The Iraqi J. Vet. Med. 16 (1992)

AETIOLOGICAL AND PATHOLOGICAL STUDY ON OVINE AND CAPRING ABORTED FOETI

A. M. AL-Darraji[1] ; S. H. Dhahir and M J. Alwan.[1]

Departments of Pathology[1] & Medicine & Therapeutics, College of Veterinary Medicine, Baghdad University.

SUMMARY

Bacteriological and histopathological investigations were conducted on ovine and caprine aborted foeti, ten each, collected from different parts of Iraq, to determine the posible etiology of abortion and to characterize the histopathological changes associated with them. Microbial isolation revealed the following isolates: Brucella melitensis[14], Listeria monocytogens[3], Chlamydia psittaci[2] and Campylobacter foetus[1].

Histopathological changes were evident in specimens of placenta and aborted foeti. These are: Bacterial colonies in the necrotic chorionic epithelial cells, bronchopneumonia, multifoceal hepatic necrosis, splenic reticuloendothelial hyperplasia and interstitial nephritis were associated with Br. melitensis isolates.Multifocal necotizing hepatitis, pneumonitis, diffuse reticuloendothelial hyperplasia with lymphoid necrosis in spleen, nephrosis and meningitis were features of C. psittaci isolates.

Myocarditis, acute hepatocellular degeneration and necrosis and diffuse cortical renal hemorrhages accompanied the L. monocytogens induced abortion. Multifocal hepatitis and suppurative pneumonia are seen in V. fetus abortion foeti.

INTRODUCTION

Abortion can be defined as an expulsion from the uterus of a dead or living fetus befor it reaches a viable age at any stage of gestation[1]. Both in ovine and caprine species, many infectious and non-infectious factors are known to cause abortion[2]. Abortion could occure in goats or ewes infected with Listeria monocytogens, Campylobacter fetus, Brucella species and Chlamydia psittaci[3, 4, 5].

The available literature on various aspects of abortion in sheep and goats in Iraq, indicates the paucity of information on the diseases in general and the histopathology of infectious abortion in particular. The objective of this study were to determine the possible etiology of abortion in sheep and goats and to characterize the histopathology associated with them.

MATERIALS AND METHODS

Ovine and Caprine aborted foeti, ten each, were collected from private mingled sheep and goat flocks suffering from abortion in different geographic locations of the country. Placentaş were collected with aborted foeti. Suitable small tissue pieces were taken from lung, livers, spleen, kindneys, hearts and brains, fixed in 10% formal saline, processed routinely, sectioned and stained with hematoxylin and eosin stains. For cultural examination, pieces of the same organs were collected under aseptic precautions. Different media were used for primary isolation and identification of the causative agents, each specimen was cultured on blood agar, brucella agar, tryptic soy agar, thiol broth, thioglycollate medium, pepton water, S.I.M. medium, potassium thiocynate enrichment medium and embryonated eggs.

RESULTS

Bacteriological findings:

Brucella melitensis was isolated from[14] cases and from the remaining[6] cases, different types of microbial isolates were obtained, including the following: L. monocytogens[3] cases, C. psittaci[2] cases and C. fetus[1] case.

Histopathological findings:

The pathological changes were exclusively confined to the parenchymatous organs in all of the aborted foeti.

Brucellosis:

Placental pathology:

Microscopic examination revealed bacterial cells in the periplacentomal and chorionic epithelial cells. There were areas of necrosis of the chorionic epithelium accompanied by infiltration of the underlining connective tissue stroma with mononuclear cells and neutrophils (Fig. 1). Exudate on the surface of placental membranes and between the cotyledonary villi consisted of cellular necrotic debris, fibrin, bacteria.

Foetal pathology:

Lungs:

There were scattered foci of bronchopneumonia with the affected alveoli had their lumen filled with fibrin, macrophages, few neutrophils and lymphocytes. There were hyperplasia of goblet cells with mucin secretion seen in the airway lumens. Other pulmonary changes included interstitial mononuclear cellular thickening, interlobular odema (Fig. 2). Vascular congestion and subpleural hemorrages.

Livers:

The majority of foetal livers had portal inflammatory response in the form of sheets of mononuclear cells around branches of the hepatic artery and portal veins. There were congestion focal hemorrhages, degeneration changes and multifocal necrosis of hepatocytes with kupffer cell proliferations.

Spleen:

Splenic lesions consisted of minor multifocal reticuloendothelial hyperplasia seen in the red pulp.

Kidneys:

The prominent lesion here was mild focal interstitial nephritis characterized by scattered small focal interstitial cellular infiltration predominantly mononuclear cell types.

