركبة والصدر نتيجة للتربية في البطاريات المصنوعة من السلك الحديد

محمود عبدالظاهر ، محمد خيرى ، علام نفاذي

عند تربية الدواجن في بطاريات مصنوعة من السلك لوحظ أن نسبة منها تصاب بأورام
في مفصل الركبة والسطح الخارجي للصدر • وأن هذه الأورام تؤدي الى عدم قدرة الدجاجة
على الوقوف أو الحركة وتتكون هذه الأورام من الأنسجة الضامة الغنية بالأوعية الدموية
وقد ثبت أن هذه الأورام لا تؤدي الى اصابة المفصل بأي تغييرات كما أنها لا تحدث أي
تغييرات في الأعضاء الداخلية ولكنها قد تؤدي الى الموت من الجفاف والضعف والجوع •

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**PATHOLOGY OF HOCK AND BREAST GRANULOMA DEVELOPED
IN CHICKENS REARED IN CAGES**
(With 8 Figures)

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SUMMARY

Granuloma-like swelling developed on the outer surface of the hock joint of heavy breeds of broilers reared in wire cages. The lesions was bilateral and was commonly ulcerated. It caused severe deformity of the legs. Histopathologically, the lesion consisted of highly cellular and highly vascular granulation tissue. Chickens developed this lesions sitting on their breast on cage wire for long peroids. Constant trauma by the wire has led to the development of fibrocysts or granuloma-like lesion between the epidermis and the muscular tissues on the keel bone. The internal organs were not significantly affected by these lesions but three birds died from dehydration nad debility.

INTRODUCTION

Lameness is a major cause of morbidity and mortality in massive poultry production. Leg weakness may be considered as an important problem where heavy breeds of birds are grown. Lameness and leg weakness my lead to death of the bird from dehydration; debility emaciataon and cannibalism. Losses of 15-20% caused by lameness and leg weakness had been reported in turkey (JULIAN and BHATNAGAR, 1985). The causes of lameness and leg deformity in birds are multiple and include rickets, foot-pad dermatitis, Osteoporosis, slipt tendon, curled toe paralysis, arthritis and fracture of the bones (ANDERSON, et al. 1979; CHAVEZ and FRATZER, 1972; LAURSEN; JONES, 1968; RIDDELL, 1975; RIDDELL, 1980; MARTLAND, 1985).

Appearance of a granulomatus swelling over the plantar aspect of the hock joint and skin related to the keel bone has been noticed in chicken reared in wire cages for experimental purposes. It was suggested that these lesion may be either due to infections, trauma or both agents. The aim of the present work was to study the nature and pathogénsis of similar lesions. Moreover its effect on the surrounding tissue and internal organs were studied and discussed.

MATERIAL and METHODS

Fifty broiler chickens (6 weeks old average body weight were 800 ± 200 gm) housed in five wire cages; food and water were supplied ad libitum. The birds were examined daily. Five birds showing lesion were detected after fifteen days, while two weeks later another two birds were affected. Three birds died after fourty days with prominent lesions in the

hock and breast. The remaining birds were killed 6 weeks after housing; 50% of the birds showed the hock and breast granuloma. Bacteriological samples from the lesions were taken under aseptic condition cultured on blood agar and Mackonky's media, moreover mycological examination was done. Tissue specimens from the swelling, its surrounding tissue and internal organs were taken and processed for histopathological studies.

RESULTS

Macromorphological studies:

The lesions over the outer surface of the hock joint were consisted of hard mass of tissue the size of which was from 1/2 to 2 cm. The lesion was bilateral causing a pronounced deformity of the hock joints. The skin covering the lesion was very thick and not infrequently ulcerated.

Cut section through the lesions revealed that they were consisted of hard cartilaginous tissue which have a white colour but were occasionally severely congested. Examination of the joint and periarticular tissues revealed no changes.

