Gross and Histopathological Study of the Genitalia in Goats: 1. Ovaries

Keywords: Ovaries; Goats genitalia; Abnormalities; Ovarian tuberculosis

Abstract
Among the 340 samples collected from the pregnant and nonpregnant animals, 126 (37.058%) were pregnant, 127 (37.35%) were found without gross pathological abnormalities, and the remaining 43 (21.64%) samples were found with gross and pathological abnormalities of ovaries. The present study is achieved to find out the gross and pathological lesions in ovaries of goats. The ovarian lesions were 72 (21.176%) abnormalities in 340 specimens recorded, the most common lesions were ovaro-bursal adhesion 28 cases (26; 7.647% mild and 2; 0.588% severe), para-ovarian cysts (22; 6.470%), follicular cystic ovary (7; 2.058%). Histopathologically, the follicular cysts characterized by the presence of a large empty cyst in the ovarian stroma surrounded by proliferating theca cells layer, and marked proliferation of granulosa cells layer. Cystic corpus luteum was (5; 1.470%), luteal cystic ovary (4; 1.175%). Microscopically, the cysts were lined by a fibrous layer surrounded by a tutioned theca cells layer. Other rare pathological conditions of the ovaries were an ovarian hematoma 4 (1.176%), ovarian tuberculosis, 1 (0.294%). Histopathologically, ovarian tuberculosis is characterized by typical granulomatous tubercle presence in the ovarian stroma characterized by pinkish caseous necrosis in the center surrounded with thick purple granuloma. Ovarian Cysticercus cellulosae was (10; 29.4%). It can be concluded that ovarian abnormalities constitute a percentage (21.176%), and ovarian tuberculosis was firstly recorded in Iraq and Kurdistan region.

Introduction
The Kurdish goat is a multipurpose animal provide an enormous range of products including meat, milk, skin for leather making and cashmere and mohair fibers production [1,2]. Reproduction of the goat is the immediate importance to the goat keepers because it has a high fertility rate and produces much youngs in a year [3,4]. Thus, abnormalities of goat reproductive organs have a significant effect on its fertility [5]. Reproduction in goats defined as seasonal, various factors affecting the seasonality include latitude, climate, breed, physiological stage, presence of male, breeding system, and specifically photo period [6]. In general, the breeding season starts in autumn and ends in winter, with anoestrus in spring/summer [7].

In Kurdistan, very few works have been done on this effect. Although gross lesions of the female genital tracts make the fertility be reduced in the goats to varying degree, and tiny information is known about incidence and nature of the abnormalities in Sulaimani region [4].

The gross and pathological abnormalities of reproductive organs have been surveyed and reviewed by various authors [8,9].

Macroscopic abnormalities in pregnant and non-pregnant Iraqi goats were 14.69% [5]. At Sulaimani abattoir, the incidence of gross abnormalities in non-pregnant genitalia was 16% while in the pregnant genitalia macroscopic abnormalities were 9.42% [10]. Alwan and Amin observed that the ovarobursal adhesion is the most common condition, which is about 5.66% of the ovarian lesions in Sulaimani Region. In the Iraqi goats, the most common ovarian abnormality seen in abattoir was a para-ovarian cyst 3.95% [5]. The incidence of a follicular cyst in Pakistan was 0.24% [11], in Uganda 3.8% [12], in Kurdistan the percentage is 4%, recorded by [4]. Incidence of luteal cyst was 0.17% [12], while in Kurdistan was 2% in non-pregnant goats [4].

The present study was conducted to determine the microscopic and macroscopic lesions of ovarian abnormalities in goats slaughtered at the abattoir of Sulaimani province - Kurdistan Region of Iraq.

Materials and Methods
The study was conducted on 340 samples of goats’ genitalia which were collected on three days per week from the Slaughter house that located in “Qaragol” district in Sulaimani province. Samples were collected during the period of the beginning of September 2014 to the June 2015. No information regarding the identity and history of the animals included in this study were published.

Figure 1: A photograph represents ovaro-bursal adhesion: (A) Mild unilateral, (B) Severe unilateral, and (C) Severe bilateral.
obtained. The genitalia were separated immediately after evisceration at the slaughter house. The broad ligaments, the loose connective tissues, and the fat surrounding the vulva and retroperitoneal part of the vagina and other genitalia were removed as far as possible to clear the reproductive organs for a better examination. The flexures of the uterine tubes were straightened out by freeing them from the mesosalpinx. The samples were being placed in plastic bags and transported to the laboratory of Veterinary Teaching Hospital of the College of Veterinary Medicine at the University of Sulaimani.