Chlamydial abortion:

Liver:

There was multifocal necrotizing hepatitis characterized by dilation of central veins and sinusoids, focal necrosis of hepatocytes and moderate to severe inflammatory cell infiltrates,composed of macrophages and lymphocytes. The other prevalent hepatic lesions were disrupted hepatic cytoarchitecture, multinucleated megakaryocytes (Fig. 3) and bile duct proliferation.

Lung:

The predominent microscopic changes consisted of vascular congestion and interstitial mononuclear cell infiltration (pneumonitis).

Spleen:

Splenic lesions consisted of diffuse reticuloendothelial hyperplasia with lymphoid necrosis (Fig. 4). There were splenic congestion and infiltration of neutrophils.

Kidney:

The cytoplasm of the tubular lining epithelium was either large or vacuolated. There is also vascular congestion.

Brain:

Histological examination of the brain revealed that the reaction was almost limited to the adventitia of the meningeal and the neuroparenchymal vessels. Mononuclear cells were seen arranged in an eccentric distribution about the congested blood vessels.

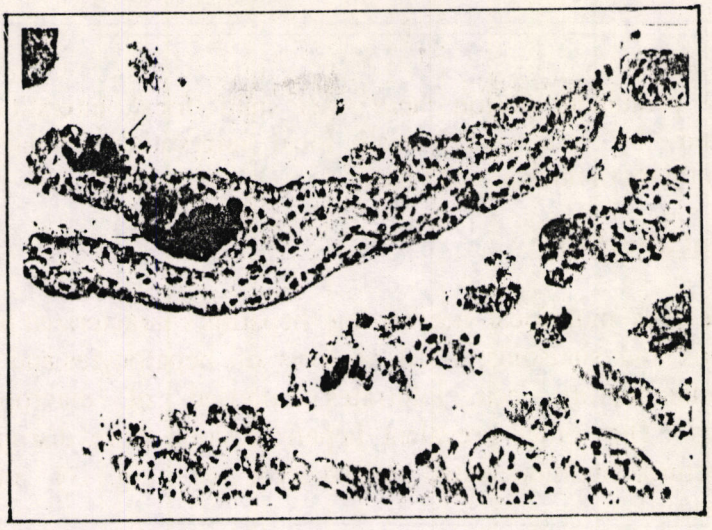

Fig.1 : Placenta of Brucella-aborted animal. There is necrosis and sloughing of the chorionic surface epithelium, with bacteria. (H. & E. X20)

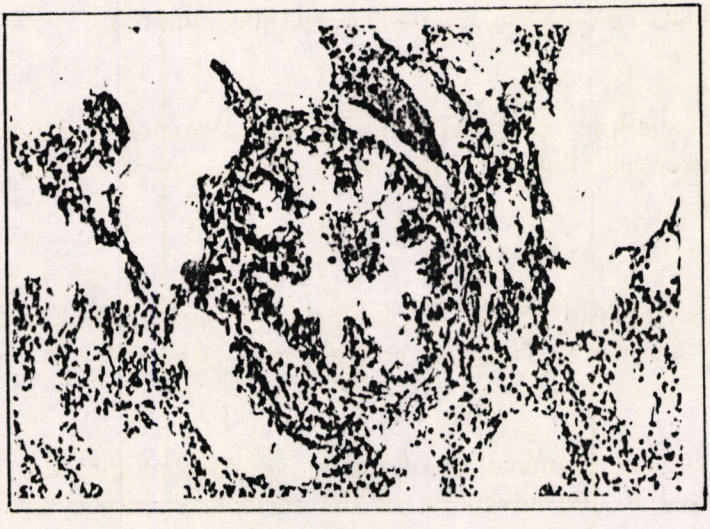

Fig.2 : Lung of Brucella abortion fetus. There is acute bronchopneumonia. Notice mucin and inflammatory cells in the airway and interstitial tissue. (H. & E., X20).

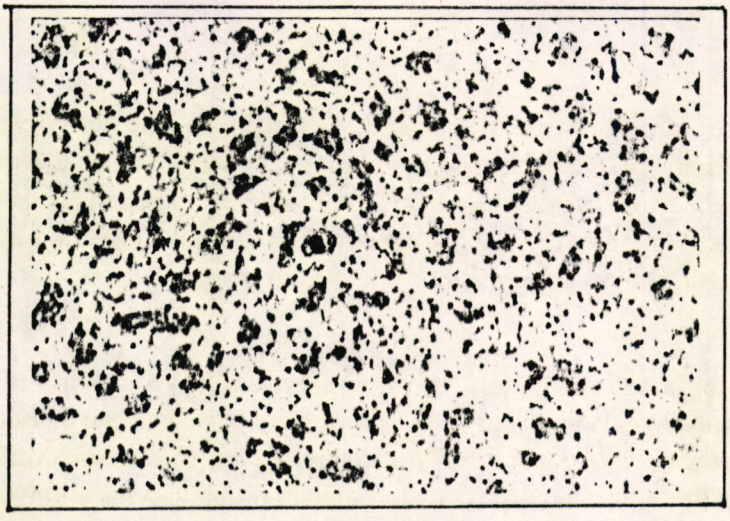

Fig.3 : Liver of a Chlamtdia-aborted fetus. There is disrupted hepatic cytoarchitecture with severe inflammatory cells infiltration.

