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HISTOPATHOLOGICAL STUDY ON OVARIES AND FALLOPIAN TUBES OF BUFFALO-COWS

(With one Table and 8 Figures)

By

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دراسة هستوباثولوجية على مبايض وقنوات مبيض الجاموس

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تـم تجمـيع المـبايض وقنوات فالوب من ٣٤٠ جاموسة بالغة غيرعشار. وقد تم إجراء الفحص الظاهري والفحص الهستوباثولوجى بالمجهر الضوئي. ولوحظ وجود آفات مرضية فـي المبـيض في عدد ٣٤٠/٥٦ حيوان بنسبة ١٧,٦٤% وشملت: حويصلات متكيسة في ٨ حـالات بنسبة ٢,٣٥%، حويصلات صفراء في ٩ حالات بنسبة ٢,٦٤%، أجسام صفراء في١٨ حالة بنسبة ٥,٢٩%، تكيسات جار مبيضية في ١١ حالة بنسبة ٣,٢٤%، عدم وجود المـبايض في حالة واحدة بنسبة ٠,٢٩%، التهاب المبيض في حالة واحدة بنسبة ٠,٢٩%، تـيراتوما في عدد٢ حالة بنسبة ٠,٥٨%، ورم ليفي حميد في المبيض في حالة واحدة بنسبة ٠,٢٩%، اتصـال نسـيجي بين المبيض والرباط العريض في حالة واحدة بنسبة ٠,٢٩%، التصـاقات بين المبيض وكيس المبيض في ٣ حالات بنسبة ٠,٨٨%، وتكيس مائي في كيس المبيض في عدد ٢ حالة بنسبة ٠,٥٨%. أما بالنسبة للتغيرات المرضية في قنوات فالوب، فقـد لوحظ وجود آفات مرضية في ٣٤٠/٦ حيوان بنسبة ١,٦٧% وشملت: تجمع مائي في قنوات فالوب في ٥ حالات بنسبة ١,٤٧% وتكيسات في الغشاء المبطن لقناة فالوب في حالة واحـدة بنسـبة ٠,٢٩%. وبـالفحص الميكروسـكوبي للمبايض كانت التغيرات الباثولوجية الميكروسكوبية واضحة في حالات عدم وجود المبيض (نسيج ضام يحتوي على اوعية دموية سـميكة الجـدار ومغطى بخلايا طلائية مفلطحة) والتهاب المبيض (تواجد الخلايا الليمفاوية وأوعية دموية وليمفاوية متمددة وارتشاحات داخل النسيج الضام للمبيض) والتيراتوما (نسيج كيراتيـنى طلائـي متعدد الطبقات وطبقة سميكة من النسيج الضام تحتوي على غدد عرقية ودهنـية وحـو يصـلات الشعر) والورم الحميد للمبيض (فيبروما) (نسيج ضام مرتب في اتجاهـات مخـتلفة ويحتوي على خلايا الفيبروبلاست وأوعية دموية حديثة التكوين). ومن ناحـية أخري كانت التغيرات الباثولوجية الميكروسكوبية في حالة قنوات المبيض تتميز بعدم وجـود الـزوائد الأولـية والثانوية أو متواجدة في بعض الحالات ولكنها قصيرة في حالات

الـتجمع المائـي فـي قنوات فالوب (الهيدروسالبنكس) وفي حالة تكيس الغشاء المبطن لقناة فـالوب تمـيزت بوجـود حويصلات كبيرة ومستديرة الشكل مبطنة بنسيج طلائي منخفض الطول.

