قسم الباثولوجيـــــا
كلية الطب البيطرى ـ جامعة أسيوط
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تقرير عن عدوى الاشريشيا كولاى فى الماعز الفرنسى الالبينى الحامل للبروسيلا فى أسيوط

مختار مصطفـــى

فى هذا التقرير ثبت أن العترة المعزولة من الاشريشيا كولاى لها تأثـــير باثولوجى قوى معبرا عنه بالاصابات التسممية العامة فى الاعضاء الخلويـــــة كانت طبيعة هذه الاصابات معبرة بتغير نسيجى وتحلل خلوى ، شمل هـــذا التحلل الخلوى الرئة والكبد والامعاء والكلى والغدد الثديية والطحـــــال والعقد الليمفاوية والمخ . أدت هذه التغيرات الخلوية الى وفيات حـــادة فى مزرعة الماعز الحاملة للبروسيلا واعزيت هذه التغيرات الى التسمم الدمـــوى الداخلى للميكروب .

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REPORT ON E. COLI INFECTION IN BRUCELLA CARRIERS FRENCH ALPINE GOATS AT ASSIUT

(With 1 Table & 5 Figs.)

By
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SUMMARY

In this report, the isolated E. coli strain was proved to be a powerful pathogen as was indicated by the generalized toxic lesions in the parenchymatous organs. The nature of these lesions was tissue alteration and cytolysis. These cytolytic changes involved the lung, liver intestine, kidney, mammary gland, spleen, lymph nodes and brain. These parenchymatous changes resulted in acute deaths in the brucella carrier goat farm and could be correlated to the endotoxaemia of the organism.

INTRODUCTION

E. coli is a common pathogenic M.os.among all animal species. Epizootics of gastroenteritis (calf scours or white scours) is very common in neonatal calves (MADE, 1969). Cases of calf bronchopneumonia associated with scours and joint lesions were also reported by many authors since ago (SANDERS, 1940 and THROP, SHIGLEY and FARRELL, 1942).

This paper is a report of the serologic, bacteriologic gross and histopathologic findings from the selected cases in an Alpine French goat farm in order to reach a correct diagnosis of the etiologic agent responsible for the deaths in this farm.

MATERIAL and METHODS

Clinical, serological, bacteriological, gross and histopathologic examinations were carried out in a farm of French Alpine goats at Dayrout, Assiut Governorate. 9 goats were selected and examined clinically and serologically. 3 goats were examined grossly and histopathologically in addition to P.M. bacteriology.

Serological examination:

Blood samples were collected from the jugular vein by sterile syringes from 9 goats. Brucella serum agglutination test was done on these samples.

P.M. and histopathologic examination:

P.M. exam. was carried out on 3 female goats. Tissue specimens from the lung, liver, intestine, kidney, spleen, mammary gland, brain, supramammary lymph node, prescapular lymph node and mesentric lymph node were collected and fixed in neutral buffered formaline and procesed for microscopic examination by H.E. sections.

Bacteriologic examination:

The bacteriologic exam. was carried out on the 3 goats subjected for P.M. exam. Trials for isolation and identification of the causative M.os.were done from heart blood, synovia filled joints as well as the selected organs.

RESULTS

I. Clinical and Serological picture

Table (1)

Case No.	Titre for Brucella agg. test	Clinical signs
8095	1/40	Chronic mastitis
8098	1/80	Chronic diarrhae
109	1/160	Chronic mastitis
302	1/80	Fever, cough
378	1/160	History of late abortion, swelling of fore and hind knee joints
129	/320	History of late abortion, swelling of fore and hind knee joints and pneumonia.
114	1/160	Cough, fever
301	1/80	Chronic diarrhae
218	1/80	Cough, fever

II. Post-mortem picture

The external features of the carcasses examined showed emaciation, pale mucous membranes and swelling of the fore and hind knee joints.

The cardiac, apical and intermediate lobes of the lungs showed red and greyish hepatized areas of lobular pattern and other areas of compensatory emphysema. Other lobules were congested. The gastrointestinal tract showed no prominent lesions. The liver was congested, dark red in colour and on cut section blood oozed freely. Foci of necrosis of the liver parenchyma were seen with other patches of degeneration. In one case examined, yellow icteric pigmentation was seen in the s.c. fat, omentum and mesentric fat. The kidneys were normal in appearance except in one case softening and pulpy texture of the renal parenchyma was observed. The heart of all cases examined was normal. The right prescapular, supramammary and mesentric lymph nodes were congested and haemorrhagic. Brain meninges were severely congested. The fore and hind knee joints were swollen and showed synovia filled joint cavities.