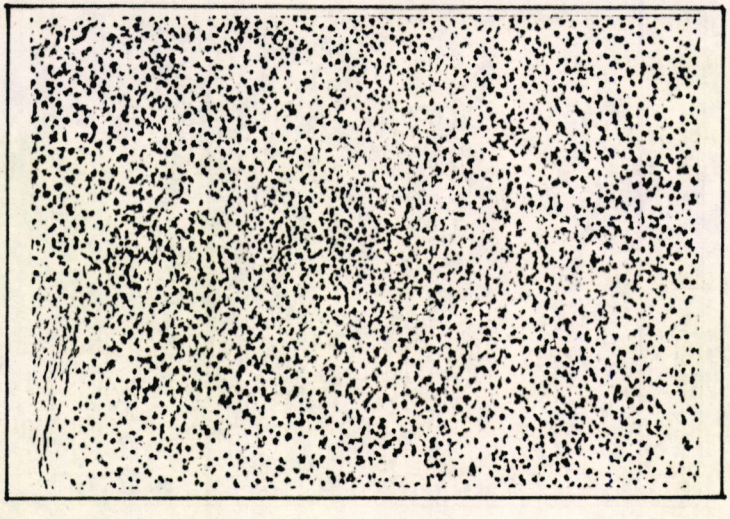

Fig.4 : Spleen of Chlamydial-aborted fetus. Notice necrosis of the lymphoid follicles and the reticuloendothelial hyperplasia. (H. & E., X10).

Listeriosis

Heart:

There were severe myocarditis and epicarditis. The myocardium had multifocal areas of vascular degeneration of its muscle cells, infiltration with macrophages, lymphocytes and neutrophils as well as oedematous separation of the muscle bundles (Fig. 5). There were mononuclear cellular aggregation in the epicardium witth congestion of its blood vessels .

Livers:

Histological examination of the livers revealed congestion of the portal vessels, central veins and sinusoids. There were foci of acute cellular swelling and acute hepatocellular necrosis.Numerous cellular infiltration were scattered throughout the section and consisted mainly of histiocytes and lymphocytes. Portal vessels contained fibrin thrombi and hemosidrin-laden macrophage .

Kidney:

The prominent lesion were diffuse cortical hemorrahges and marked acute tubular nephrosis.

Lung and spleen:

The lung and spleen show no remarkable lesions, except for vascular congestion.

Campylobacter fetus:

Lung:

Histologically, the lung revealed serous exudation and cellular infiltration of the pulmonary parenchyma, which consisted mainly of macrophages, lymphocytes and neutrophils. These cells were present in the alveolar lumens and in the interstitiu m.

Kidney and spleen:

No significant microscopic lesions were seen.

Liver:

The liver had multifocal hepatitis characterized by foci of infiltration of mononuclear type cells present in the parenchyma, togather with hepatocellular degeneration to focal areas of hepatic necrosis. There is activation of the reticuloendothelial cells of liver acompanied by increases numbers of megakerocytes (Fig. 6). There are numerous nucleated erythrocytes in the liver sinusoids.

DISCUSSION

Abortion among animal is considered as one of major problem in certain countries, such as, Iraq, United states, Europe, Australia and india and it is caused by Brucella species, Chlamydia psittaci, Listeria monocytogens and Campylobacter fetus emerged as an important etiology of the disease in sheep and goats[6,7,8,9]. In the present study, Br. melitensis is isolated from the stomach content of aborted foeti. Similarty *Kulshreshtha et al*,[10] isolated Br. melitensis from the stomach content of aborted foeti. Necrotizing placentitis as well as the accumulation of large numbers of bacterial cells in the chorio-allantoic trophoblasts is observed durin g the present study, finding in agreement with the previous description of brucella intracellular location in the infected host tissue[2]. Brucella species have marked predilection for chorionic trophoblasts of the ruminant placenta in which replication of the organism lead to necrotizing placentitis[3]. Trophoblasts may enhance grouth of Brucella because of erythritol content or hormone synthesis or by other undefined mechanism[2].

