

MONITORING OF PATHOLOGICAL LESIONS IN NON-GRAVID OVINE UTERUS

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Abstract: A total of 108 non-gravid ovine uteri were collected from slaughtered ewes at Mosul slaughter house and private butcheries to monitor and identify the uterine pathological lesions. The uteri were grossly examined for observation of gross pathological lesions. Tissues samples were collected for histopathological studies. The incidence of different pathological lesions was calculated. Diffuse or nodular endometrial hyperplasia, endometrial degeneration and desquamation and endometrial coagulative necrosis at ratios 36.11%, 20.37% and 16.66% respectively. Endometritis and subendometrial fibrosis were noticed in 7.40% and 3.70% of the examined samples. Also vascular hyperemia and vascular wall thickening were observed in 12.96% and 5.55% of total examined samples. It is concluded that most of the detected lesions in nongravid uteri appears to be related with previous infections or pregnancies.

Key words: Nongraviduteri; lesions; ewes

Introduction

Uterus is the largest part of female genital tract which is formed from perimetrium, myometrium and the endometrium. Endometrium is essential for fetal implantation and placentation. The uterine glands in the endometrium secrete uterine milk necessary for nutrition of the conceptus during the preimplantation period. Also the uterine glands secrete PGF2 α necessary for luteolysis of the CL periodicum with subsequent initiation of a new oestrous cycle (1). The uteri in farm animals including ewes can be affected with a wide range of pathogens. Hyperemia, hemorrhage and hydrometra were recorded as circulatory disturbances in the uterus (2, 3). Uterine atrophy may arise due to ovarian dysfunction or nutritional deficiency (4). Physical affections or trauma may result in

uterine torsion, uterine prolapse and uterine rupture especially when occur near the time of parturition (2). Metritis and endometritis are common uterine affections in farm animals which may be acute or chronic resulting in infertility (5). They may develop more complicated sequels including pyometra and mucometra (2). Parasitic infestation like Hydatid cysts, *Echinococcus granulosus*, was recorded in the uterus (6). Uterine tumors including leiomyoma and lymphosarcoma (2) squamous cell carcinoma (7) and hemangioma (8) were also recorded in cattle and sheep.

The present study aimed to monitor and identify the types and incidence of uterine lesion in the ovine uterus in the Mousl region.

Materials and methods

Directly after slaughtering 108 non-pregnant uteri were collected from ewes at Mosul abattoir and several private butcheries in the city for a period extended from November 2012 to May 2013. The uteri were identified and transported in ice tank to the Department of pathology and poultry disease, College of Veterinary Medicine, University of Mosul.

The uteri were macroscopically examined for presence of gross pathological lesions. These lesions were recorded and some of them were photographed. Tissues samples were collected from two uterine horns (apex, middle part and base of each horn as well as from uterine body.

The samples were preserved in 10% neutral buffered formalin for two days. The samples were prepared for histopathological examination and stained with H&E according to Khodakarm-Tafti and Davari (4). The prepared slides were examined under light microscope, Kruss, Germany, and photographed using digital camera (SONY Japan). The pathological changes were recorded and classified as has been mentioned in table, 1. Also the incidence of each specific pathological lesion was calculated in relation to the total number of the examined uteri.

Results

Mild to moderate cellular adaptations lesions as being manifested by endometrial hyperplasia and endometrial atrophy were recorded at the percentages of 36.11% and 1.85% respectively (Table, 1 and Figs. 1, 2).

Disturbances in cell metabolism as being represented by endometrial degeneration and desquamation (20.37%) and endometrial coagulative necrosis (16.66%) were recorded (Table, 1 and Figures, 3, 4). Inflammations and repair were recorded as endometritis (7.4%), sub endometrial fibrosis (3.7%), placental retention and adhesions (0.93%), pyometra (1.85%). Also endometrial scarification, endometrial ulceration, myometrial abscesses and granuloma were recorded at the rate of 0.93% for each (Table 1 and Figs. 5-8).