SUMMARY

Female genital organs of 340 adult breeding non-pregnant buffalo-cows were collected from slaughter houses and examined grossly and microscopically with special emphasis on ovarian and Fallopian tubes affections. The ovarian affections were observed in 56/340 animals (16.46%) and included non-luteinized follicular cysts in 8 cases (2.35%), luteinized follicular cysts in 9 cases (2.64%), persistent corpora lutea in 18 cases (5.29%), paraovarian cysts in 11 cases (3.24%), ovarian aplasia in one case (0.29%), ovariobursal adhesions in 3 cases (0.88%), oophoritis in one case (0.29%), teratoma in 2 cases (0.58%), ovarian fibroma in one case (0.29%), ovarian attachment to broad ligament in one case (0.29%), and bursal cysts in 2 cases (0.58%). The oviductal affections were found in 6/340 animals (1.76%) and included hydrosalpinx in 5 cases (1.47%) and oviductal mucosal cysts in one case (0.29%). The most prominent light microscopy findings in ovaries were observed in cases of ovarian aplasia (a band of connective tissue containing many thick walled blood vessels covered by flat epithelial cells), oophoritis (lymphocytic infiltration alongside dilated blood vessels and lymphatics with edema in connective tissue stroma), teratoma (keratinized stratified squamous epithelium and thick layer of fibrous connective tissue containing hair follicles, sweat and sebaceous glands), and ovarian fibroma (fibrous connective tissue containing fibroblasts running in different directions and newly formed blood vessels). On the other hand, the histopathological changes in oviducts were characterized in case of hydrosalpinx by absence of primary and secondary folds or in some cases they were present as low folds and in case of oviductal mucosal cysts by presence of large circular cysts lined with low cuboidal epithelium.

Key words: *Histopathology, ovary, fallopian tube, buffalo-cows.*

INTRODUCTION

The buffaloes have an outstanding potentiality as a source of good quality lean meat for human consumption (Farrag, 1978). Examination of genital tracts of non-pregnant buffaloes at the abattoir

suggests that the reproductive problems among buffaloes may be more than those of cows (El Khouly, 1985). Examination of ovaries in abattoir revealed a high prevalence of congenital and physiological disorders. Malnutrition, genetic factors and hormonal disturbances are considered the major causes of ovarian problems (Ribadu *et al.*, 1991).

Ovarian agenesis, ovarian hypoplasia, and paraovarian cysts were reported in buffaloes (Ahmed and Khan, 1993, and Sharma *et al.*, 1993). In addition, luteinized follicular cysts and ovarian cysts were recorded by Sharma *et al.* (1993) and Hasler *et al.* (2004) in buffaloes and Brown Swiss cows, respectively, while Ahmed and Khan (1993), and Opinder and Roy (1995) reported the cystic corpora lutea in buffaloes and cattle.

Kennedy and Miller (1993) reported that oophoritis in domestic animals was relatively rare and when occurs it is usually pyogenic. Oophoritis was recorded in buffaloes by Kumar and Singh (1985) and Sharma *et al.* (1993). Also, Abd El Hafeiz *et al.* (2005) observed oophoritis in buffaloes, due to BVD infection, that was characterised by plasmocytic and lympocytic infiltrations in the cortical stroma. Moreover, dermoids, bursitis, and ovariobursal adhesions were reported in buffaloes by Shalash (1991), Khanna *et al.* (1995), respectively.

Kennedy and Miller (1993) noticed that the primary lesions in the uterine tubes are uncommon and salpingitis, pyosalpinx, and hydrosalpinx are the only ones of importance which usually occur secondary to disease of the uterus or due to manual manipulation of the ovary. On the other hand, Aggag (1986) and Khasatiya *et al.* (1998) recorded hydrosalpinx, aplasia, agenesis, and mucosal cysts in Fallopian tubes of buffaloes.

The aim of this work is to describe the most common lesions in ovaries and Fallpopian tubes of buffalo-cows collected from the slaughter houses at Giza province, Egypt.

MATERIALS and METHODS

A- Animals

Ovaries and Fallopian tubes of 340 adult breeding non-pregnant buffaloes (3-6 years) of unknown previous history of fertility were collected from El Hawamdya and El Moneeb slaughter houses at Giza province from June 2002 to May 2004.

B- Histopathological study

Ovaries were examined regarding their size, and the presence of patho-physiological structures (normal and abnormal ovarian structures),

while Fallopian tubes were dissected and examined regarding the presence of gross lesions. The necropsy specimens were taken and fixed in 10% formol saline solution, processed, sectioned and stained with H&E stains (Wilson and Gamble, 2002).

RESULTS

The pathological findings in ovaries and Fallopian tubes were found in 56 (16.47%) and 6 (1.76%) out of 340 animals (Table 1).

