

## A Study of Congenital abnormalities of the Non-Pregnant genitalia in cows: 1. Ovaries and uterine tubes

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### Abstract

The current study was conducted to detect the pathological conditions of the congenital abnormalities of ovaries and uterine tubes of cows slaughtered at the abattoir in Sulaimani, Kurdistan Region-Iraq. The pathological conditions were subjected to a macroscopic and microscopic examination of 404 samples of female genitalia collected from slaughtered non-pregnant cows, during the period from February to September 2014 from the Qaragol slaughterhouse twice a week. The organs were observed macroscopically for pathological abnormalities and stained tissues with Haematoxylin and eosin. They were examined under microscope for determination of the type of lesion present in the organ. Among the 404 genitalia samples collected from the non-pregnant animals, 206 (51%) were found without gross pathological abnormalities and (with cyclic activity) and the 30 (7.43%) samples were found with gross congenital abnormalities of ovaries and uterine tubes. Detected lesions in the ovaries and uterine tubes included paraovarian cysts 3.21%, ovarian hypoplasia 1.98%, ovarian agenesis 0.50%, aplasia of uterine tube 0.99%, segmental aplasia of uterine tube 0.50% and accessory of uterine tube 0.25%. The histopathological sections of paraovarian cyst showed a single layer of tubal-type ciliated cuboidal epithelial cells resting on a thin layer of fibrous tissue, the section of ovarian hypoplasia showed lack of ovarian follicles and oocytes, which instead are replaced by bands fibrovascular stroma. The partial duplication of uterine tube was observed, which was about 6 cm from the uterotubal junction and extended distally for a distance of 4 cm that was found in right side of tracts. It was concluded that the paraovarian cysts were the most common congenital abnormalities of ovaries and uterine tubes in non-pregnant cows.

Keywords: Pathology, Congenital Malformation, Ovaries, Uterine tubes, non-pregnant cows

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دراسة عن التشوهات الخلقية في الجهاز التناسلي غير الحامل للأبقار 1. المبايض والأنابيب الرحمية

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### الخلاصة

اجريت الدراسة لمعرفة حالات التشوهات الخلقية في المبايض والانابيب الرحمية في الابقار المذبوحة في مجزرة السليمانية، إقليم كردستان العراق. تعرضت الحالات المرضية للفحص العياني والمجهري والبالغة 404 عينة للجهاز الأنثوي غير الحامل للأبقار للفترة من شباط الى ايلول 2014. من مجزرة الكراول مرتين في الأسبوع. خضعت العينات للفحص المجهري والحالات المرضية وخضعت العينات النسيجية بصبغة الهيموتوكسلين - ايوسين. لم يلاحظ وجود تشوهات خلقية في 206 عينة وبنسبة 51% من مجموع 404 عينة تم جمعها لوحظ وجود 30 عينة فيها تشوهات خلقية 7.43% عانية في المبايض والانابيب الرحمية والتي تشمل كيس جنيب المبيض 3.21%، نقص نتسج المبايض 1.98%، انعدام المبيض 0.5%، انعدام الانبوب الرحمي 0.99%، انعدام قطعة من الانبوب الرحمي

0.5% وملحقات الأنبوب الرحمي 0.25%. لوحظ وجود فرق معنوي بين حالات التشوهات الخلقية. أظهر التقطيع النسيجي لكيس جنيب المبيض وجود طبقة مفردة من الخلايا الطلائية العمودية المهذبة على الطبقة رقيقة من النسيج الليفى. كما أظهر التقطيع النسيجي لنقص تتسج المبايض انعدام وجود الجريبات المبيضية والبيوض والتي استبدلت بوجود احزمة من النسيج الليفى الوعائى. كما لوحظ ازدواج جزئي للأنايبب الرحمية والتي تمتد بمسافة 6 سم من الاتصال الرحمي الانبوبي والذي يمتد بمسافة 4 سم في الجانب الأيمن من الجهاز التناسلي. وقد استنتج من الدراسة ان التكيس جنب المبيض من اكثر التشوهات شيوعا في المبايض والأنايبب الرحمية في الأبقار. الكلمات المفتاحية: علم الأمراض التشوهات الخلقية، المبايض، الأنايبب الرحمية، أبقار غير الحامل.

## Introduction

Farm animals are one of the fundamental pillars of the economy of Kurdistan region in general, and cows in particular as an economical unit from which people of Kurdistan get great benefit. Thus reproductive problem among cows have economic consideration(1). The basis for a successful cattle-breeding program is the efficient functioning of the entire reproductive system (2). Abattoir surveys of cows genitalia in various parts of the world provide useful information on the types and incidence or prevalence of the congenital abnormalities (3, 4). According to (5) associated with a lack of functional structures related to the sexual cycles on the ovaries leading to true anoestrus that associated with congenital malformation of ovaries. Abnormalities of uterine tubes of cows limit the transfer of male and female gametes may result in sterility or infertility. The gross abnormalities of the uterine tube like occlusion, aplasia and other micro-lesion which are not palpable per rectum and could be responsible for reproduction failure in farm animals, and these tubular abnormalities may show repeat breeding of known or obscure etiology which requires confirmed by patency testing (6). The present study was conducted to determine the microscopic and macroscopic lesions of congenital abnormalities of ovaries and uterine tubes in non-pregnant cows slaughtered at the abattoir of Sulaimani province, Kurdistan region Iraq.