The circulatory disturbances including hyperemia, hemorrhage and vascular wall thickening were recorded at the rates of 12.96%, 2.77% and 5.55% respectively (Table 1 and Fig. 9). Disturbances of pigmentation were observed as hemosiderosis and jaundice at the rates of 1.85% and 0.93% respectively. A single case of uterine tumor was diagnosed as metastatic squamous cell carcinoma in the uterus at a rate of 0.93% (Figs. 10, 11, Table 1).

Discussion

The aim of the present study was to screen the incidence and the types of pathological lesions in the ovine uterus in the Mousl region. The incidence of endometrial hyperplasia (36.11%) is higher than that (2.3%) recorded in Basarha region (10). This may be attributed to the variations in the environmental condition and the in the type and incidence of diseases producing such conditions between the two regions. The endometrial hyperplasia may arise as result of oestrogen level. Reynolds et al, (2009) (9) observed similar conditions in overectomized ewes infected with higher doses of oestrogen. Also endometrial hyperplastic condition was recorded in ewes fed on estrogen rich clover (11).

Endometrial atrophy was recorded in the bovine uterus in Al-qisysia province (12). It was mainly detected in the uteri affected with chronic endometritis (4, 13). Disturbances in cell metabolism appeared as endometrial degeneration and necrosis. The degenerative changes may be confused with physiological apoptosis normally occurring during estrus cycle (14). However the pathological endometrial degenerations and necrosis usually accompany abortions, endometritis and prolonged dystocia as mentioned by (5). Endometrial necrosis and desquamation were diagnosed in case of chlamydial infections. Also stated endometrial degenerations and fibrinonecrotic endometritis were induced in pregnant ewes after experimental intravenous injection of *Trypanosoma evansi* (16). Melo et al, (2017) (17) found that feeding of pregnant goats on green leaves of the plant *Multiglandulosa terapterys* resulted in abortion, focal placentitis and coagulative necrosis of endometrium.

Table 1: The incidence of pathological lesions in the non-pregnant uteri of ewes collected from Al-Mousl region

Type of lesion Classification of the lesion	Incidence	
	Rate	Percentage
Cellular adaptations		
Endometrial hyperplasia (Nodular or diffused)	39/108	36.11%
Endometrial atrophy	2/108	1.85%
Disturbances in cell metabolism		
Endometrial degeneration and desquamation.	22/108	20.37%
Endometrial coagulative necrosis	18/108	16.66%
Inflammation and repair		
Endometritis	8/108	7.4%
Sub endometrial fibrosis	4/108	3.7%
Placental retention	1/108	0.93%
Pyometra	2/108	1.85%
Endometrial scarification	1/108	0.93%
Ulceration	1/108	0.93%
Myometrial abscess	1/108	0.93%
Granuloma	1/108	0.93%
Circulatory disturbances		
Hyperemia	14/108	12.96%
Hemorrhage	3/108	2.77%
Vascular wall thickening	6/108	5.55%
Disturbances of pigmentation		
Hemosiderosis	6/108	1.85%
Jaundice	1/108	0.93%
Tumors		
Squamous cell carcinoma	1/108	0.93%

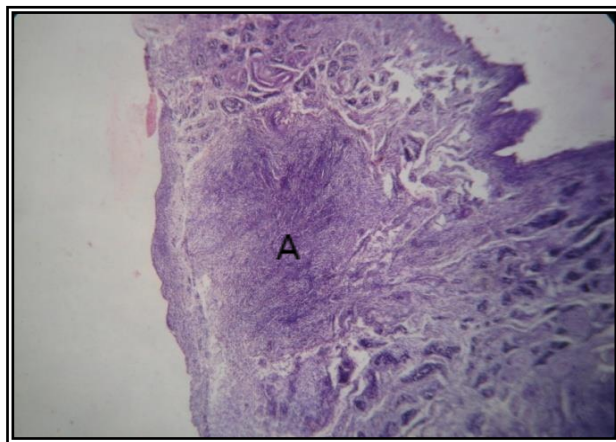
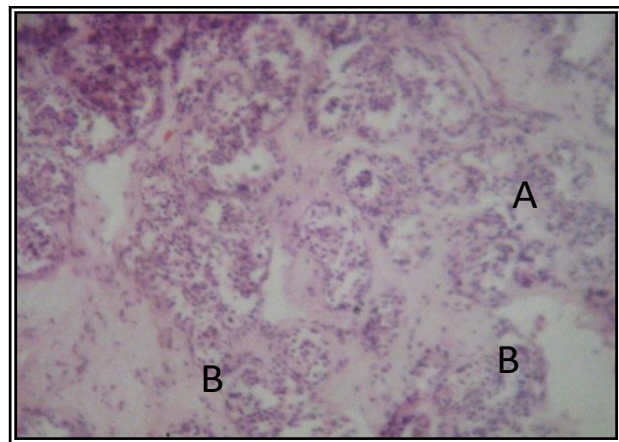
**Figure 1:** Photomicrograph of a section in ovine uterus showing nodular hyperplasia in endometrium (A). H&E, 40X**Figure 2:** Photomicrograph of a section in ovine uterus showing endometrial atrophy manifested by shrinking and reduction in the size of the uterine glands (A) and subendometrial. H&E, 115 X