The breast lesions were in the form of fibro cysts located sub cutaneously between the skin and the breast muscle. The wall of the cyst was thick fibrous and may be of white yellowish colour or severely congested. The content of the cyst varies greatly, they may contain a bloody fluid, yellowish thick exudate, or clear fluid. The lesions of the breast sometimes appeared as grayish red solid mass. They ranged from a bean to half a lemon in size. The skin over the lesions was thickened, while the underlying muscle revealed no detectable gross changes.

Gross examination of the three birds died with hock and breast lesions showed that the liver was enlarged and contained multiple white small foci. The spleen kidneys and heart were small in size and of pale colour. The intestine was thin and flabby.

Micromorphological studies:

Microscopically, the lesion that developed over the surface of the hock joint was consisted, in its deeper parts, from fibrous connective tissue containing, abundant blood vessels (Fig. 1) and was heavily infiltrated with mononuclear cells (Fig. 2) especially around the blood vessels. In some areas the blood vessels were dilated to form large blood spaces (Fig. 3). The middle layer of the lesion was less vascular and the blood vessels were surrounded by small number of mononuclear cells. Metaplasia of connective tissue to cartilaginous tissue was seen in some parts. The epidermis covering these granuloma showed increased keratinization or was totally destroyed with ulcer formation, The periarticular tissue was infiltrated with mononuclear cells, congested and showed perivascular accumulation of mononuclear cells. The articular cartilage were unchanged.

Microscopically, the breast lesion from birds killed after 15 days was consisted of proliferating, richly vascular connective tissue infiltrated with mononuclear cells. The blood vessels were severely dilated and engorged with blood. There was a tendency of multilocular cyst formation with a main cavity and secondary ones. The content of the cavity consisted of granular debris and mononuclear cells (Fig. 4). In chicken killed after 30 days, the wall of the cyst consisted of two distinct layers (Fig. 5). The outer layer, which was continuous with the dermis consisted of young proliferating and richly vascular connective tissue infiltrated with mononuclear cells (Figs. 6,7). The second layer was consisted of mature fibrous less vascular connective tissue which was moderately infiltrated with inflammatory cells. An exudate consisted

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of eosinophil cells and red blood cells filled the cyst. At this stage the dermis was thickened while the epidermis was either unchanged or thickened due to hyperplasia of the brickle cell layer. The muscular tissue under the lesions were more or less healthy. In more advanced stages (chickens killed at the end of the experiment), granuloma was formed in the breast and was consisted of partly dense fibrous highly vascular connective tissue, but the vascular bed was compressed and empty. In few areas, the connective tissue was less dense and contained abundant blood capillaries and few macrophage cells. At this advanced stage the inflammatory process was extended to the underlying muscular tissue. Inflammatory connective tissue were seen extended deeply inbetween the muscle bundles and encircling them. Some of the muscle fibres undergone hyaline degeneration.

The three birds which died during the course of the experiment showed severe hock and breast lesions. Hock granuloma was bilateral. It was very large in size and ulcerated. The lesions of the breast was also very severe, large in size and filled with bloody exudate. The internal organs from these three birds revealed focal mononuclear cells reactions in the liver (Fig. 8). Other organs were atrophied, and the intestinal wall was thin. The organs from other killed chickens revealed no characteristic changes. Bacteriological studies from the lesions were negative, and mycological examination revealed no positive results.

DISCUSSION

Broiler chickens reared in cages developed granuloma like swelling over the planter surface of the hock joint. This granuloma was consisted of inflammatory fibrous connective suggesting that it may be caused by continuous trauma of the cage-wire and the heavy weight beared by the bird. This differs from the avascular lesions described by JULIAN and BHATNAGAR (1985) in turkeys which was suggested to be due to inactivity of the bird and sitting for extended period. However, confinement and inactivity of the birds in our experiment played also a role in the pathogenesis of these lesion. The chronic granulomatus inflammatory process extended to include the periarticular tissues giving rise to aseptic periartthritis. However the articular tissues were not affected. At later stages, the epidermis and the underlying tissue either undergo necrotic changes or was partly covered by a heavy layer of kerato hyaline material. The latter play a great role in preventing infection and the development of aseptic lesions.

