

A HISTOPATHOLOGICAL STUDY ON RETAINED PLACENTA IN BUFFALOES IN COMPARISON WITH SPONTANEOUSLY DROPPED ONES (With 4 Figures)

By

H.A. FETAIH and N.H. SALEH*

(Received at 4/5/1995)

دراسة نسيجية مرضية على المشيمة المحتبسة في الجاموس
 بالمقارنة مع المشيمة المنفصلة ذاتيا
 حمدى فتح ، نشأت صالح

أجرى هذا البحث لدراسة التغيرات النسيجية المرضية التي تؤدي الى احتباس المشيمة في الجاموس بعد الولادة. تم الفحص المجهرى لقطاعات نسيجية عديدة مأخوذة من المشيمة المحتبسة في عدد أربعة حيوانات من إجمالي ١٦٠ جاموسه كانت ولادتها طبيعية (نسبة حدوث الاحتباس ٢,٥٪) (وذلك بعد إنزال المشيمة يدويا بعد مرور ٢٤ ساعة من الولادة) وكذلك فحصت مجهريا المشيمة المنفصلة ذاتيا لعدد ٤ حيوانات أخرى. من أهم ما أثبتته الفحص المجهرى لحالات المشيمة المحتبسة هو وجود إلتهاب صديدي وما صاحبه من إحتقان وأوديماء وأنزفه موضعيه في أحد الحالات. وكذلك حدوث إلتهايات مزمنه مع تكاثر خلايا الأنسجة الضامه مما أدى الى تليف خملات المشيمة وتشابكها مع بعضها البعض وتلف العديد منها في باقى الحالات. هذا وقد وجد في كل الحالات تتركز لمعظم الخلايا المبطنه لخملات المشيمه وتحلل الباقي منها وانفصالها من أماكنها. ووضح أيضا مدى تنكس الأوعيه الدمويه والتهاب جدرانها مع ضيق مجراها بدرجات متفاوتة. بإستخدام الصبغات الخاصة والتي صبغت بها القطاعات النسيجية ثبت وجود العديد من أنواع البكتريا الموجيه الجرام والسالبه الجرام مستعمره لطبقات المشيمه المختلفه ولم يثبت وجود أى فطريات. إستخلص من الدراسة أن الإلتهاب الصديدي وما صاحبه من تورم خملات المشيمه، والإلتهايات المزمنه وما صاحبها من تليف هى الأسباب التي أدت الى إحتباس المشيمه، وأن التلوث والعدوى البكتيرية لعبت دورا هاما في إحداث هذه المشكله.

SUMMARY

Histopathological examination of 4 retained placenta obtained from buffaloes after normal calving revealed that, purulent placentitis occurred in one case and chronic placentitis with fibrosis occurred in the other 3 cases. In both conditions, necrosis of the majority of the trophoblast was evident, in addition, vasculitis and/or degeneration of the walls of the blood vessels with narrowing of their lumen were also seen. Many

* Dept. of Theriogenology, Fac. Vet. Med., Suez Canal Univ.

types of Gram positive and Gram negative bacteria were detected in the tissue sections of retained placenta.

Keywords: A histopathological study on retained placenta in buffaloes in comparison with spontaneously dropped ones

INTRODUCTION

Retention of the placenta is basically due to failure of the villi of the fetal cotyledons to detach themselves from the maternal crypts of the caruncles (ROBERTS, 1982).

The incidence of placental retention in buffaloes varies greatly from herd to another at various times. VINATTIERI *et al.* (1945) found an incidence of 17.1% in buffaloes, their findings did not differ greatly from those of EL-HARIRY *et al.* (1981), SAMAD *et al.* (1984) and MAHFOUZ (1987) who claimed a percentage of 21.05%, 23.2% and 22.5% respectively. In this respect, RAMAN and BAWA (1977) recorded that retained placenta accounted for 30% of all postpartum reproductive disorders in buffaloes. A low incidence of retained placenta 4.6%, 1.2% was reported by YOUSSEF (1973) and ATALLAH (1993) respectively.

The principal causes of retention were previously studied by some authors. VINATTIERI *et al.* (1945) found that separation of buffalo calves from dams immediately after birth resulted in 22.7% retention due to interference with

hormonal stimulation of the posterior pituitary lobe. YOUSSEF (1973); AWAD *et al.* (1980); MAHFOUZ (1987) AND OSMAN and SHEHATA (1992) added that low serum level of Ca, phosphorus, carotene and vitamin A were usually accompanied by retention of placenta in buffaloes. The problem of placental retention in other animals except the cows as reviewed by ROBERTS (1982) was briefly studied. In buffaloes this problem still needs more investigation particularly from the pathological aspect.

