ABSTRACT

The objective of the present study was to determine the prevalence of ovarian abnormalities and oviduct abnormalities of Iraqi buffaloes. Buffalo cow reproductive tracts were collected at random intervals slaughtered at Mosul abattoir, from January 2006 to August 2010. A total of 405 of mature primiparous and pluriparous genital tracts were examined. Ovaries were inspected for cross lesions and oviductal lesions were included in this study. Hydrosalpinx and pyosalpinx were diagnosed and evaluated by measurement using ruler and caliper. Salpingitis was classified into chronic, subacute and acute according to histological examination. Out of the 405 buffalo genital tracts examined, various abnormalities with different degrees of severity were observed in 216 (53.3%) of cases. Twenty two (5.4%) were pregnant and the remaining 41.2% (167/405) were macroscopically normal. Follicular cyst, luteal cyst, cystic corpus luteum, paraovarian cyst, ovarian sarcoma, inactive ovaries, senility anestrous, pyosalpinx, hemosalpinx, obstruction of oviduct, salpingitis, double oviduct were recorded. In conclusion, the current study disclosed that, ovarian and oviductal abnormalities seem to be an important problem with possible subsequent infertility and sterility in buffalo cows in Mosul. The high proportions of hydrosalpinx and ovarobursal adhesions are the major problems in buffalo herds in Mosul leading to slaughtered and economic losses.

Keywords: ovarian abnormalities, follicular cyst, luteal cyst, ovarobursal adhesions, oviductal abnormalities, hydrosalpinx, pyosalpinx, buffalo cow

INTRODUCTION

Genital organ disorders are important cause of infertility and sterility in buffalo cows causing high economic losses (Azawi 2006, 2008; Azawi et al. 2008a). The ovaries and oviducts are important for controlling estrous cycle, hormonal production, fertilization and the maintenance of the embryo until its arrival in the uterus. Ovarian pathology and oviductal abnormalities are common diseases in domestic mammals, especially cattle and buffaloes (McEntee 1990; Azawi et al. 2008b). Abnormalities of the buffaloes reproductive organs had been reported in surveys in Iraq (Alwan et al. 2001; Al-Fahad et al. 2004; Azawi et al., 2008c), India (Rao and Sreemannarayana 1983; Sar et al. 1996), Egypt (Ghaneem et al. 2002) and Iran (Moghaddam and Mamoei 2004). The animals presented in all the above surveys did not included detailed pathological causes of certain abnormalities of the ovaries and oviducts. The aim of this study was to
study the prevalence of ovarian abnormalities and oviduct abnormalities of buffaloes.

MATERIALS AND METHODS

Buffalo cow reproductive tracts were collected at random intervals slaughtered at Mosul abattoir, from January 2006 to August 2010. A total of 405 of mature primiparous and pluriparous genital tracts were examined. The specimens were transported to the college of veterinary medicine, university of Mosul. Each specimen was examined grossly in the laboratory in order to exclude any specimen containing reproductive abnormality. Pregnant specimens were discarded. All cases were examined for presence of fetuses. Then the vagina, uterus, uterine tubes and ovaries were visually inspected for cross lesions. The vagina and uterus were opened up to utero-tubal junction and examined. Ovaries were inspected for cross lesions and the number of corpora albicantia (CA) and side of the ovary with corpus luteum (CL) recorded. A pair of ovaries with either a corpus hemorrhagicum (CH), a large CL and > 5 mm follicle (s) in diameter or a regressing CL with follicle (s) > 6 mm in diameter were classified as active and the animals as cycling. When there was no CL or CH or the presence of a regressed CL without > 5 mm in diameter follicle (s), such ovaries were classified as inactive and the animals as noncycling. A regressing CL coupled with an incomplete involuted uterus was classified as post-parturient anestrous. Corpora albicantia replacing the corpora lutea of pregnancy are large and tend to persist indefinitely (Roberts, 1986). They are more prominent in buffaloes, and can therefore be used to estimate the parity of an animal (Jainudeen et al., 1983). An animal with more than 7-10 CA and there was no CL or CH and without > 5 mm diameter follicle (s) was regarded as being in anestrous due to old age or senility. Specimens with oviductal lesions were included in this study. Hydrosalpinx and pyosalpinx were diagnosed and evaluated by measurement using ruler and caliper. Salpingitis was classified into chronic, subacute and acute according to histological examination. The patience of each uterine tube was checked by injecting 5 ml of colored fluid (Indian ink) near the junction of the uterine tube with the corresponding uterine horn. Biopsies (approximately 1 cm³) were obtained from each oviducts affected with hydrosalpinx, pyosalpinx, salpingitis and oviductal obstruction of samples included in this study. The biopsy was immediately placed into bottle containing 10% formal saline solution and stored at 4°C till preparation for sectioning, which was included dehydration, clearing, embedding, sectioning and staining were performed as the methods described by Luna (1968).