I- Ovarian lesions:

Table 1 shows ovarian lesions in 56 animals and classified into:-

1- Ovarian cysts

a- Non-luteinized follicular cysts

Non-luteinized follicular cysts were observed in 8 cases (2.35%) either unilaterally or bilaterally. Macroscopically, the cysts were spherical and bulging from the ovarian surface and their size ranged from 2.1-7 cm in diameter and had a semitransparent, well vascularized thin wall (Fig. 1). Microscopically, the ovum and the surrounding cells of the cumulus oophorus were absent or degenerated and the inner most layer of granulosa cells was flattened and degenerated (Fig. 2).

b- Luteinized follicular cysts

Luteinized follicular cysts were found in 9 cases (2.64%). Macroscopically, the size ranged from 1.3-8 cm in diameter and they were rounded in shape, bulged over the surface of ovary, with opaque thick tense wall (0.3 cm), and had no ovulation fossa (Fig. 3). Microscopically, the ovum and the basement membrane were absent or degenerated and in some cysts, the granulosa cells showed cytoplasmic vacuolization (Fig. 4).

c- Persistent corpora lutea

Corpora lutea were reported in 18 cases (5.29%) (Table 1). Macroscopically, the corpora lutea were fluctuating, spherical in shape with ovulation papillae and thick white fibrous tissue wall. Microscopically, the cellular structure was indistinguishable from the normal functioning corpus luteum.

d- Paraovarian cysts

The paraovarian cysts were seen in 11 cases (3.24%) (Table 1). Macroscopically, the cysts were spherical, oval or elliptical in shape, with thin transparent wall, contained a clear yellow serous fluid and attached to the mesovarian ligament or to the mesosalpinx close to the ovary. Microscopically, the cysts were lined with one layer of cuboidal

or flattened epithelial cells and surrounded by a thin layer of fibrous connective tissue.

2- Ovarian aplasia

Ovarian aplasia was observed unilaterally in one case (0.29%) (Table 1). Macroscopically, it appeared as small, white soft mass replacing the left ovary. Microscopically, it was seen as a band of connective tissue containing many thick walled blood vessels covered by flat epithelial cells (Fig. 5).

3- Oophoritis

Oophoritis was noticed unilaterally in one case (0.29%) (Table 1). Microscopically, lymphocytic infiltration alongside dilated blood vessels and lymphatics with edema in connective tissue stroma (Fig. 6).

4- Teratoma (dermoid cystic type)

Ovarian teratomas of cystic type were found unilaterally in ovaries of 2 cases (0.58%) (Table 1). Macroscopically, it consisted of a fibrous wall surrounding a cavity filled with brownish jelly-like fluid, hair and greasy material (Fig. 7). Microscopically, the cavity of the teratoma was lined with keratinized stratified squamous epithelium, under which there was a thick layer of fibrous connective tissue containing hair follicles, sweat and sebaceous glands (Fig. 8).

5- Fibroma

Ovarian fibroma was recorded in one case (0.29%) (Table 1). Microscopically, it was characterized by a fibrous connective tissue containing fibroblasts running in different directions and newly formed blood vessels.

6- Ovarian adhesions

a- Ovarian attachment to broad ligament

It was found in one case (0.29%) (Table 1).

b- Ovariobursal adhesions

Ovariobursal adhesions were observed in 3 cases (0.88%) (Table 1).

7- Bursal cysts

Bursal cysts were noticed in 2 cases (0.58%) (Table 1). In one case, the bursal cysts were bilateral and measured 9.5 cm and 5 cm in diameters, while in the second case the bursal cyst was unilateral and measured 8 cm in diameter.

II- Fallopian tubes lesions

Pathological findings in Fallopian tubes were shown in Table 1.

1- Hydrosalpinx

Hydrosalpinx was found in 5 cases (1.47%) either unilaterally or bilaterally. Macroscopically, the Fallopian tubes with hydrosalpinx appeared fluctuated with semitransparent thin wall and were distended with a clear fluid (Fig. 3). Microscopically, primary and secondary folds were either absent or present as low folds.

2- Oviductal mucosal cysts

Mucosal cysts of Fallopian tubes were noticed microscopically in one case (0.29%) as large circular cysts lined with low cuboidal epithelium.