## Materials and Methods

The study was conducted on 404 samples of non-pregnant cow's genitalia which were collected twice per a week from a new slaughterhouse in "Qaragol" district in Sulaimani province. The data collection was carried out from February to September 2014. These samples were collected randomly from local breeds, the age of the animals was from 2-5 years and no information regarding the identity and history of the animals were included in this study. The samples were transported in a cool box to the laboratory of Veterinary Teaching Hospital at the College of Veterinary Medicine in the University of Sulaimani within three hours of the collection for gross pathological examination. The pregnant genitalia were excluded and all non-pregnant genitalia were examined visually for gross morphological or pathological abnormalities. Each ovary and uterine tubes of non-pregnant genitalia was carefully examined for the presence of different types of gross congenital malformation of ovaries and uterine tubes. The histopathological samples were taken into 10% natural buffer formalin. the sample were cut 3-4 micron with microtome the slides were stained with hematoxillin-eosin and examined under the light microscope. Statistical analysis were done using Chi-square(7).

## Results

There was a significant difference between different anomalies ( $P>0.05$ ). Non-pregnant genitalia from cows were examined; it was 206 (51%) genitalia without gross pathological abnormalities (with cyclic activity) while 30 (7.43%) were found non-pregnant with gross congenital abnormalities of ovaries and uterine tubes. The different types of congenital abnormalities of ovaries and uterine tubes in non-pregnant cows presented in Table (1).

**Table (1) Congenital abnormalities of ovaries and uterine tube in cow's genitalia in the Sulaimani province.**

Congenital abnormalities	R-side No	L-side No	Both side No.	Total No.	Percentage% n= 404
Paraovarian cyst	7	6		13	*3.21%
Ovarian agenesis		2		2	0.50%
Ovarian Hypoplasia	3	5		8	*1.98%
Aplasia of the uterine tube	1	3		4	*0.99%
Segmental aplasia of the uterine tube	1	1		2	0.50%
Accessory uterine tube (Duplication) uterine tube	1			1	0.25%
Total	13	17		30	7.43%

There was a significant difference between different values ( $P>0.05$ )



Fig. (1) Single para-ovarian paramesonephric cyst side in the right side, attached to the mesosalpinx.

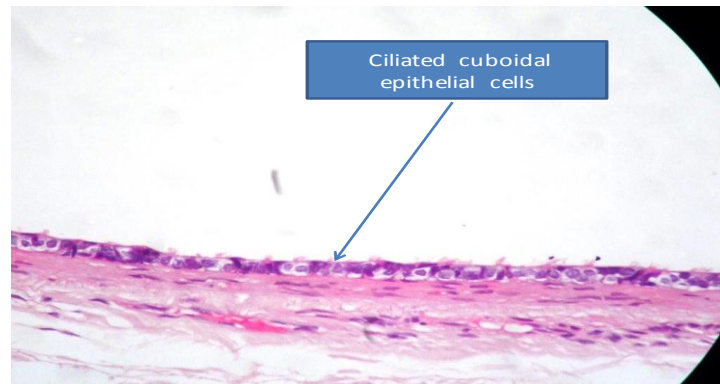


Fig. (2) Paraovarian paramesonephric cyst, the section shows a single layer of tubal-type ciliated cuboidal epithelial cells resting on a thin layer of fibrous tissue (H&E, 400X).



Fig. (3) Ovarian agenesis



Fig. (4) Showing the total ovarian hypoplasia in left side small, smooth surface and lack of ovarian follicles.

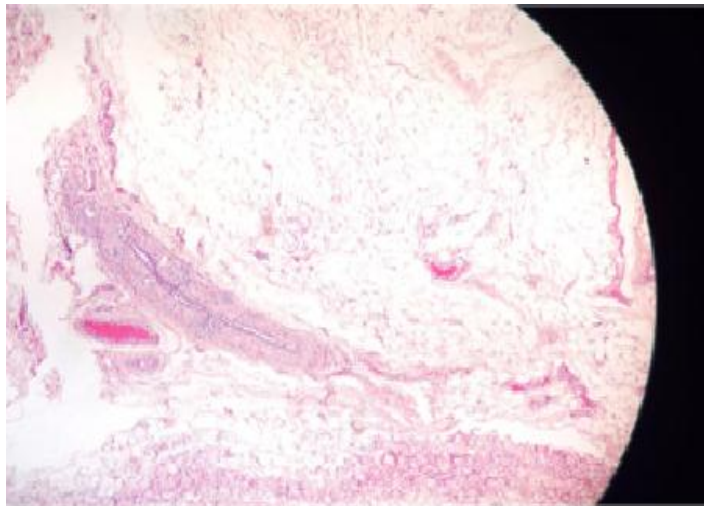


Fig. (5) Ovarian hypoplasia, the section shows lack of ovarian follicles and oocytes, which instead are replaced by bands of fibro vascular stroma. There are, however, few primoridal follicles (H&E,100X).