The ovaries were the first part of the genitalia to be examined. Each ovary of the non-pregnant genitalia was carefully observed. Externally and internally for the presence of different types of gross pathological abnormalities like tumors, cysts (follicular, luteal and para ovarian cyst), inflammatory conditions, congestion, and other visible changes. Ovaries with cysts greater than 1 cm in diameter were considered pathological cyst, based on the appearance of the cysts, were classified into follicular and luteinized cysts. Follicular cysts were thinner than luteal cysts, and thin-walled while luteinized cysts were presented as thick wall cysts. Ovarian bursa examined for adhesions; adhesions ranged from a fine strand of connective tissues between the ovarian bursa and the ovary ovaro-bursal adhesion to severe adhesions, were completely embedded in fibrous tissues. Then the data were recorded in percentage as well as photographed. A tissue sample from the affected ovaries (section of approximately one cubic centimetre) is being fixed in a plastic container that contains 10% buffered formalin for histopathological examination.

### Results

The genitalia from 340 goats were examined. 126 (37.05%) were pregnant. 127 (37.35%) genitalia without gross pathological abnormalities in Table 1.

### Discussion

The present study describes most of the lesions that occurred in the ovaries of goats slaughtered in Sulaimani slaughterhouse (Table 1).

The total percentage of ovarian abnormalities 72 (21.17%) from 43 genitalia, this result was higher than that recorded by other workers [11,13-15] with the incidence of 6.07%, 5.21%, 11.8%, and 10.4%, respectively. The significant differences in the incidence of obvious abnormalities found in the various areas, and might be due to differences in breed, species, and age [5]. While a high number of genital lesions in goats, especially in Iraqi Kurdistan region, probably is due to many factors that include: poor housing,

### Table 1: Gross pathological abnormalities of the ovaries in goats’ genitalia in the Sulaimaniabattoir.

<table>
<thead>
<tr>
<th>Pathological abnormalities</th>
<th>Right side No.</th>
<th>Left side No.</th>
<th>Both sides No.</th>
<th>Total No.</th>
<th>Percent N=72</th>
<th>Percent N=43</th>
<th>Percent N=340</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ovaro-Bursal adhesion a: Mild</td>
<td>7</td>
<td>12</td>
<td>7</td>
<td>26</td>
<td>36.111</td>
<td>60.465</td>
<td>70647</td>
</tr>
<tr>
<td>b: Severe</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2.777</td>
<td>4.651</td>
<td>0.588</td>
</tr>
<tr>
<td>2 Para-ovarian cyst</td>
<td>5</td>
<td>12</td>
<td>5</td>
<td>22</td>
<td>30.555</td>
<td>51.162</td>
<td>6.470</td>
</tr>
<tr>
<td>3 Follicular cystic ovary</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>7</td>
<td>9.722</td>
<td>16.279</td>
<td>2.058</td>
</tr>
<tr>
<td>4 Cystic corpus luteum</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>5</td>
<td>6.944</td>
<td>11.627</td>
<td>1.470</td>
</tr>
<tr>
<td>5 Luteal cystic ovary</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>5.555</td>
<td>9.302</td>
<td>1.176</td>
</tr>
<tr>
<td>6 Ovarian hematoma</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>5.555</td>
<td>9.302</td>
<td>1.176</td>
</tr>
<tr>
<td>7 Ovarian tuberculosis</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1.388</td>
<td>2.325</td>
<td>0.294</td>
</tr>
<tr>
<td>8 Cysticercus tenuicollis</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1.388</td>
<td>2.325</td>
<td>0.294</td>
</tr>
</tbody>
</table>

### Figure 2: A photograph illustrates para-ovarian cyst: (A) Unilateral, and (B) Bilateral.

### Figure 3: Photomicrograph of the broad ligament. The red arrows reveal an empty para-ovarian cyst embedded within a loose connective tissue of broad ligament. Black arrows show muscle bundle. The cyst surrounded by a fibromuscular thick wall lined by simple epithelium (yellow arrows). H&E. Scale bar: 500 µm.
inadequate knowledge of the owner’s, bad managements, insufficient nutrition level, and increased contamination [4,10].