Pulmonary, hepatic, renal and splenic lesions of aborted foeti from which brucella was isolated, were similar to those described before [11,5]. Numbers of Chlamydial isolates from the internal organs of aborted foeti were similar to those reported by Khanna et al[12], who found that among 36 specimens Chlamydia was isolated from 2 cases. The results showed that the pathological changes in the parenchymatous organs of the foetal of Chlamydia associated abortion are characteristic for natural Chlamydia psittaci induced abortions[15,13,14] and indicated that the primary cause of abortion is probably C. psittaci.

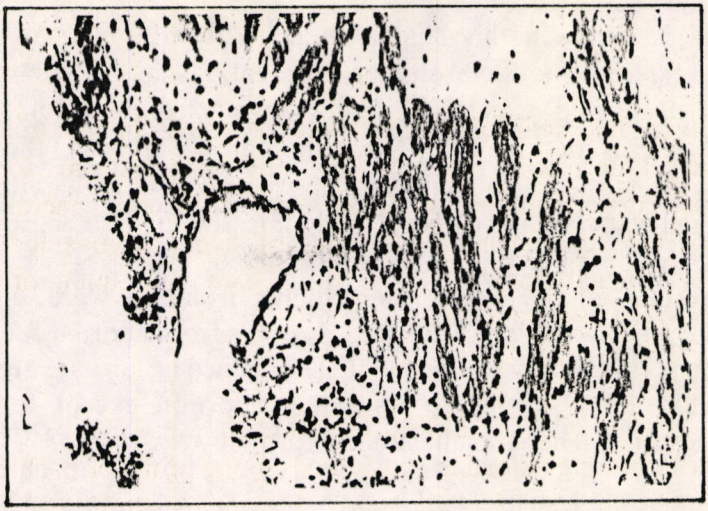

Fig.5 : Heart of a listeria-aborted fetus. Acute mycarditis characterizes by degeneration changes of the muscle cells together with acuteiinflammatory response. (H. & E., X20).

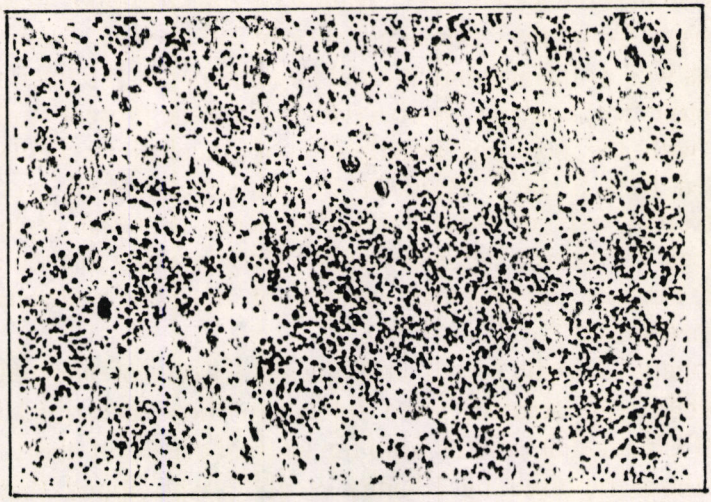

Fig.6 : Liver of Campylobacter-aborted fetus. Acute necrotizing hepatitis. (H. & E., X10).

Listeria isolation in this study, obtained from foetal parenchymatous organs (Liver, spleen, and foetal stomach contents) is compatible with findings of *Gitter et al*[16] who isolated L. monocytogens from the stomach contents and internal organs of one ewe. The pathological changes in the foetal from which L. monocytogens isolated were in accordance with what *Jubb* and *Kennedy*[17] and *Nieberle* and *Cohrs*[18] and indicated that the cause of abortion might be due to L. monocytogens.

The results of Campylobacter foetus isolation were supported by *Bird et al*[19] who were able to isolate C. Foetus from aborted foetal stomach contents. The present study showed that significance lesions are absent in the aborted foetus of C. Foetus associated abortion except for multifocal necrotizing hepatitis. These results are supported by *Smith et al*[20].

REFERENCES

1- Guss, S. B. (1977). Managemment and disease of goats scottsdate, Ariz, Dairy goat journal publishing corp. 103, 176-177.

2- Anderson, T.D.; Eador, V.P. and Cheville, N.F. (1986). Pathogensis of placentitis in the goat inoculated with Br. abortus. I. Gross and histopathologic lesions. Vet. Path. 23: 219-226.

3- Molello, J.A.; Jensen, R; Flint, J.C. and Collier (1963). Placental pathology, I. Placental lesions of sheep experimental infected with Br. ovis. Am. J. Vet. Res. 24: 897-901.