III. P.M. bacteriologic findings

E. coli was isolated and identified from all the selected organs, heart blood as well as from joint synovia.

IV. Histopathological findings

The lung:

The grossly hepatized lobules of the lung showed the picture of acute exudative bronchopneumonia. The alveolar and bronchial lumina were filled by the desquamated epithelium, inflammatory exudate and the neutrophilic leucocytes Fig. (1). Capillary congestion was prominant. Focal areas of compensatory alveolar emphysema with rupture of some alveoli was observed. Characteristically was the cytolytic necrosis of wide areas of the lobules involving the inflammatory exudate and lung septa.

The liver:

The pathological changes of the liver revealed features of acute parenchymatous hepatitis. With consideration of the vascular lobular distribution of the liver, the center of the lobule suffered from diffuse ytolytic changes of the liver parenchyma Fig. (2). The nuclei of the hepatocytes showed different grades of karyolysis. The cytoplasm showed lytic necrosis with loss of its acidophilic staining. The middle zone of the lobule manifested the picture of fat dystrophy. The degenerated fat appeared as clear empty vacuole sharply defined in the cell. The periphery of the lobule was slightly affected in the form of hydropic degeneration of the liver cells. The central veins were severely congested with haemolysed blood.

The intestine:

Diffuse cytolytic necrosis involved the intestinal villi as well as the intestinal glands. The nuclei of the intestinal and glandular epithelium showed different grades of karyolysis while the cytoplasm became necrosed with loss of its acidophilia.

The kidney:

The renal parenchyma had the picture of acute alteration complicated by cytolytic changes (Fig. 3). Majority of the tubules showed diffuse lytic necrosis. Other tubules were still preserving their histologic structure although the cytoplasm was faintly stained and the nuclei were hypochromatic. The intertubular capillaries and the glomerular tuft of capillaries were congested and the erythrocytes were haemolysed. Some renal corpuscles showed a reactive immune hypercellular reaction of the glomeruli comlicated by cytolysis of their cellular constituents Fig. (3).

Mammary gland:

The mammary gland showed diffuse cytolytic changes on a picture of chronic fibrosing mastitis Fig. (4). Some acini in a mammary lobule still more or less healthy in appearance. Other acini were degenerated and their lumina were filled with corpora amylacia of the chronic inflammation. In the interstitum, chronic proliferative reaction was predominant involving the interlobular and intralobular stroma. The cytolytic necrosis included majority of the acini and the proliferating stroma. This was expressed by varying degrees of nuclear necrobiosis and liquifaction of the cytoplasm.

The spleen:

The main observed change in the spleen was the lytic necrosis of the lymphoid follicles of the white pulp and the cell population of the red pulp Fig. (5). The nuclei were in different grades of karyolysis. The cytoplasm was totally liquified. The capillary network of the spleen showed severe congestion with evidence of haemolysis.

The lymph nodes:

Both the cortex and medulla of the prescapular, supramammary and mesentric lymph nodes were involved by the process of advanced cytolysis. The lymphoid tissue nearly disappeared and transformed into a diffuse area of liquified tissue. Moreover, liquifaction involved also the reticular stroma of the nodal tissue.

The brain:

The brain meningese were congested. Selective neuronal degeneration was a sporadic finding as indicated by shrinkage of some neurons and chromatolysis.

DISCUSSION

In this investigation, the serologic findings of the examined animals revealed some cases with high titre for brucellosis (1/160 & 1/320) indicating the presence of chronic brucella infection in the farm. This brucella infection lowered the resistance of the animals which gave the chance for E. coli organism to flurish up resulting in acute deaths due to E. coli. The brucella affected animals had a clinic history of late abortion and arthritis.

The P.M. findings of the 3 examined goats showed generalized changes allover the parenchymatous organs and knee joints. MOLL and BRANDLY (1955) stated that the pathological changes due to E. coli were not confined to any particular organ or organ system but seemed to be of a generalized nature.

With P.M. bacteriologically, we could isolate E. coli organism from the parenchymatous organs as well as from the synovial fluid of the affected joints. This finding indicated the septicaemic picture of the disease. MADE (1969) examined new borne calves with E. coli infection and explained two different patterns of the disease: (a) - a septicaemic form and (b) enteric form only. In the septicaemic form the author cultured E. coli from all organs but in the enteric form only from the intestine and intestinal lymph nodes.