The present study was carried out to study the histopathological changes which occur in retained placenta in buffalo-cows in comparison with that spontaneously dropped in the same species.

MATERIAL and METHODS

A total of 160 normal calving buffalo-cows selected from a herd kept at the farm of the Faculty of Veterinary Medicine Suez Canal Univ. at Ismailia Province were included in the present study.

The buffalo-cows aged 6-8 years, weighed 500-600 Kg and gave from 4-6

births. Out of 160 normal calvings 156 dropped their placenta in the due time and 4 were considered retained according to BHALARU *et al.* (1983).

Retained placentae were manually removed 24 hours postpartum and terramycin tablets (2-4 gm) were placed in the uterus. Samples from retained placenta as well as those spontaneously dropped were taken for the present study. Specimens from different parts of each placenta were taken and immediately fixed in buffered neutral formalin solution for 24 hours. The fixed specimens were then dehydrated, embedded in paraffin wax and sectioned at 4-5 μ . The histological sections were stained by the routine stain hematoxylin and eosin. Special stains for bacteria (Brown and Brenn) and fungi (PAS) were also used (Luna, 1968).

RESULTS

On gross examination the retained placenta were friable and reddish brown in colour with putrid odour. The chorioallantois was edematous and necrotic, the cotyledons were larger than normal, firm and matted with a dirty red exudate mixed with detachable necrotic tissues. One of the retained placenta was covered with suppurative exudate. The spontaneously dropped placenta showed only slight edema and hyperaemia.

Histological examination of the spontaneously dropped placenta showed

that the chorionic villi are rich in vasculature, and the capillaries were widely dilated and filled with intact RBCs. The lining epithelium of the villi composed of cells (trophoblasts) of variable sizes, some with 2 nuclei and arranged in multiple layers (2-3 cells thick), lying in between them numerous small capillaries. Many of the trophoblasts were vacuolar and degenerating and some were sloughed. The mesenchymal cells of interstitium were of variable shapes and present in a faintly basophilic, finely fibrillar edematous matrix (Fig. 1). The muscular blood vessels of the interstitium were dilated.

Histopathological examination of the retained placenta revealed that the trophoblasts lining the chorionic villi were mostly necrotic and detached (Fig. 2) while a less proportion of cells showed vacuolar degeneration and swelling. Inflammatory changes were detected in the four retained placenta. In one of the retained placenta there was a purulent placentitis in which the interstitium of the chorionic villi and the intercotyledonary areas were edematous, hyperaemic and infiltrated by neutrophils and some mononuclear cells mainly lymphocytes and few histocytes (Fig. 3). Focal haemorrhages were also seen. The large blood vessels of the severely inflamed areas suffered from vasculitis. The muscular wall of these

blood vessels was highly vacuolar, infiltrated with the same type of inflammatory cells and their lumen were very narrow. In some parts of the retained placenta exhibiting purulent placentitis, there was severe congestion and high vascularity with numerous blood vessels and capillaries.

The other three retained placenta showed chronic inflammatory changes. The chorionic villi became very thick due to fibroblastic proliferation. The mesenchymal cells of the interstitium became resembling the mature fibrocytes. The villi fused together to form disorganized masses of tissues (Fig. 4) trapping in between the degenerated and necrotic trophoblasts and cryptal epithelium. Occasionally large areas of necrosis, focal haemorrhages and infiltration by mononuclear cells were also seen. The blood vessels showed degeneration with vacuolation of the wall and narrowing of the lumen.

Staining of the histological sections with Brown and Brenn stain for bacteria revealed the presence of mixed types of bacteria colonized the placental tissues. These types included Gram positive cocci, diplococci, bacilli (sporulated and non sporulated), Gram negative long bacilli and coccobacilli showing bipolarity. Some of the sporulated bacilli showed terminal and subterminal spores. Staining of the histological sections with

PAS stain for fungi did not reveal the presence of any mycotic hyphae. Only one case of the spontaneously dropped placenta showed long Gram negative bacilli.

DISCUSSION

The incidence of retained placenta in the present study was 2.5%. A nearly similar lower incidence was reported by *YOUSSIF (1973) and ATALLAH (1993)*. However a much higher incidence was recorded by *VINATTIERI et al. (1945); RAMAN and BAWA (1977); EL-HARIRY et al. (1981); SAMAD et al. (1984) and MAHFOUZ (1987)*. The incidence of retained placenta varies widely due to the large variation in the parity, calving season, calving performance and managemental factors. *ATALLAH (1993)* cited that, the excellent supply of green fodders all the year round may be an additional factor reducing the incidence of retained placenta.