The total incidence of ovaro-bursal adhesion (Figure 1) was 8.235% of which mild ovaro-bursal adhesion was 7.647%. Severe ovaro-bursal adhesion was 0.588% that found in non-pregnant goats (Table 1), both cases of severe ovaro-bursal adhesion were bilateral and completely enveloped the ovary. This result is higher than that reported by [5,11,16] which were 2.99%, 2.47% and 1.96%, respectively. While lower than the results recorded by Amin, Alwan and Kumar, they recorded 4%, and 7%, subsequently [4,10,15]. Histologically, cystic Graffian follicles characterized by a large fluid-filled cyst in the ovarian stroma and surrounded by a thick layer of the theca cell layer with the proliferation of granulosa cell layer in the lumen of the cyst (Figure 5). These findings have been described by [12,13].

The total incidence of the luteal cystic ovary was 1.175%. All the cases were unilateral having thick walled and the size of the fibromuscular tissue.

The incidence of cystic ovaries (follicular and luteal cystic) might be attributed to insufficient luteinizing hormone before or at the time of ovulation, age of animals and nutrient deficiency [22]. The effect of uterine infection on ovarian function could be due to the role of endotoxins that are produced by gram-negative bacteria that prevents preovulatory LH surge and ovulation causing persistent ovarian cysts [23]. Follicular cystic ovary (Figure 4) had a prevalence of (2.058%); all of the cases were unilateral. This result was higher than that reported by other workers [11-13] which were 0.24%, 1.88% and 0.08%, respectively. While lower than the results recorded by Amin, Alwan and Kumar, they recorded 4%, and 7%, subsequently [4,10,15]. Histologically, cystic Graffian follicles characterized by a large fluid-filled cyst in the ovarian stroma and surrounded by a thick layer of the theca cell layer with the proliferation of granulosa cell layer in the lumen of the cyst (Figure 5). These findings have been described by [12,13].

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Cystic corpora lutea were observed in 5 (1.470%) cases from the total numbers of genital tracts. All of the cases were unilateral. This observation is higher than the results reported by Ogunbodede et al. who reported 0.77%, and lower than those reported by Sattar and Khan that reported 2.08% and Mohammad that registered 5.44% in cows in Sulaimani [11,26,27] (Figure 8). Microscopically, the cysts have central cavities that surrounded by luteinized cells, and a thin layer of fibrous connective tissues between the luteal cells and the lumen of the cyst (Figure 9) that is in agreement with [13,28].

Hematoma (Figure 10) of the ovary occurs at regular ovulation and in an anovulatory follicle. Four cases of ovarian hematoma were observed in the present study and the percentage was (1.175%). One case (0.5%) of ovarian hematoma was recorded by Fathalla et al. in cows [23]. An ovarian hematoma occurs as results of blood losses surrounded by a layer of luteinized cells (Figure 7). These lesions were similar to that observed by other workers [11,24]. This observation was higher than the results reported by Al-Rawi which was 0.66% and according to Francis who recorded 1.4% [12,25].

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due to rupture of the follicles and may resolve spontaneously with no effect on the fertility (Smith) [29]. Histologically, it characterized by the presence of massive and extensive hemorrhagic blood clots within the ovarian stroma that surrounded by infiltrating inflammatory cells (Figure 11). This finding were agreed with that reported by Fathalla et al. [23].

Tuberculosis in goats caused by the *Mycobacterium bovis*, goats are more susceptible than sheep for the disease [30]. The ovarian tuberculosis was reported in the present study and had a prevalence of (0.294%). In Jordan, this disease also recorded in the ovaries by Fathalla et al. with the incidence of 0.5% in cows [23]. The incidence of bovine tuberculosis in Sulaimani region was 5.1% and 8.9% as reported by and Ali [31,32]. Grossly, both ovaries dotted by some tubercles. The size of each tubercle varies from 1-3 cm (Figure 12). Microscopically, the typical granulomatous tubercle characterized by the presence of typical granulomatous tubercle that is described by the presence of the pinkish center of caseous necrosis interlaced with thick purple granuloma. The granulomatous lesion is surrounded by many epithelioid and Langhans giant cells, together with the proliferation of fibrous connective tissue within the lesion (Figure 13). These lesions agree with that observed by Schmitt et al. in the deer [33]. Tuberculosis disease is of public health and of economic importance throughout the world [34]. The ovarian tuberculosis in goats is the pathological abnormality that has not been reported by Iraqi researchers previously [35].

Ovarian *Cysticercus tenuicolis* cyst was also observed in one (0.294%) case and was attached to the serosa of the right ovary (Figure 14).

References


