An Abattoir Study of Genital Pathology in Cows: II. Uterus, Cervix and Vagina

1. Introduction

Genital organ disorders cause economic losses due to infertility or sterility. Many studies were performed on these disorders in many countries in the world [2, 6, 13, 16, 20, 22, 25]. Uterine disorders have been encountered in some studies and researchers [2, 24] reported that the most common lesion in the uterus was inflammatory changes. In abattoir studies in Turkey, metritis, uterine tuberculosis and non-suppurative endometritis were reported by ÇALISKAN [9] and DINÇ and GULER [10]. In some research about genital organ disorders of cows, double cervix, cervical cyst and cervicitis [2, 10, 21, 24], cystic Gartner’s duct and vaginitis [2, 21, 22] have been reported.

The present study was performed to determine incidence and the macroscopic and microscopic features of uterine, cervical and vaginal disorders in cows slaughtered at abattoir in Konya, Turkey. Lesions of ovary and oviduct in these cows had been published in a separate article.
2. Materials and Methods

A) ANIMALS

The material was obtained from an abattoir study in which the genital tracts of 1113 cows and heifers from different breeds (Holstein, Swiss-Brown and native breeds) were examined for female genital tract disorders. Samples were collected between September 1999 to November 2000; pregnant specimens were discharged.

B) EXAMINATION PROCEDURES

The uterus, cervix and vagina were examined after slaughter procedures and gross abnormalities were recorded. The uterus, cervix and vagina of each tract were numbered, put in separate plastic bags and brought to the laboratory as soon as possible in order to minimize autolytic changes. Volume of uterine fluid in hydrometra and mucometra cases were measured. Tissue samples from affected part of genital tracts were fixed in 10 per cent buffered formalin, routinely processed and embedded in paraffin wax. Sections cut at 5 µm thickness were stained with hematoxylin and eosin (H&E), Brown-Brenn, Ziehl-Neelsen, periodic acid Shiff (PAS) and van Gieson methods [17].

3. Results

A) INCIDENCE

During this study, 1113 cows and heifers were examined for reproductive tract disorders and some pathological changes were detected. Examinations revealed that in 36 cases (3.23 %) uterus, in 28 cases (2.51 %) cervix and in 33 cases (2.96 %) vagina had pathological changes. These results are summarised in Table I and II.

B) MACROSCOPIC AND MICROSCOPIC FINDINGS

1. Uterus

Segmental Aplasia: This congenital abnormality was found in 5 cases (0.45%). In one case, although ovaries and oviducts were present on both sides, right uterine horn was congenitally absent (Uterus unicornis). In second case, ovaries and vagina had normal structure, but the lumen of left uterine horn, corpus uteri and cervix was absent. In this case, right uterine horn showed cystic distension due to dark brown blackish colored and creamy content. Hydrosalpinx in the right oviduct were also observed (Figure 1). In the other 3 cases, diagnosed as segmental aplasia, both ovaries were normal but vagina has narrow ductal appearance and become blind sac on the level of cervix. In these cases, corpus uteri was shorter than normal structure with narrow lumen and both uterine horns were become blind sac without connection to the both oviducts.

Hydrometra: In this case, uterus was thin-walled due to accumulation of clear and watery fluid (about 450 ml) in the lumen of the corpus uteri and both uterine horns with stenosis of cervical lumen. These lesions was accompanied by atrophy of caruncles and follicular cyst in the right ovary. On microscopic examination, degeneration and desquamation of lamina epithelialis were seen.

Mucometra: These lesions were found in 4 cases (0.36%). In these cases, accumulation of 300 to 400 ml clear, mucinous fluid were detected in the lumen of corpus and cornu uteri. Mucometra was accompanied with parovarian cyst in one case, and follicular cyst and cystic corpus luteum in another case. Microscopic examination showed oedema in the lamina propria. Endometrial glandular hyperplasia was also seen in the case of mucometra accompanied by follicular cyst.

Endometrial Glandular Hyperplasia: Hyperplasia of endometrial glands was detected in 13 (1.16%) cases. Uterine mucosa has generally oedematous appearance. Microscopic examination revealed oedema glandular hyperplasia associated with by follicular cyst (6 cases), granulosa cell tumor, metaplasia of cervix and chronic vaginitis (1 case), follicular cyst and endometritis (1 case), and follicular cyst and mucometra (1 case).