Chickens with bilateral hock granuloma setting on their breast for extended periods developed either fibrocysts or breast granuloma, whose histological structure suggested a traumatic origin. Organs from dead and killed birds revealed no significant changes related for this lesion. Atrophy which found in the internal organs of three birds died during the experiment suggested that the cause of death may be due to dehydration and debility.

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LEGEND OF FIGURES

- Fig. (1):** Hock granuloma consists of inflammatory C.T. rich with small capillaries H&E (10x).
- Fig. (2):** Hock granuloma infiltrated with mononuclear cells. H&E (20x).
- Fig. (3):** Hock granuloma, blood veseles prominently dilated and filled with blood H&E (10x).
- Fig. (4):** The cavity of the breast granuloma is filled with exudate rich mononuclear cells. (20x).
- Fig. (5):** The wall of the fibrocysts consists of the three distinch layers. H&E (4x).
- Fig. (6):** The outer layer of the fibrocysts consists of C.T. rich in blood capillaries H&E (10x).
- Fig. (7):** Breast granuloma showed blood vesseles dilated and filled with blood. H&E (10x).
- Fig. (8):** Mononuclear cells infiltration of the liver H&E (10x).



Fig. (1)

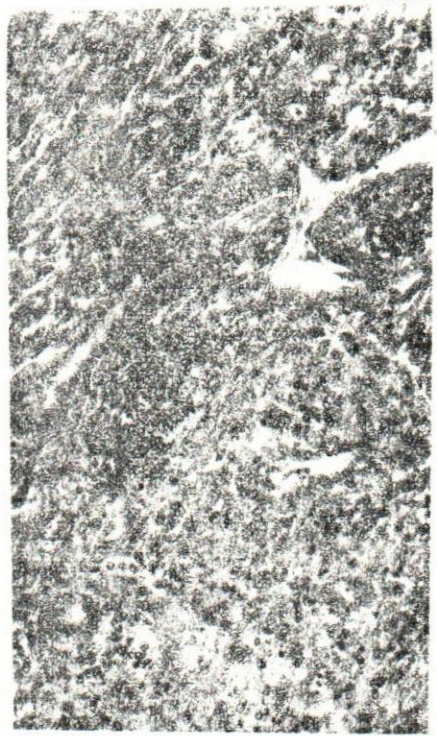


Fig. (2)



Fig. (3)

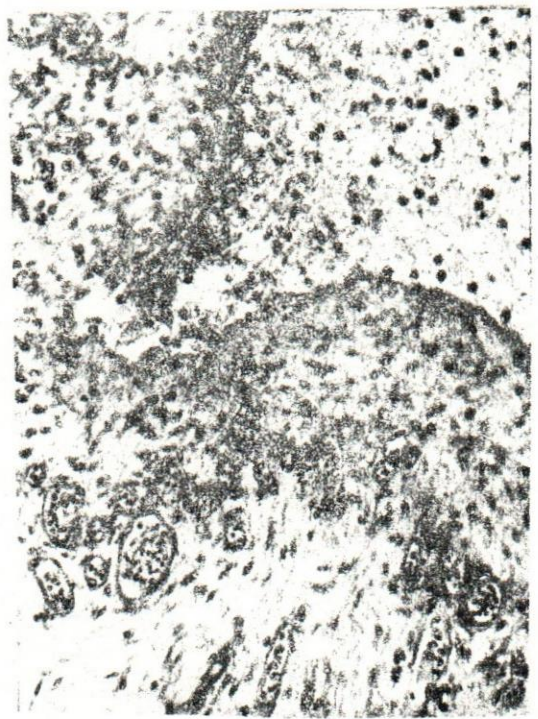


Fig. (4)



Fig. (5)