Table 1: Pathological findings in ovaries and Fallopian tubes:

Affections	Percentages of cases	
	Total animals (340)	Total cases with affection
I- Ovarian affections:	60 (17.64%)	60 (100.00%)
1- Ovarian cysts		
a- Non-luteinized follicular cysts	8 (2.35%)	8 (13.33%)
b- Luteinized follicular cysts	9 (2.64%)	9 (15.00%)
c- Persistent corpora lutea	18 (25.29%)	18 (30%)
d- Paraovarian cysts	11 (3.24%)	11 (18.33%)
2- Ovarian aplasia	1 (0.29%)	1 (1.67%)
3- Oophoritis	1 (0.29%)	1 (1.67%)
4- Teratoma	2 (0.58%)	2 (3.33%)
5- Fibroma	1 (0.29%)	1 (1.67%)
6- Ovarian adhesions		
a- Ovariobursal adhesions	3 (0.88%)	1 (1.67%)
b- Attachment to broad ligament	1 (0.29%)	3 (5.00%)
7- Bursal cysts	2 (0.58%)	2 (3.33%)
II- Fallopian tubes affections	6 (1.76%)	6 (100.00%)
1- Hydrosalpinx	5 (1.47%)	5 (83.33%)
2- Oviductal mucosal cysts	1 (0.29%)	1 (16.67%)

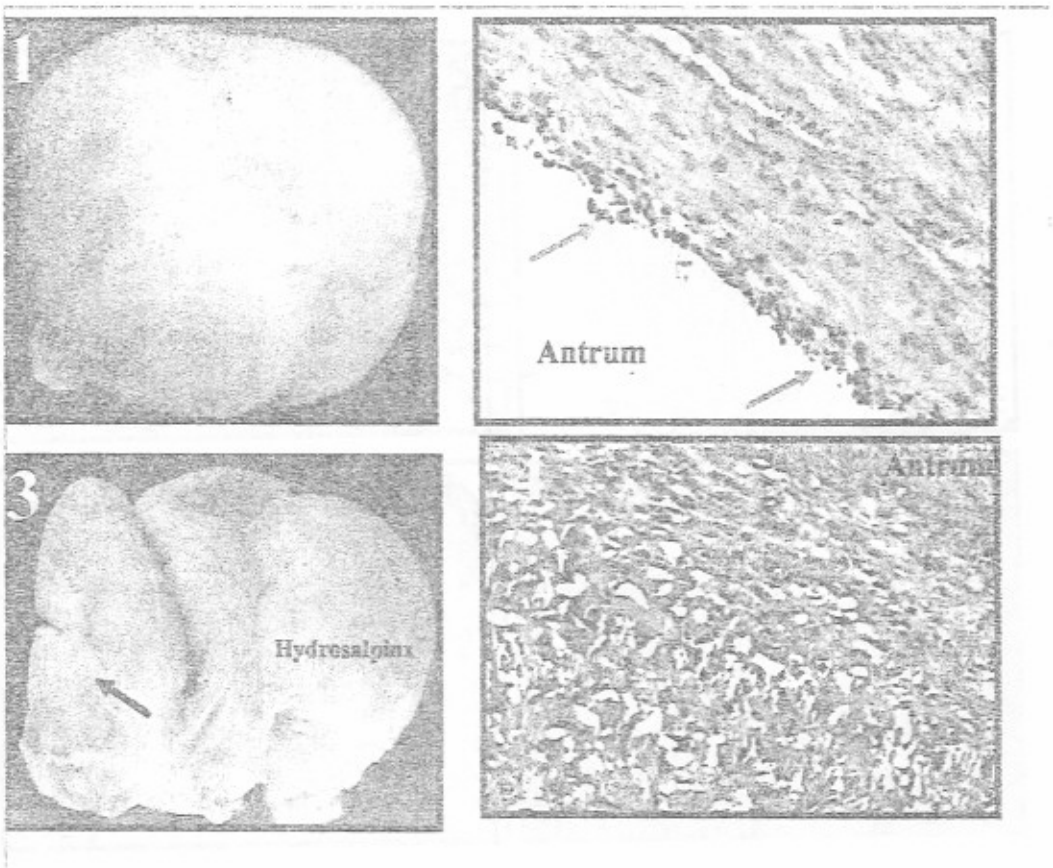

Fig. 1: Ovary has one large semitransparent non-luteinized follicular cyst of 7 cm in diameter. Outer view revealed that the cyst consisted of well vascularized 4 chambers.