In the present work, the histological structure of the spontaneously separated placenta was nearly the same as that described in cattle by *DELLMANN and BROWN (1987)*. The presence of degeneration in many trophoblasts was considered a normal finding necessary for normal detachment (*KENNEDY, 1947 and BENESCH and WRIGHT, 1951*). The main histopathological

HISTOPATHOLOGICAL STUDY, RETAINED PLACENTA IN BUFFALOES

changes observed in the retained placenta were purulent placentitis with consequent hyperaemia and edema in one case and chronic placentitis with fibrosis and necrosis of the cotyledons in the other three cases.

Retention of the placenta in the first case was suggested to occur due to swelling of the chorionic villi that interfered with the normal separation and detachment of the villi from the maternal crypts. In the other three cases adhesions between the cotyledons and the caruncles were due to fibrosis and these adhesions were suggested to be the cause of retention. Such suggestions are in accordance with those of *BJORKMAN and SOLLEN (1961)* and *JONES and HUNT (1983)*.

The inflammatory reaction and detection of bacteria in the examined tissues of retained placenta indicated the important role of bacterial infection in induction of the problem in buffaloes. *SERUR and BAYOUMI (1979)* considered the bacterial infection before, during or after parturition as one of the major causes of retention of the placenta in cattle. As a conclusion the purulent placentitis with consequent swelling of the chorionic villi and the chronic placentitis with fibrosis were responsible for the placental retention. The tissue changes as well as the bacterial infection were the main factors inducing the problem in buffaloes.

REFERENCES

- Atallah, S.A. (1993)*: Some studies on reproductive disorders during pregnancy and puerperium in buffaloes ph.D. Thesis, Fac. Vet. Med. Suez Canal Univ.
- Awad, Y.L.; Youssif, R.H. and Mikhail, M.F. (1980)*: Individual factors of the calf as predisposing cause to retained placenta in buffalo dam. *J. Egypt Vet. Med. Assoc.*, **40**, 77-78.
- Benesch, F. and Wright, J.G. (1951)*: *Veterinary Obstetrics*, Williams and Wilkins Comp., Baltimore, Md.
- Bhalaru, S.S.; Tiwana, M.S. and Dhillon, J.S. (1983)*: Factors affecting the incidence of retained placenta in buffaloes. *Trop. Vet. Anim. Sci. Res.* 81-82. (*Anim. Breed. Abst.*, **51**, 5944).
- Bjorkman, N. and Sollen, P. (1961)*: A morphological study on Retention Secundinarum in Cattle, *Acta Vet. Scand.*, **2**, 157.
- Dellman, H. and Brown, E. (1987)*: *Text book of Veterinary Histology*. 3rd Ed., Lea & Febiger, Philadelphia.

- El-Hariry, M.N.; El-Fadaly, M.A. and Awad, H.H. (1981):* The effect of Devidrel on the puerperium and fertility of buffaloes. *J. Egypt. Vet. Med. Assoc.*, 41, 29-35.
- Jones, T.C. and Hunt, R.D. (1983):* *Veterinary Pathology*. 5th Ed. Lea & Febiger, Philadelphia.
- Kennedy, A.J. (1947):* Retention of placenta in the bovine. *Vet. Rec.*, 59, 519-523.
- Luna, G. (1968):* *Manual of histologic staining methods of the Armed Forces*. Institute of pathology. 3rd Ed. Mc. Graw-Hill Inc., USA.
- Mahfouz, H.H. (1987):* Retention of placenta in cows and buffaloes. M.D. Vet. Sci. Thesis. Fac. Vet. Med. Assiut Univ.
- Osman, A.M. and Shehata, H.S. (1992):* Trial for prophylactic reduction of retained placenta in buffaloes and subsequent fertility. *12th Int. Congr. Anim. Reprod. and A.I.* The Hague, the Netherlands., 2, 907-909.
- Raman, S.R.P. and Bawa, S.J.S. (1977):* Incidence of pre and postpartum reproductive disorders in bovines. *Haryana Veterinarian.*, 16, 99-101.
- Roberts, S.J. (1982):* *Veterinary Obstetrics and Genital diseases*. Indian reprint, CBS Publishers & Distributors. India.
- Samad, A.; Ali, C.S., Ahmad, K.M. and Najib-ur-Rehman. (1984):* Reproductive diseases of the water buffalo. *10th Int. Congr. Anim. Reprod and A.I.* Urbana Champaign., IV, 25-33.
- Serur, B.H. and Bayoumi, A.H. (1979):* Histopathological studies of the retained and spontaneously delivered placenta in cattle. *J. Egypt. Vet. Med. Assoc.*, 39, 5-12.
- Vinattieri, E.; Hayard, A.H.S. and Artioli, O. (1945):* Retention of placenta in the buffalo with associated sequelae. *Vet. Rec.*, 57, 509-511.
- Youssif, R.H. (1973):* Some etiological factors affecting retention of placenta in cattle and buffaloes. M.D. Vet. Sci. Thesis, Fac. Vet. Med. Cairo Univ.