RESULTS AND DISCUSSION

Reproductive organs from 405 animals were examined; 5.4% (22/405) of the animals were pregnant, 41.2% (167/405) were cycling. Various abnormalities with different degrees of severity were observed in 216 (53.3%) of cases. The prevalence of the various ovarian and oviductal abnormalities of buffaloes is presented in Table 1.

Ovarian abnormalities

Follicular cysts (Figure 1) are recorded in six (1.5%) cases. The average diameter was 32.8 ± 1.3 mm. Luteal cysts (Figure 2) was diagnosed in one (0.2%) buffalo cow. Cystic corpora lutea were encountered unilaterally in five (1.2%) cases. The
corpora lutea had an average diameter of the cystic cavity in the center of the corpora lutea varied considerably from 6 to 18 mm. Twenty six (6.4%) cases had ovarobursal adhesions (Figure 3 and 4). The severity of ovarobursal adhesions ranged from mild strands of connective tissue between the ovary and the bursa (34.6%) to severe adhesions (65.4%), when the ovary was completely encapsulated in fibrous tissue. Paraovarian cysts were found in 18 (4.4%) of the cases, they were generally single (Figure 5), but double and triplet were also recorded. These cysts were filled with thick mucoid fluid. One ovarian tumor (Figure 6) was examined histologically and was confirmed to be ovarian sarcoma. Out of 405 examined genital tracts, 6 (1.5%) were found to be inactive ovaries. While five (1.2%) were found as senility anestrous.

**Oviductal abnormalities**

Hydrosalpinx (Figure 7 and 8) was found in 20 (4.9%) cases. In these cases dilatation of oviduct due to clear amber fluid accumulation were detected. In eight cases extreme dilatation were observed with the oviduct having maximum diameter of 30 mm. Pyosalpinx (Figure 9) was recorded in nine (2.2%) characterized by dilatation of the oviduct due to thick whitish-yellowish pyogenic fluid. Three cases (0.7%) of oviducts

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Table 1. Prevalence of various kinds of abnormalities in ovaries and oviducts in buffaloes.

<table>
<thead>
<tr>
<th>Ovary</th>
<th>Abnormalities</th>
<th>No.</th>
<th>%</th>
<th>Right</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follicular cyst</td>
<td></td>
<td>6</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luteal cyst</td>
<td></td>
<td>1</td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cystic corpus luteum</td>
<td></td>
<td>5</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paraovarian cyst</td>
<td></td>
<td>18</td>
<td>4.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ovarobursal adhesions</td>
<td></td>
<td>26</td>
<td>6.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ovarian sarcoma</td>
<td></td>
<td>1</td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactive ovary</td>
<td></td>
<td>6</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senility anestrous</td>
<td></td>
<td>5</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td>68</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Oviducts</th>
<th>Abnormalities</th>
<th>No.</th>
<th>%</th>
<th>Right</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrosalpinx</td>
<td></td>
<td>20</td>
<td>4.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pyosalpinx</td>
<td></td>
<td>9</td>
<td>2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemosalpinx</td>
<td></td>
<td>3</td>
<td>0.7</td>
<td></td>
<td></td>
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<tr>
<td>Obstruction</td>
<td></td>
<td>6</td>
<td>1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salpingitis</td>
<td></td>
<td>5</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adhesions-salpingitis</td>
<td></td>
<td>7</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double oviducts</td>
<td></td>
<td>1</td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td>51</td>
<td></td>
</tr>
</tbody>
</table>
filled with bloody discharge were recorded. Obstruction of oviduct was observed in six (1.5%) cases and salpingitis was found in five (1.2%) cases. Adhesions between mesosalpinx and perisalpingeal tissues were observed seven (1.7%). One case (0.2%) of double oviduct (Figure 10) was found in the left side of the tracts examined. Histological examination confirmed the diagnosis of double oviduct. Microscopic examination of the oviducts with hydrosalpinx showed mucosal atrophy and dilatation of oviduct lumen without any signs of inflammation characterized by no infiltration of inflammatory cell (Figure 11). While pyosalpinx showed mucosal atrophy and dilatation of uterine tube lumen with signs of severe inflammation including higher infiltration of lymphocytes and sloughing of the mucosa epithelial layer lining uterine tubes.