Fig. 2: Ovary showing non-luteinized follicular cyst with degenerated granulosa cells (arrows) and thick fibrous theca layers. (H&E, X100).

Fig. 3: Left ovary encapsulated (arrow) inside the bursal cyst (8 cm in diameter). Right side showed hydrosalpinx about 12 cm in diameter with uterine adhesion.

Fig. 4: Ovary showing lutenized follicular cyst with marked vacuolization of granulosa cells. (H&E, X100).

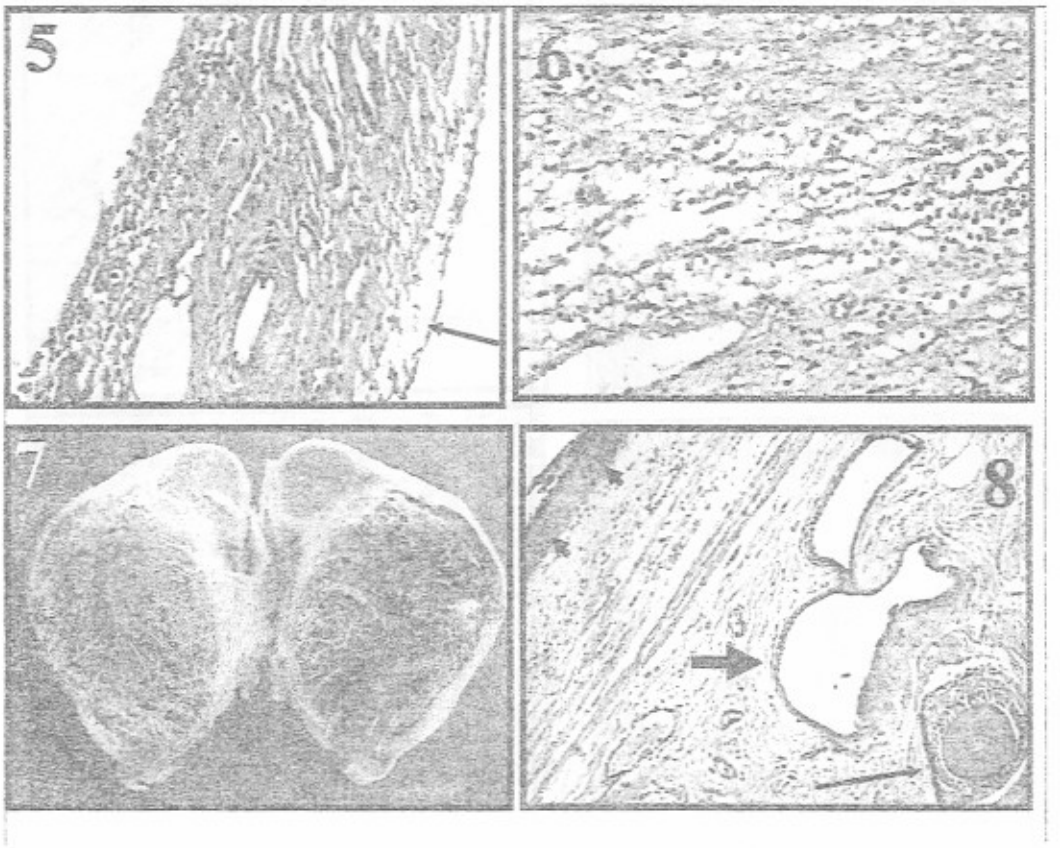

Fig. 5: Aplastic ovary represented by a band of fibrous connective tissue containing many dilated blood vessels and covered by flat epithelium (arrow). (H&E, X100).

Fig. 6: Ovary showing focal areas of lymphocytic infiltration and oedema in the connective tissue stroma alongside many dilated lymphatics. (H&E, X100).