Figure 3: Photomicrograph of a section in ovine uterus showing vacuolar degeneration in endometrial cells (A) Sloughing of endometrium (B). H&E, 40X

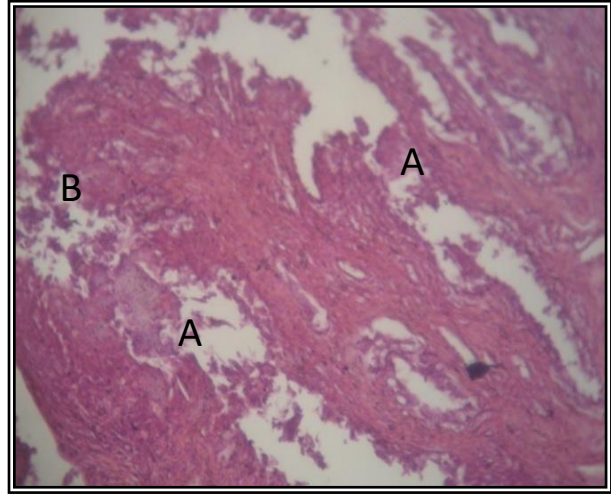


Figure 4: Photomicrograph of a section in ovine uterus showing coagulative necrosis in endometrial cells (A) Sloughing of endometrium (B). H&E, 115X

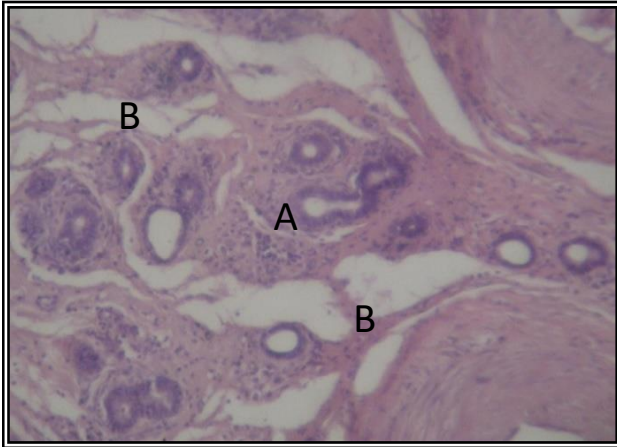


Figure 5: Photomicrograph of a section in ovine uterus showing endometritis manifested by infiltration of inflammatory cells (A) and edema (B). H&E, 165 X.

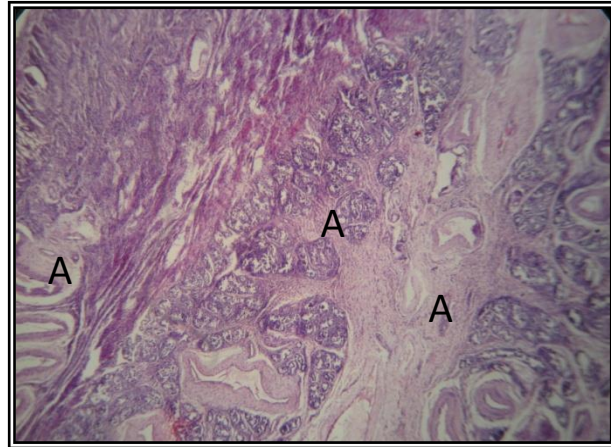


Figure 6: Photomicrograph of a section in ovine uterus showing subendometrial fibrosis (A). H&E, 40X.