Endometritis: In this study, inflammatory changes of endometrium was found in 14 cases (1.26%) and classified as: catarrhal endometritis (2 cases), chronic nonpurulent endometritis (3 cases), purulent endometritis (2 cases), necrotic endometritis (6 cases) and tuberculosis (1 case).

In catarrhal endometritis, macroscopically, uterine mucosa was hyperemic and oedematous appearance and the mucosa was covered by viscous and yellowish white colored exudate. Microscopically, along with degeneration and desquamation in the lamina epithelialis, hyperemia, oedema and mononuclear cells infiltrations in the lamina propria, and a few neutrophil granulocytes in the uterine lumen were detected (Figure 2).

Macroscopically, chronic nonpurulent endometritis was characterized by many scattered pin head sized nodules, which were bulged on to the endometrial surface and yellowish brown or grey colored (Figure 3A). Microscopic examination showed degeneration, desquamation and sometimes hyperplasia of lamina epithelialis. Mild increase of connective tissue, lymphocytic-plasmacytic infiltrates and in some cases lymphoid follicle formation were also observed (Figure 3B).

Purulent endometritis were found in 2 cases. In these cases, creamy, yellowish gray colored with smelly pus accumulation were seen in the uterine lumen (Figure 4A). Microscopically, accumulation of desquamated epithelial cells and extensive neutrophil granulocytes were detected in the lumen of uterus and uterine glands. In lamina propria, severe neutrophil granulocyte and a few lymphocytic-plasmacytic infiltrates were observed. In these cases, inflammatory changes were also found in the other parts of genital tract.

In this study, the most common type of endometritis was necrotic endometritis (6 cases). Uterine mucosa was dark green blackish colored, and covered by yellowish green colored viscous pus. Necrotic foci, focal hemorrhage and rem-
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FIGURE 1. — Segmental aplasia. Aplasia of corpus uteri and left uterine horn. Note accumulation of dark brown blackish content in right uterine horn and hydrosalpinx.

FIGURE 2. — Catarrhal endometritis. Desquamated epithelial cells and neutrophil granulocytes in the uterine lumen, and lymphocytic-plasmacytic infiltrates in the propria layer, H&E X 105.


FIGURE 5. — A. Tuberculosis in the uterus and oviduct. Miliary granulomas scattered on the mucosal surface and thickness of oviduct, B. Tuberculous granuloma in the lamina propria, H&E X 30, and acid-fast bacilli (insert), Ziehl-Neelsen X 300.


FIGURE 7. — Squamous metaplasia of cervical epithelium, H&E X 120.

FIGURE 8. — Chronic cervicitis. Heavy lymphocytic-plasmacytic infiltrates in the lamina propria, H&E X 78.
nants of necrotic placenta were also found in the uterine, cervical and vaginal mucosa in two cases (Figure 4B). On microscopic examination, degeneration and extensive necrosis of the mucosal epithelium with necrotic epithelial cells and accumulation of neutrophil granulocytes in the uterine lumen were observed. Coagulative necrotic foci, neutrophil granulocytes and lymphocytic-plasmacytic infiltrates were also seen in the lamina propria. In some cases these lesions were accompanied by necrotic and inflammatory changes of cervix and vagina.

Uterine tuberculosis was diagnosed in one case. In uterine horns, corpus uteri and oviduct, yellowish grey nodules, 2 to 5 mm sized were scattered, bulged on the mucosal surface. Thickness of both oviducts was evident (Figure 5A). Microscopically, granulomas consisted of necrotic centre with mineralisation surrounded by epitheloid cells and Langhan’s type giant cells and zone of mononuclear cells with fibrous capsula were observed in the lamina propria. Degeneration and desquamation in the lamina epithelialis were also seen (Figure 5B). Ziehl-Neelsen stained sections revealed the presence of clumps of acid-fast bacilli around the necrotic centre, in the cytoplasm of macrophage and Langhan’s type giant cells (Figure 5B-insert). In this case, salpingitis tuberculosa was also observed.

Perimetritis: In this case, thickness of uterine, cervical and vaginal serosa with yellowish colored pus accumulation were observed. Vaginal wall had a necrotic and hemorrhagic fistule, and adhesions between vaginal serosa and rectum were observed. Microscopic examination showed thickness of uterine serosa due to increase of fibrous connective tissue and neutrophil granulocytes. In this case, inflammatory changes and adhesions were also found in the other parts of reproductive tract.

Parametritis: In this case, several abscesses with yellowish colored content and hard consistency were found in the ligamentum lata and ligamentum intercornuale. On microscopic examination, remnants of necrotic cells with mineralisation surrounded by mononuclear cells infiltration and thick fibrous capsula were seen.