4- Misra, D.S.; Kumar, A. and Sethi, M.S. (1976). Effect of erythritol and sex hormones on growth of brucella species. Ind. J.Exp. Biol. 14: 65-68.

5- Meador, V.P.; Hagemoser, W.A. and Deyoe, B.L. (1988). Histopathologic findings in brucella abortus infected pregnant goats. Am. J. Vet. Res. 49: 274-280.

6- Johnson, W.A. (1983). Chlamydiosis. Brit. Vet. J. 13: 93-101.

7- Al- Khatib, G.M. and Al-bassam, (1975). Report on outbreak of vibrionic abortion in Iraq. Berland. Munth. Tierar. Wochen. 88: 86-88.

8- Kishturia (1986). Chlamydial abortions in sheep in Himachal pradesh. Ind. Vet. J. 63: 985-986.

9- Dhahir, S.H. (1990). Bacteriological and seriological study on some infectious causes of ovine and caprine abortion. Ph.D. Thesis, Coll. Vet. Med. Baghdad, Iraq.

10- Kulshreshtha, R.C. : Jagjit singh, B.V. and Chandiramani, N.K. (1983). A study on abortion associated with brucellosis in a sheep farm in india. Ind. J. Comp. Microbiol. Immunol. infect. 4: 154-158.

11- Sandhu, K.S: Kumar, N; Joshi, D.V. and Sidhu, S.S. (1987). Aetiopathological studies on bovine aborted foetuses. Ind. J.Anim. Sci. 57: 812-816.

12- Khanna, R.N.S; Gupta, R.K.P.; Purohit, V.D. and Sadana, J.R. (1987) Isolation, identification and characterization of Chlamydial isolates from cases of sheep abortion. Ind. J. Anim. Sci. 57: 121-123.

13- Linklater, K.A. (1979). Abortion in sheep. Vet. Rec. 1:30-35.

14- Pienaar, J.G. and Schutte, A.P. (1975). The occurrance and pathogenesis of Chlamydiosis in domestic and labratory animals. Am. J. Vet. Rec. 42: 77-90.
15- Gusen, D.E. ; Acland, H.M. and Gillete, D.M. (1983). Abortion and stillbirsh associated with Chlamydia psittaci var ovis in dairy goats with high titers to Toxoplasma gendii. Am. Vet. Med. Ass. 183: 1447-1450.
16- Gitter, M. : Richardson, C. and Boughton, E. (1986). Experimental infection of pregnant ewes with L. moncytogens. Vet. Rce. 118: 575-578.
17- Jubb, K.V.F. and Kennedy, P.C.(1970). Pathology of domestic animals. 2nd edition, Vol. I. Academic press, New York.
18- Nieberle and Cohrs (1966). Texbook of the special pathological anatomy of domestic animals. Pergamen Press. Oxford London.
19- Bird, M.M.S. ; Stephons, D.J.; Wall, E.P. and Delisle, G.W. (1974). Enzootic abortion in ewes. Vet. Rec. 62; 251-254.
20- Smith, H. A.; Jones, T.C. and Hunt, R.D. (1974). Veterinary pathology, 4th ed. Lee and Fibiger, Philadelphia.

التغيرات المرضية والمسببات الجرثوميه للاجنه المجهضه في الاغنام والماعز

علي مجيد الدراجي , سالم احمد الظاهر , محمد جواد علوان

فرع الامراض والطب العدلي وفرع الطب والعلاج ،
كلية الطب البيطري , جامعة بغداد

الخلاصـــه

تم الحصول على عشرين جنين مجهض من الاغنام والماعز لدراسه التغيرات المرضيه والمسببات الجرثوميه لها.

اوضحت نتائج العزل الجرثومي العزولات التالية:
Brucella melitensis[14], Listeria monocytogens[3], Chlamydia psittaci[2] Campylobacter foetus[1].

اوضحت نتائج دراسة لتغيرات المرضيه التهاب المشيمه النخرى والتهاب القصبات الرئوي وتنخر الكبد والالتهاب الكلوي الخلالي في الاجنه المجهضه بسبب Br.melitenses وكذلك التهاب الكبد النخري وذات الرئه وتنخر وتضخم الطحال والتهاب السحايا في الاجنه المجهضه بسبب Chlamydia psittaci والتهاب عضلة القلب وتنخر وتنكس الكبد في الاجنه المجهضه نتيجة للاصابه Listeria monocytogens وكذلك التهاب الكبد وذات الرئه القيحي في الاجنة المجهضه بسبب Campylobacter foetus.