By histopatholigical examination of the parenchymatous organs, we could record pneumonia and degenerative changes of the liver, intestine, kidney and mammary gland. All these lesions had a common feature expressed by tissue cytolysis. These cytolytic necrotic changes in our view could be attributed to the effect of the endotoxin secreted by the organism which had a powerful lytic effect upon these organs and a haemolytic effect on erythrocytes. Bacterial endotoxins were reported by many authors to affect selected enzymes and metabolic system of the host which are responsible for the tissue damage (BERRY, SMYTHE and YOUNG, 1959; SCHAYER, 1960; BERRY & SMYTHE, 1963 and THOMAS, 1964).

MEILBOE (1938) reported mild degenerative changes of the parenchymatous organs in a type of calf diarrhea that he designated isocolibacillosis. STARR (1926) and THORP, et al. (1942) reported degenerative changes of the parenchymatous organs and pneumonia due to E. coli. SAID (1969) introduced E. coli or its endotoxin into the teat of rabbits, and could induce mastitis. SWEENEY (1969) stated that E. coli serogroup A_1 was associated with outbreaks of fatal enteric disease in 20 litters in 14 herds. McGOVERN (1971) considered zonal necrosis of the liver as the most common histologic manifestation of shock encountered at autopsy due to E. coli. Coalson, Archer, Hall, Kern, Benjamin, Beller-Todd and Hinshaw (1979) found acute tubular necrosis in the kidney of shocked monkeys following live E. coli organism infusion.

Another picture of the disease was described by OSBORNE (1966) following oral inoculation of 5 known serotypes of E. coli in calves. The most common lesions recorded by the author were vascular stasis, edema, hemorrhage and thromboemboli while acute and chronic gastro-enteritis characterized the disease clinically. The author correlated the pathophysiological changes to absorbed E. coli endotoxin or the absorption of E. coli and a substance intimately associated with the viability of the organism. In another work by the same author (1967) following I.V. administration of E. coli serogroups, he could induce reversible and irreversible anaphylactoid shock. The shock lesios

were correlated to the bacterial endotoxin of E. coli. In our findings, the natural disease did not exhibit any vascular changes or shock lesions as experimentally recorded by these workers.

The histopathologic picture ofthe spleen and lymph nodes in our data showed also cytolytic necrosis of the lymphoid tissue; a change accompanied endotoxaemia of the disease. Controversy, OSBORNE (1967) found hyperplastic lymph nodules and proliferative changes in splenic corpuscles and considered these lesions to be due to immune responses of the host to E. coli endotoxin. WARD, JOHNSON and ABELL (1959) and WARD, ABELL and JOHNSON (1961) have associated these changes with antibody production.

The author conclusion is that chronic brucllosis in the goat farm at Dayrout resulted in acute deaths due to E. coli which had a septicaemic picture manifested as generalized endotoxaemic tissue changes.

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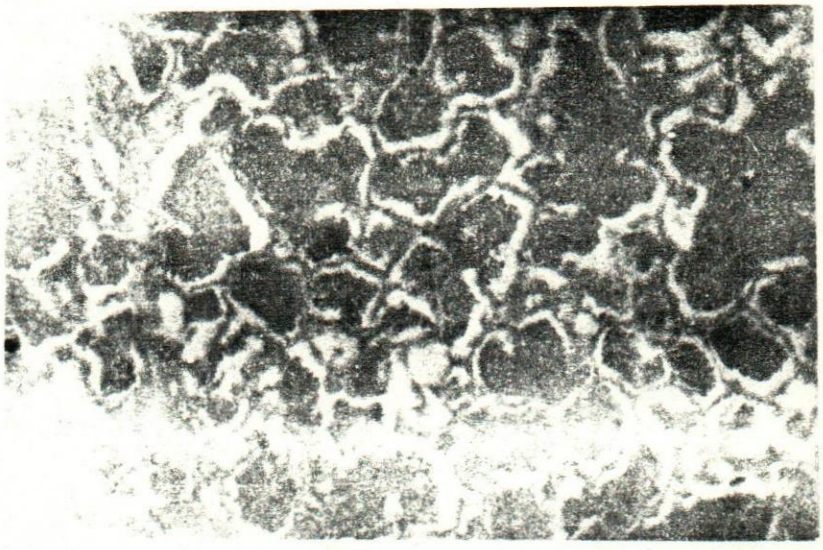

Fig. (1): Lung showing acute exudative pneumenia and cytolysis.
H.E. (X 1280).