2. Cervix

In this study, 28 cases (2.51%) cervical disorders were detected in 1113 reproductive tracts. The results are shown in Table II.

Double cervix: This disorder was found in 2 cases. In these cases, two cervical canals with no connection were separately opened into uterus, diagonally (Figure 6A). Microscopically, both cervical canals were seen in normal histologic structure.

Postcervical band: This disorder was detected in 8 cases (0.72%). Bands close to cervical canal with dorsoventral direction were observed. The size of these bands were varied from 0.7 to 4 cm width and 0.2 to 0.8 cm thickness (Figure 6B). When these bands were removed, one cervical canal was seen. Microscopic examination showed both surfaces of band lined by squamous epithelium, like as vaginal mucosa, and van Gieson stained sections revealed the presence of dense collagen fibers and a few smooth muscle fibers. In one case, glands formation were also seen in the propria layer.

Cervical cyst: In this case, a cyst containing clear fluid with 5x4.5x4 cm at dimensions were found in cervical serosa. Microscopic examination revealed cervical cystic cavity lined by one layer cuboidal or sometimes columnar epithelium.

Metaplasia: No macroscopic changes were observed about this disorders in the cervix. But, the microscopic examinations revealed focal squamous metaplasia (Figure 7) associated with granulosa cell tumor and catarrhal endometritis in two cases.

Gland formations: Microscopic examination showed gland formation in the propria of cervix in 3 cases. No macroscopic findings were seen about this lesion. Gland formation was accompanied by cystic corpora lutea (one case), dorsoventral postcervical band (one case) and purulent endometritis - chronic cervicitis and vaginitis (one case).

Cervicitis: This lesion was observed in 15 cases. Grossly, there were hyperemia, yellowish green colored exudat and smelly pus on the uterine, cervical and vaginal mucosa. In 3
cases, yellowish colored foci ranged from 3 to 5 mm sized were observed on the cervical mucosa. There were remnants of necrotic placenta on mucosal surface in 2 cases (Figure 4B). Although in 5 cases no macroscopic change was found, cervicitis was diagnosed by microscopic examination.

Histopathologically, cervicitis was classified as acut cervicitis (3 cases), purulent cervicitis (2 cases), necrotic cervicitis (4 cases) and chronic cervicitis (6 cases). Acute cervicitis was characterized by degeneration and desquamation of the mucosal epithelium, neutrophil granulocytes and a few lymphocytic-plasmacytic infiltrates. In purulent cervicitis the lumen of cervix was filled with extensive neutrophil accumulations and desquamated epithelial cells. Severe neutrophil accumulation and a few lymphocytic-plasmacytic infiltrates were also observed in the lamina propria. In some cases, diagnosed as necrotic cervicitis, extensive necrosis of mucosal epithelium and accumulation of neutrophil granulocytes with desquamative epithelial cells were evident. In the lamina propria, focal necrosis and hemorrhagia with neutrophil granulocyte and lymphocytic-plasmacytic infiltrates were also seen. Chronic cervicitis characterised by degeneration and desquamation of the lamina epithelialis, heavy infiltration of mononuclear cells and increase of connective tissue in the lamina propria (Figure 8). Chronic cervicitis was accompanied by metaplasia of mucosal epithelium and lymphoid follicle formation (one case) and gland formation (one case) in the lamina propria.

3. Vagina

Vaginal disorders were observed in 33 cases (2.96 %) out of 1113 reproductive tracts. The result are shown in Table II.

**Cystic Gartner’s Duct:** These cystic structures were found in the ventral wall of vagina, between orificium urethra...

<table>
<thead>
<tr>
<th>Lesions</th>
<th>Number of cases (n)</th>
<th>Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segmental aplasia</td>
<td>5</td>
<td>0.45</td>
</tr>
<tr>
<td>Hydrometra</td>
<td>1</td>
<td>0.09</td>
</tr>
<tr>
<td>Mucometra</td>
<td>4</td>
<td>0.36</td>
</tr>
<tr>
<td>Glandular hyperplasia</td>
<td>13</td>
<td>1.16</td>
</tr>
<tr>
<td>Endometritis</td>
<td>14</td>
<td>1.26</td>
</tr>
<tr>
<td>Catarhal endometritis</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Chronic nonpurulent endometritis</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Purulent endometritis</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Necrotic endometritis</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Perimetritis</td>
<td>1</td>
<td>0.09</td>
</tr>
<tr>
<td>Parametritis</td>
<td>1</td>
<td>0.09</td>
</tr>
<tr>
<td><strong>TOTAL.</strong></td>
<td><strong>39</strong></td>
<td><strong>3.50</strong></td>
</tr>
</tbody>
</table>

*: Incidence and total number increased because more than one lesion occurred in some cases.