Fig. 7: Ovarian teratoma of cystic type (6.5 X 4 cm) containing hair and brownish jelly-like fluid.

Fig. 8: Ovarian teratoma showing epidermis of stratified squamous epithelium (arrow heads) and dermis containing hair follicle (thin arrow) and sweat glands (thick arrow). (H&E, X40).

DISCUSSION

Incidence and distribution of reproductive abnormalities may impair or inhibit normal reproductive performance and considered as one of the major factors causing infertility. The non-luteinized follicular cysts in this study was 8 cases (2.35%). Acland (2001) attributed that condition to either failure of the release or insufficient quantity of luteinizing hormone (LH) during oestrous due to lesion in hypothalamus or pituitary gland, which leads to failure of the release of gonadotrophin-releasing hormone. In cattle, many factors were found to contribute or predispose to the development of the cystic condition such as genetic factors, exogenous injection of steroids and other hormones which interfere with normal release of LH and feeding of Alfa Alfa hay in large amount with high estrogenic content (Al Dahash and David, 1977). Jones *et al.* (1997) noticed that the non-luteinized follicular cyst can be induced by cortisol administration which suggested that the stress confinement may contribute to the lack of LH surge. Moreover, Kruif (2003) stated that postpartum uterine infection causes cystic ovary in cows and it has been proposed that bacterial endotoxins lead to endometrial damage and prostaglandin's elevation that stimulate secretion of cortisol from the adrenal gland which in turn suppresses the pre-ovulatory release of LH resulting in development of such cysts. On the other hand, Peter (2004) stated that ovarian follicular cysts were a major reproductive problem in lactating dairy cows and the primary physiological defect leading to formation of ovarian follicular cysts was a failure of hypothalamus to trigger the preovulatory surge of LH in response to estradiol. Additionally, Lawson *et al.* (2004) reported that there were moderate positive relationships between milk production efficiency and retained placenta, induction of estrous, uterine infections, ovarian cysts, and induction of birth.

The luteinized follicular cysts were found in 9 cases (2.64%). Al Dahash and David (1977) speculated that luteinized follicular cysts developed from the most mature follicles which have well developed theca cells sufficient to become luteinized. Furthermore, Jones *et al.* (1997) said that the pathogenesis of luteinized cysts is believed to involve either an insufficient LH surge to cause ovulation or possibly immaturity of the follicle at normal LH surge leading to failure of ovulation. Arthur *et al.* (1982) claimed that the lutein tissue usually results in cessation of cyclic activity, while Peter (2004) stated that the animals with luteinized cysts may tend to be in anoestrum as the higher

amount of progesterone secreted by this luteinized structure may change the pattern of gonadotrophins' secretion.

Persistent corpora lutea were reported in 18 cases in this study (5.29%). Arthur *et al.* (1982) stated that persistent corpora lutea in cattle occurred due to interference with the production of luteolysin ($PGF_2\alpha$).

In this study, paraovarian cysts were reported in 11 cases (3.23%). McEntee (1990) mentioned that they are suspected to arise from persistent embryonal structures. Alam (1984) stated that the paraovarian cysts do not interfere with reproductive performance until compression of the lumen occurs.

Ovarian aplasia was observed in one case in this study (0.29%). Acland (2001) claimed that ovarian aplasia had been associated with cytogenetic abnormalities such as XXX chromosomes in mares and cows.

Oophoritis was detected unilaterally in one case (0.29%). Jones *et al.* (1997) mentioned that oophoritis may be due to direct extension or haematogenous infection.

Benign teratomas of a dermoid cystic type were observed in 2 cases (0.58%) with similar histological structure to that described by McEntee (1990).

Ovariobursal adhesions were recorded in 3 cases (0.88%). Aggag (1986) recorded higher percentages of ovariobursal adhesions in buffaloes and cattle, while El Wishy *et al.* (1988) reported a similar incidence of ovariobursal adhesions (0.9%) in buffaloes. Ovarian trauma may result in such adhesions (McEntee, 1990).

Hydrosalpinx was noticed in 5 cases (1.47%). Hydrosalpinx often follows chronic salpingitis (Miller and Campbell, 1978) and may also occur as a congenital abnormality (McEntee, 1990).

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