LEGENDS

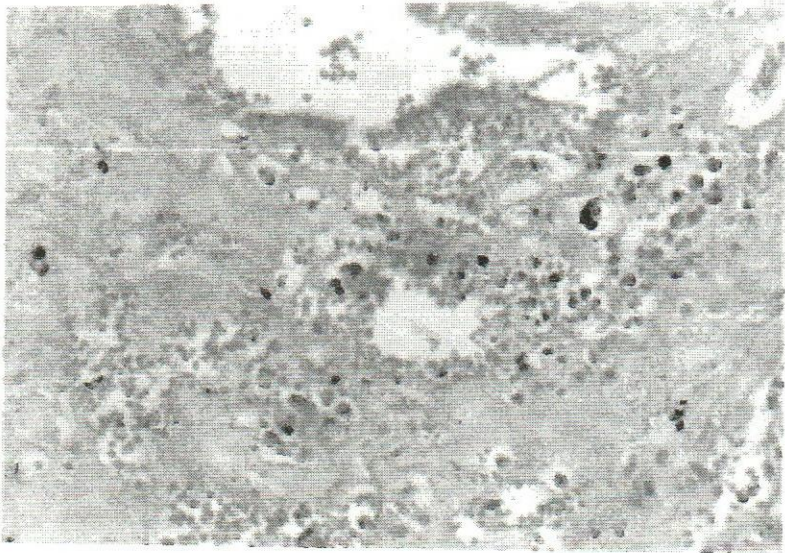
- (Fig. 1):** Histological section of the chorionic villi of spontaneously dropped placenta. H & E (X 110).
- (Fig. 2):** Histopathological section in the cotyledon of a retained placenta showing necrosis and sloughing of the trophoblasts. Notice the vacuolation of the wall of blood vessels (arrows). H & E (X 110).
- (Fig. 3):** Histopathological section in the placenta exhibited purulent placentitis showing congestion, edema, focal haemorrhage and leucocytic infiltration in the interstitium. H & E (X 400).
- (Fig. 4):** Histopathological section in placenta suffered from chronic placentitis with fibrosis. Notice the fusion and loss of the normal shape of the chorionic villi. H & E (X 110).



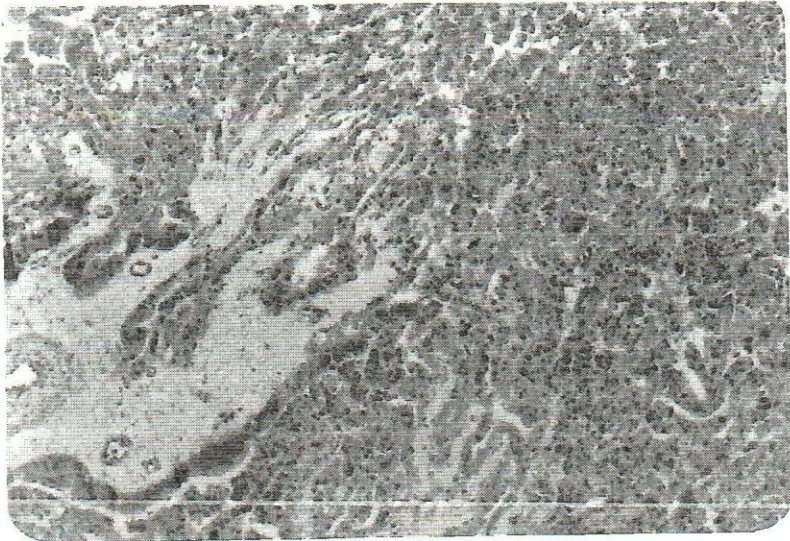
(Fig. 1): Histological section of the chorionic villi of spontaneously dropped placenta. H & E (X 110).



(Fig. 2): Histopathological section in the cotyledon of a retained placenta showing necrosis and sloughing of the trophoblasts. Notice the vacuolation of the wall of blood vessels (arrows). H & E (X 110).



(Fig. 3): Histopathological section in the placenta exhibited purulent placentitis showing congestion, edema, focal haemorrhage and leucocytic infiltration in the interstitium. H & E (X 400).



(Fig. 4): Histopathological section in placenta suffered from chronic placentitis with fibrosis. Notice the fusion and loss of the normal shape of the chorionic villi. H & E (X 110)