**Table I. — Pathological findings and incidence of the uterine disorders in 1113 cows.**

<table>
<thead>
<tr>
<th>Lesions</th>
<th>Number of cases(n)</th>
<th>Incidence(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cervical Disorders</strong></td>
<td><strong>31</strong></td>
<td><strong>2.79</strong></td>
</tr>
<tr>
<td>Double Cervix</td>
<td>2</td>
<td>0.18</td>
</tr>
<tr>
<td>Postcervical Band</td>
<td>8</td>
<td>0.72</td>
</tr>
<tr>
<td>Cervical Cyst</td>
<td>1</td>
<td>0.09</td>
</tr>
<tr>
<td>Metaplasia</td>
<td>2</td>
<td>0.18</td>
</tr>
<tr>
<td>Gland Formations</td>
<td>3</td>
<td>0.27</td>
</tr>
<tr>
<td>Cervicitis</td>
<td>15</td>
<td>1.35</td>
</tr>
<tr>
<td>Acute cervicitis</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Purulent cervicitis</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Necrotic cervicitis</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Chronic cervicitis</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td><strong>Vaginal Disorders</strong></td>
<td><strong>33</strong></td>
<td><strong>2.96</strong></td>
</tr>
<tr>
<td>Cystic Gartner’s duct</td>
<td>12</td>
<td>1.07</td>
</tr>
<tr>
<td>Vaginal band</td>
<td>6</td>
<td>0.54</td>
</tr>
<tr>
<td>Vaginitis</td>
<td>15</td>
<td>1.35</td>
</tr>
<tr>
<td>Purulent vaginitis</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Necrotic vaginitis</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Chronic vaginitis</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

*: Incidence and total number increased because more than one lesion occurred in some cases.

**Table II. — Pathological findings and incidence of the cervical and vaginal lesions in 1113 cows.**
external and cervix. The size of these cysts varied from chick- pea to hen’s egg sized (Figure 9A), and these cysts contained viscous and clear fluid. Cyst of Gartner’s ducts were accom- panied by postcervical band (one case), cervical cyst (one case) and follicular cyst on the right ovary (one case).

Vaginal Band: This disorder was seen in 6 cases (0.54%), and was characterised by vaginal bands with dorsoventral direction and close to orificium urethra externa. The size of these bands varied from 0.3 to 2 cm in width and 3 to 4 mm in thickness (Figure 9B). Microscopic examination showed both surfaces lined by squamous epithelium, similar to vagi- nal mucosa and van Gieson stained sections revealed collagen fibers and a few smooth muscle bundles.

Vaginitis: Inflammatory changes in the vagina were found in 15 cases. In 8 of these cases, generally there were smelly yellowish grey colored pus accumulation in the uterine, cervi- cal and vaginal lumina. In some cases, dark green blackish colored mucosa showed yellowish necrotic foci (Figure 10). In one case, remnants of necrotic placenta were seen in vagi- nal lumen. There were adhesions between rectum and vagi- nal serosa with hemorrhagic fistula in one case. No macro-scopic change was observed in 7 cases.

As a result of histopathological examinations, vaginitis was classified as purulent vaginitis (2 cases), necrotic vagini- tis (5 cases) and chronic vaginitis (8 cases). Purulent vagini- tis was characterized by extensive neutrophil accumulations and desquamated epithelial cells in the vaginal lumina, infiltr- ation of neutrophil granulocytes in the mucosal epithelium and a few lymphocytic-plasmacytic infiltrates in the lamina pro- pria. In necrotic vaginitis, extensive necrosis of the lamina epithelialis and accumulation of neutrophil granulo- cytes with desquamative epithelial cells in the vaginal lumina were detected. In the lamina propria, focal coagulative necro- sis with neutrophil granulocyte and lymphocytic-plasmacytic infiltrates were also seen. Chronic vaginitis was characteri- sed by degeneration and desquamation of the mucosal epi- thelium, heavy lymphocytic-plasmacytic infiltrates and in some cases, lymphoid follicle formation in the lamina pro- pria was evident.