Figure 7: Photomicrograph of a section in ovine uterus showing scarification being obvious by fibrous tissue deposition (A) extending through endometrium and myometrium. H&E, 68X

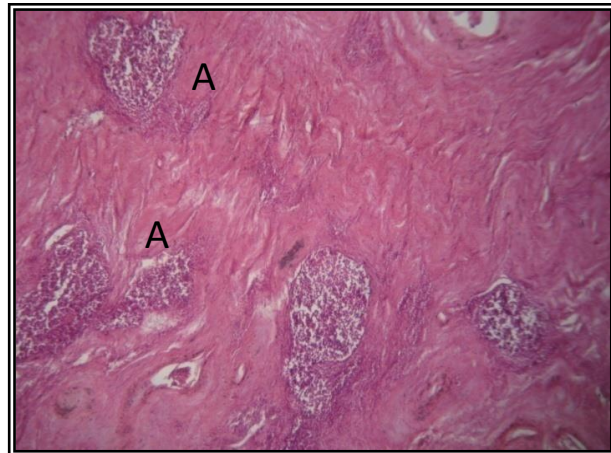


Figure 8: Photomicrograph of a section in ovine uterus showing microabscesses (A) within myometrium. H&E, 40X

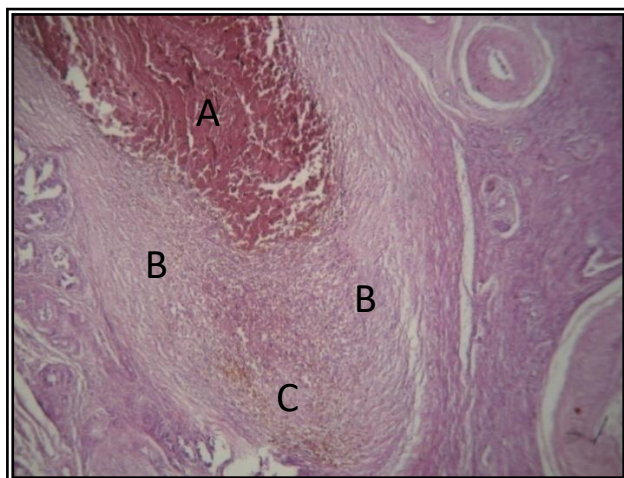


Figure 9: Photomicrograph of a section in ovine uterus showing hyperemic artery (A) thickening of vascular wall (B) hemosiderosis of vascular musculature (C). H&E, 68X

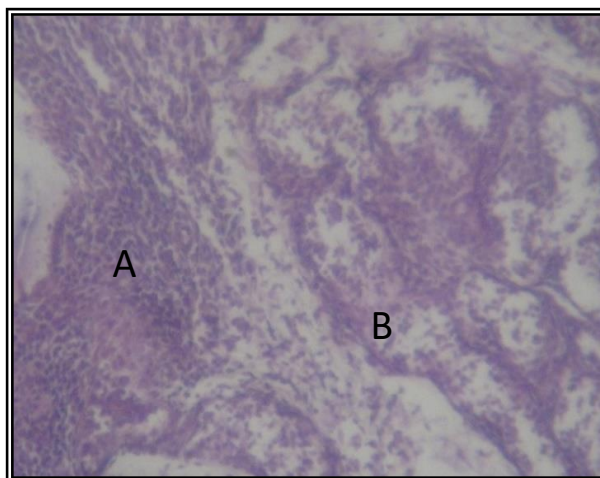


Figure 10: Photomicrograph of ovine uterus showing squamous cell carcinoma appeared as actively mitotic cell sheathes (A) and hyperchromatic multi mitotic figure cells invades uterine glands (B). H&E, 256 X