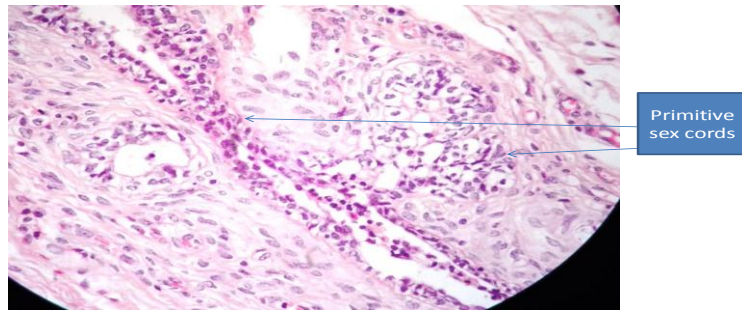


Fig. (6) Ovarian hypoplasia. The section shows few inactive primordial ovarian follicles and related sex cords, which indicate arrest of embryologic development of the ovary (H&E, 400X)



Fig. (7) Uterus unicornus and aplasia of uterine tubes



Fig. (8) Segmental aplasia in the ampulla of the right side of the uterine tube

## Discussion

The present abattoir study has provided useful information on the types and prevalence of gross congenital abnormalities of ovaries and uterine tubes of cows in Sulaimani region. Cows 30 genitalia 7.43% showed one or more congenital abnormalities in table (1) and lesions appear vary from country to country, from population of animal to another, from year to year and from breed to breed (8, 9). Paraovarian cysts in the present study reached 3.22% from the total reproductive tracts, and the percentage is higher than the results reported by (3, 4, 8, 10, 11) which were (0.26, 2, 0.72, 1.81, 0.5)% respectively and lower than that reported by (12) which was 15.4%. In Iraq, this rate is higher than the value of (13) which were 1.8%, 2.29% respectively and lower than the rate of (14, 15) which were 10.04%, 4.4% respectively. This result is in agreement with (16) which is observed on mesovarian and mesosalpinx. They are grossly as visible as translucent vesicles on the broad ligament and 2mm to 5mm as in Fig. (1). Their presence is very seldom of pathological consequence unless they impinge on the uterine tube. All paraovarian cysts are benign, which have no negative effects on reproduction and fertility (17, 18). It is one of the congenital anomalies correlated to mesosalpinx and does not interfere or affect the uterine tube (17). On histopathological examination of paraovarian cysts in this study agreed with (8), who showed a single layer of tubal-type ciliated cuboidal epithelial cells resting on a thin layer of fibrous tissue as in Fig. (2). Ovarian agenesis can affect one or both ovaries as in Fig. (3) and the associated tubular genitalia may be absent or underdeveloped (17). The percentage observed in present study is 0.50%, which is associated with uterus unicornuas of the genital tract, while (19) reported three cases accompanied by an infantile genital tract and an absence of cyclical behavior. However there is no report in a recent study. Ovarian hypoplasia is recorded as 1.98% in the present study as in Fig. (4). This value is higher than the finding of (9) who reported 0.11% while lower than that findings of (11, 12, 18) who are (2.20, 4.6 and 21.6)% respectively. This variation in ovarian hypoplasia might be due to hereditary and other environmental factors such as body condition and the percentage of gonadal hypoplasia can be reduced by using only animals (both male and female) with normal developed sexual organs as breeding stock (9, 20). According to (21) the total ovarian hypoplasia accompanied by small, smooth surface and lack of ovarian follicle, and (22) described the common manifestations of cows with hypoplastic ovaries are failure of estrous cycles and poorly developed secondary sex characteristics. Histopathologically in present study showed few inactive primordial ovarian follicles and related sex cords, which indicate arrest of embryologic development of the ovary as in Fig. (5, 6) that is in agreement with (23) that the number of primordial follicles varied considerably from one area of the cortex to another in normal ovaries. Aplasia of the uterine tube, in this study is revealed as 0.99% and in three cases it was unilateral as in Fig. (7), represented by uterus unicornuas which was associated with incomplete development of the genital tract of cow's genitalia, this value in present study was nearly in agreement with the value of (24) which was 0.1%. (25) reported a case of ovarian and tubal agenesis in a calf, while in present study the aplasia of uterine tube is associated with cases of ovarian agenesis which are associated with uterus unicornuas of cows' genitalia. In this study, segmental aplasia of the uterine tube reaches 0.50% which were identified unilaterally as in Fig. (8). This percentage is higher than the finding. (24) which was 0.05%, the tube had blind sac near the ampulla region, while Tanabe and et al. (26) recorded two cases of congenital malformation of uterine tubes in heifers that they had a total absence of both infundibulum.

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