4. Discussion

Genital abnormalities play an important role in animal breeding either by causing infertility or sterility, and thus inflict heavy economic losses to the livestock owners. Many cows with reproductive problems and low milk production have been sold or sent to slaughterhouse. For minimisation of these losses, it is important that disorders of genital organs and their incidence must be defined.

In this study, the incidence of uterine disorders were deter- mined as 3.23 per cent. This incidence was higher than 0.42 to 2.2 per cent recorded in previous reports [2, 9, 10, 22, 24], and was lower than 5.9 per cent reported by PERKINS et al. [21]. Discrepancy of the incidence may be explained by the difference in the population of cows.

In some abattoir surveys about reproductive tract disorders [10, 16, 24], segmental aplasia, which is the result of de-lopmental defects of the Müllerian ducts and referred as «white heifer disease», has been reported in cows. In the pre- sent study, findings of segmental aplasia are agree with pre- viously reported data [4, 10, 18, 19, 24]. It is suggested that these developmental defects may cause infertility or sterility due to defective development of genital tract.

It has been reported that excessive estrogenic stimulation induced endometrial hyperplasia, hydrometra and mucome- tra [8, 18, 24]. McENTEE [18] informed that endogenous sources of estrogen are follicular cysts and granulosa cell tumors, the exogenous sources include synthetic estrogens used for therapeutic purposes and clover pastures containing estrogenic compounds. In the present study, hydrometra (one case), mucometra (one out of 4 cases) and endometrial hyper- plasia (8 out of 13 cases) were accompanied by follicular cysts. One case of endometrial hyperplasia was associated with granulosa cell tumor. In our opinion, endometrial hyperplasia in these cases may be resulted from estrogenic stimulation from cystic ovarian follicles and granulosa cell tumor as reported by some researchers [3, 8, 18, 24].

In the present study, the most common uterine disorder was inflammatory changes (1.44%). Macroscopic and microsco- pic findings of endometritis, identical to previously reported data [11, 14, 15, 18]. This inflammatory changes may cause infertility, embryonic death and abortion in the pregnant cows as stated by some authors [11, 18, 19]. In this study, endometritis was accompanied by inflammatory changes of other parts of the reproductive tract in some cases. This find- ings have supported some authors opinion’s [1, 18], which is infection agents in the vagina, passing to cervix and uterine lumina may result in cervicitis and endometritis. In these cases, inflammatory lesions may be resulted from inadequate hygienic condition in the pospartum period and during partu- rition, retained placenta and traumatic laceration due to dys- tocia as a reported by JUBB et al. [12]. In two out of 6 cases of necrotic endometritis, remnants of necrotic placenta were observed. It was assumed that these cases were seen as a result of retained placenta.

Uterine tuberculosis has been reported as 0.35 per cent by DINÇ and GULER [10] and 0.09 per cent by ÇALISKAN [9] in cows. In the present study, uterine and oviduct tuberculosis was observed in one case (0.09%), and pathologic findings similar to previous data, described as miliary tubercu- losis [7, 18, 19]. McENTEE [18] claimed that tuberculosis spread to the uterine tube from the peritoneal cavity. In the present study, no macroscopic and microscopic findings of tuberculosis were seen in the cervix and vagina. But, lesions of tuberculosis were also present in the oviduct. Because of this, uterine tuberculosis may be developed from peritoneal tuberculosis via the oviduct.

It has been reported that parametritis and perimetritis usually occur concurrently and may be due to severe septic metritis, perforation of the uterine wall by a catheter or inse- mination pipette, perforation of the vaginal wall by the penis, rupture of the uterus during parturition, uterine torsion, and hemorrhage following enucleation of corpora lutea [18]. In this study, perimetritis was characterised by adhesions bet-
Cervicitis was seen in 2 cases alone, in the other 13 cases cows.

In this study, the incidence of cervical disorders were determined as 2.51 per cent, which is closer to 2.0 per cent reported by LAGERLÖF and BOYD [16] in cows. This incidence was higher than 0.01 to 0.81 per cent data reported by some researchers [2, 10, 24], and was lower than 9.4 per cent reported by PERKINS et al. [21].

In the present study, double cervix was found in two cases (0.18%), and the findings were identical to previously reported data [2, 5, 10, 18, 19]. ARTHUR et al. [4] claimed that these cases should conceive normally, but may show dystocia due to a fetal limb entering each cervical canal.