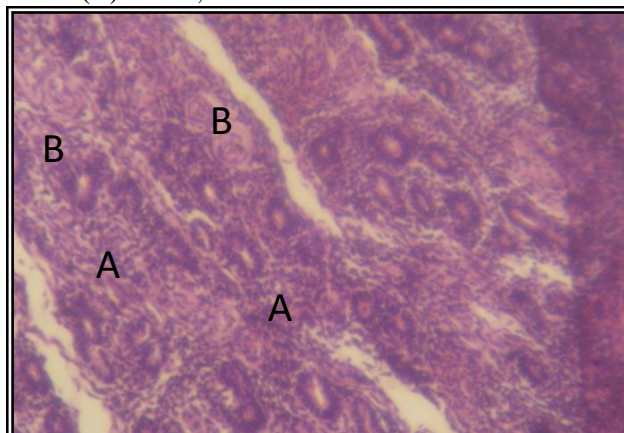


Figure 11: Photomicrograph of a section in ovine uterus showing squamous cell carcinoma appeared as actively mitotic squamous cell sheathes (A) and keratin nest structures (B). H&E, 200 X

The incidence of the endometritis in the current study (7.4%) was higher than those recorded in Ireland (2.3%) (18), Iran (2.3%) (4) and India (24.8%) (20) and lower than that (24.8%) in Al-Basraha Iraq (19).

The variations in rate may be attributed to the differences in environment and animal administration systems but still common affections worldwide. Many pathogens causing endometritis such as *Brucella abortus* (21), *Salmonella*, *Klebsiella*, *E.coli*, *Staphylococcus aureus* and *Proteus*, were isolated from genital tract (22) suffering from endometritis. Viral endometritis accompanies diseases like FMD (23).

Subendometrial fibrosis indicates chronic metritis which is usually associated with extensive deposition of collagen fibers. Charlotta et al, (200) (24) stated that fibrosis was observed in the uteri of mares with the advancement of age. Retained placental tissue was recorded at lower rate (0.93%) in the current study. The etiology may be mechanical, nutritional also bacterial, viral and mycotic infections (25).

Pyometra was recorded at rate of 1.85% of examined uteri. It was higher than that (0.15%) recorded by Khodakarm (2013) (4) and comparable to that recorded by Sharma et al, (2014) (20) in ewes. It was realized that pyometra may be related with cystic ovaries in affected animals (26). Endometrial scarification (0.93%), as indicated by scar granulation tissue extending through endometrium and myometrium can be explained as previous healing process from previous injuries of parturition (27). This lesion was recorded in 3 out of 30 ewes experimentally infected with *Mycoplasma capricolum capripneumoniae* (28).

The presence of Microabscesses in myometrium resembles the results of (29) in goats who confirmed the lesion, also (30) suggested that systemic pyogenic diseases like tuberculosis may induce that form of lesions in the genital system. Granulomatous reaction was identified at 0.93% of samples, it may be expressed by bacterial, viral, fungal or parasitic infection of

uterus (31), Also (8) recorded cases of granulomatous metritis in cattle and classified as military tuberculosis and (29) stated that granulomatous endometritis in goat was recorded at 1.29% and explained as brucellosis .

Circulatory disturbances manifested by hyperemia at 12.96% of samples mostly accompanied physiological changes as increasing estrogen level. Ali and Madboli (2013) (32) stated that increasing alpha and /or beta oestrogen receptors and decreasing norepinephrine in uterus causes hyperemia in guinea pig. Hemorrhage in myometrium and sub endometrium was noticed in three samples at rate of 2.77%. It has been thought that it accompanies sever constrictions of the myometrium during delivery or abortion which is called postpartum atonic haemorrhage (33). Thickening of the vascular walls of uterus was described by (34) as morphological changes in the myometrial arteries resulting from accumulation of collagen and mucopolysaccharides in subendothelium with focal fibrotic changes in smooth muscle layers. It is usually seen in women after multiple pregnancies. Hemosiderosis is a precipitation of hemosiderin pigment in tissue and it is reported by Beena et al, (2015) (29) in the caprine uteri in India at 25.32% of the examined samples. Jaundice stains body organs and tissues yellow by bilirubin and not specific to genital system. Squamous cell carcinoma was diagnosed in only one uterus sample at ratio 0.93%. It may arise outside the uterus and metastasized to the uterus because this type of tumors is not specific to the genital system. This suggestion may be supported by the observations of (35, 36) who recorded this type of tumors in human uteri

Conflict of interest

The authors declare that they have no conflict of interest.

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