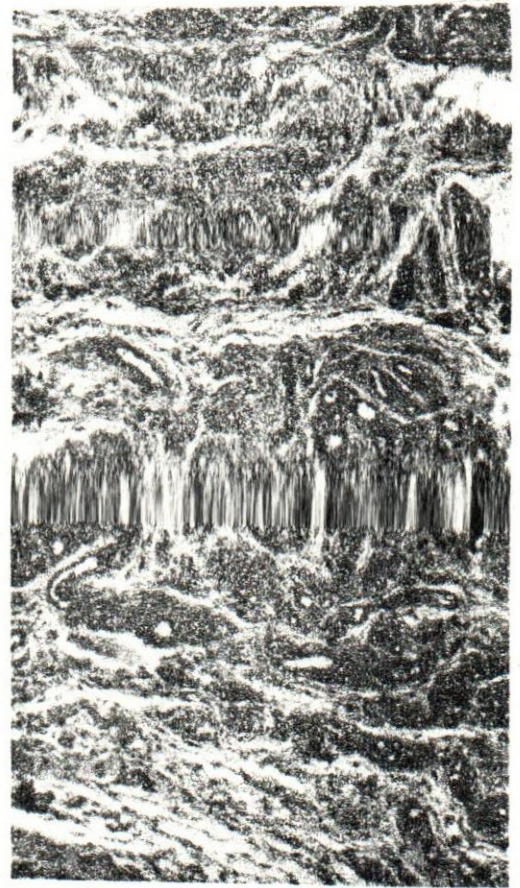


Fig. (6)

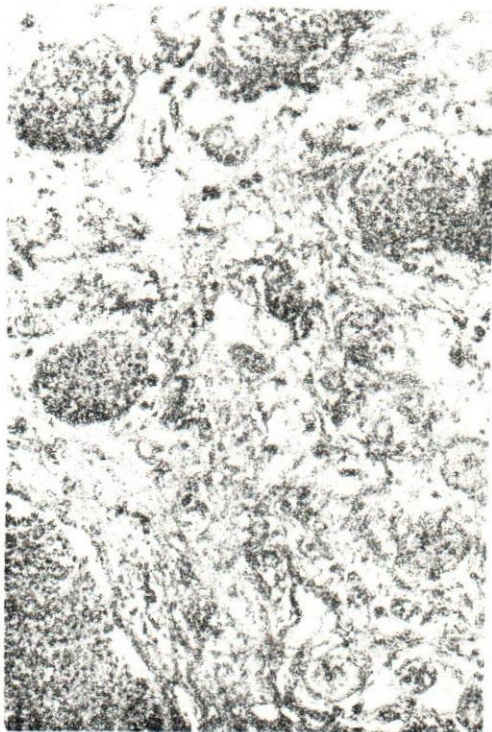


Fig. (7)

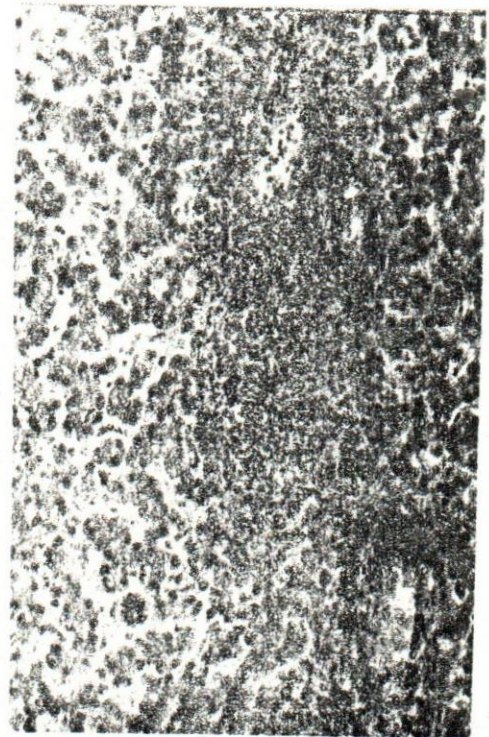


Fig. (8)