The data obtained from this study reflect the high incidence of gross lesions in buffalo ovaries and oviducts. Most of these lesions were acquired as manifested by the high incidence of follicular cyst, luteal cyst, cystic corpus luteum, paraovarian cyst, ovarobursal adhesions, ovarian sarcoma, inactive ovary, senility anestrous hydrosalpinx, pyosalpinx, adhesions and obstruction of the oviduct. The prevalence of ovarian cyst recorded in this study is comparable with those of (Al-Dahash and David, 1977; Hatipoglu et al., 2000; Azawi, 2009) who reported 5.4% and 3.8%, respectively. However, the prevalence in the present study is lower than those of (Assey et al., 1998; Feyissa, 2004), who reported 11% and 11.6%, respectively. Although the exact mechanism by which adhesions develop is unclear (Roberts, 1986), extreme adhesions have probably resulted from pregnancy complications that include retained fetal membranes and endometritis (Hatipoglu et al., 2000). Mild adhesions could result from non-infectious conditions such as physical trauma as a result of rough manipulation (Abalti et al., 2006). Localized abdominal infections such as omphalophlebitis and peritonitis are also suggested cause this condition (Noakes et al., 2002). The adhesions involved the right ovary more than the left but bilateral cases were also observed this study. This is in agreement with the findings of several workers (Herenda, 1987; Fathalla et al., 2000; Hatipoglu et al., 2002; Abalti et al., 2006). This difference may be attributed to the more active of right ovary (Roberts, 1986). Extensive adhesions leading to the obliteration of the ovarian bursa, blockage of the abdominal opening of the infundibulum or extensive coverage of the ovarian surface with fibrous tissue will certainly interfere with ovulation. This in turn may lead to infertility or even sterility depending on extent and on whether the adhesions are unilateral or bilateral.

In the present study, hydrosalpinx and
Figure 1. Follicular cyst in the right ovary.

Figure 2. Luteal cyst in the left ovary.
Figure 3. Complete ovarobursal adhesions in the right ovary.

Figure 4 Bilateral ovarobursal adhesions with a follicular cyst in the left ovary.
Figure 5. Paraovarian cyst near the right oviduct.

Figure 6. Ovarian sarcoma.
Figure 7. Hydrosalpinx in the left oviduct highly enlarged than right oviduct that was also affected with hydrosalpinx with lower enlargement.

Figure 8. Hydrosalpinx in both sides highly enlarged.
Figure 9. Pyosalpinx in both oviducts.

Figure 10. Double oviducts.
pyosalpinx were accompanied with ovarobursal adhesions and chronic endometritis. Results of the present study indicated a high prevalence of hydrosalpinx when compared to the Iraqi southern breeds (Alwan et al., 2001; Al-Fahad et al., 2004). However, this disagreement can be accounted for largely, due to the high prevalence of toxic puerperal metritis and chronic metritis as founded by previous studies (Azawi et al., 2007; Azawi et al., 2008). These two reasons may explain the high prevalence of hydrosalpinx in Iraqi northern buffaloes. The obstruction in the lumen of the oviducts resulted in accumulation of fluid. It is tempting to attach some special significance to the association of endometritis with the occurrence of hydrosalpinx, and to suggest some contributing role in the production of severe inflammation in the endometrium extended to the utero-tubal junction. This theory could be confirmed by the results of the present study as all obstructions of the uterine tubes examined were near the utero-tubal junction or in the end part of isthmus. These observations are in agreement with Miller and Campbell (1978) who claimed that hydrosalpinx is a sequel to salpingitis. In addition, Mastroianni (1999) reported hydrosalpinx as a result of some inflammatory process in or around the uterine tubes. While, Ellington and Schlafer (1993) opinion that is hydrosalpinx may be congenital disease.

In a conclusion, the current study disclosed that, ovarian and oviductal abnormalities seem to be an important problem with possible subsequent infertility and sterility in buffalo cows in Mosul. The high proportions of hydrosalpinx and ovarobursal adhesions are the major problems in buffalo herds in Mosul leading to slaughtered and economic losses.

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Figure 11. Hydrosalpinx, mucosal atrophy and dilatation of oviduct lumen with low infiltration of leukocytes (H&E X 100).


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the swamp buffalo (*Bubalus bubalis*). *Vet Rec.*, **113**: 369-372.