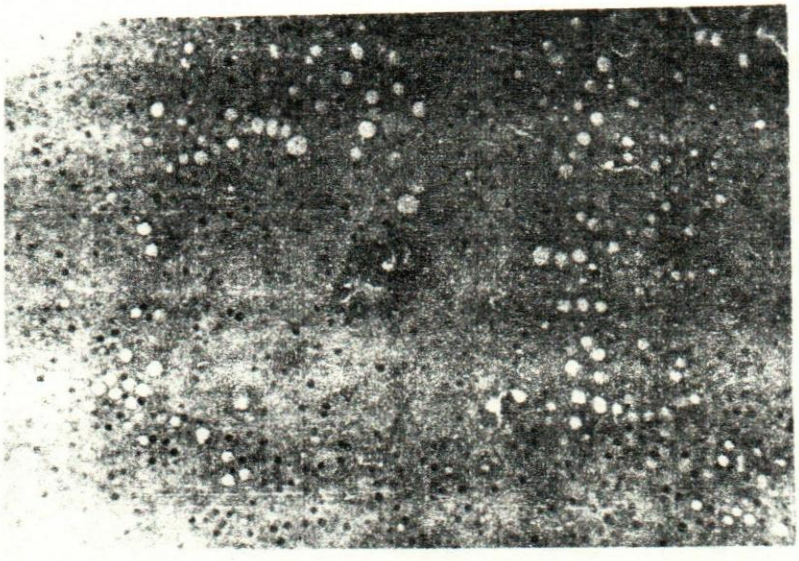

Fig.(2): Acute parenchymatous hepatitis showing cytolytic necrosis of the center of the vascular lobe, mid-zonal fat dystrophy and peripheral hydropic degeneration.
H.E. (X 1750).

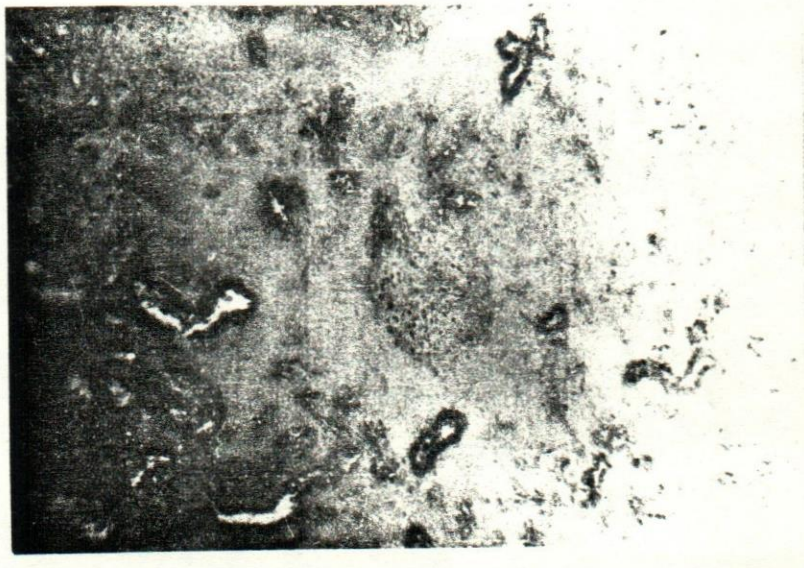

Fig. (3): Kidney showing acute renal altertion with diffuse cytolysis.
H.E. (X 1750).

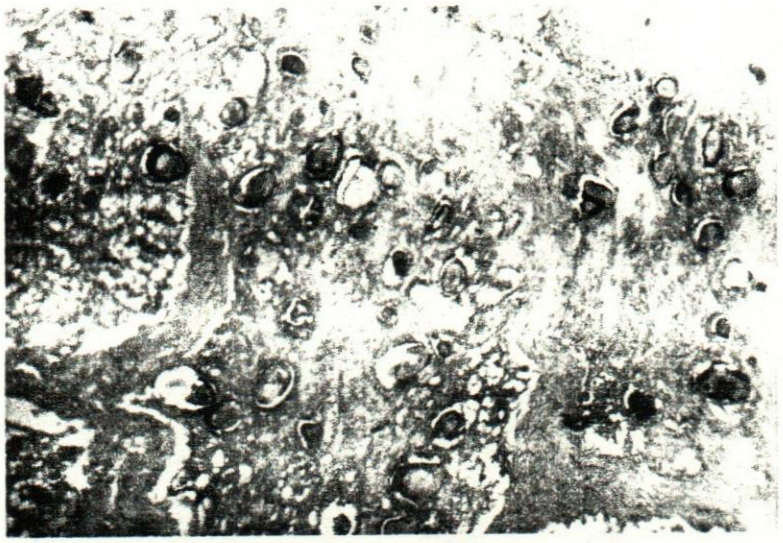

Fig. (4): Chronic fibrosing mastitis complicated by cytolysis of the glandular parenchyma and the stromal C.t. reaction. H.E. (X 690).

Fig. (5): Diffuse lytic necrosis of the splenic follicles and the red pulp cell populations. H.E. (X 441).