In this study, postcervical bands were observed in 8 cases. This disorder, which characterized with single cervical opening into double os uteri externi, have been described as dorsoventral postcervical band by some authors [4, 18]. But, no reports has been found about this disorder in the abattoir studies. On microscopic examination, these bands consisted of fibromuscular structures. ARTHUR et al. [4] claimed that the expulsion of the placenta may also be impeded by these bands. It was concluded that these bands, especially the larger ones, may also impede to artificial insemination and cause some problems such as dystocia and retention of placenta.

In our study, cervical cyst was found in one case (0.09%), and no occlusion of the cervical lumina was seen due to the cyst. In that case, the cysts may not cause sterility or infertility. In this case, cystic Gartner’s duct were also detected. These cysts may be resulted from estrogenic stimulation [18] or traumatic laceration of the cervix [12].

In the present study, squamous metaplasia of cervical epithelium was found in two cases (0.18%). In one of these, metaplasia was accompanied with granulosa cell tumor and glandular endometrial hyperplasia. In the light of this findings, in this case, metaplasia may be caused by secretion of estrogen from granulosa cell tumor. The other case was accompanied with catarrhal endometritis and chronic vaginitis. In this case, metaplasia may be a result of chronic inflammatory changes.

Cervical gland formation was detected in 3 cases (0.27%). MILLI [19] stated that this is a common disorder encountered in sheep, feeding with estrogenic plants, but sometimes may be seen in cervix of cows. Although, it was concluded that this lesion may be resulted from estrogenic plants or estrogenic drugs used for treatment. No findings was found about estrogenic stimulation, and any information couldn’t be obtained about treatment and feeding condition of these cows.

In this study, cervicitis was diagnosed in 15 cases. Cervicitis was seen in 2 cases alone, in the other 13 cases were accompanied by endometritis and / or vaginitis. This findings have supported the idea of cervicitis may be occurred by spreading endometritis and / or vaginitis as stated by McENTEE [18] and MILLI [19].

In the present study, the incidence of vaginal disorders were determined as 2.96 per cent. Cystic Gartner’s ducts were detected in 12 cases (1.07%). Macroscopic and microscopic findings and their locations have similar to previously reported data [14, 15, 18, 19]. These cysts have not seriously cause infertility and sterility. But, some cysts close to cervical canal, particularly the larger ones may cause infertility by blockage of flow of sperm to cervix during natural service and artificial insemination. McENTEE [18] stated that these cysts may be resulted from follicular cyst, highly chlorinated naphthalene poisoning and sometimes acute vaginitis. In the present study, one out of these 12 cases, cystic Gartner’s ducts were accompanied by follicular cyst and this findings have supported McENTEE’s [18] opinion. The other 11 cases out of 12, no findings and information was obtained about the cause of these cysts.

In the present study, vaginal bands were found in 6 cases. It has been reported that these bands may arise from remnants of median wall of Müllerian canal, congenitally [18, 23] or healing of traumatic laceration in the vaginal wall [23]. It was assumed that these bands may be occurred congenitally, because of no inflammatory reaction present in these bands. SEMACAN [23] claimed that some vaginal bands, resemble to imperforate hymen, may cause mucometra, pyometra, endometrial atrophy, salpingitis and impede to natural service, parturition and expulsion of placenta.

In this study, the most common vaginal disorder was vaginitis (1.35%). In these cases, macroscopic and microscopic findings agree with previously reported data [14, 15, 18, 25]. JUBB et al. [12] stated that necrotic cervicovaginitis is a complication of parturition and observed chiefly in ewes and cows as a consequence of dystocia. A number of influences, mainly prolonged pressure necrosis, laceration, and abrasion are responsible for the lesion. In the present study, necrotic vaginitis was diagnosed in 5 cases. In 4 cases lesion was accompanied by necrotic cervicitis and necrotic endometritis. It was concluded that these cases may be resulted from pressure necrosis following dystocia and traumatic laceration as a stated by JUBB et al. [12]. In this study, remnants of necrotic placenta were seen in necrotic vaginitis (one case) and purulent vaginitis (one case). In these cases, remnants of necrotic placenta may cause inflammation in the genital tract.

In the present study, uterine, cervical and vaginal inflammatory changes were observed in many cases together. This findings agree with some authors’ opinion [6, 13], which is inflammation of reproductive tract is generally found together.

In conclusion, the incidence and pathologic features of uterine, cervical and vaginal disorders were determined in cows slaughtered at Konya, Turkey. The incidence of uterine, cervical and vaginal disorders were detected as 3.32 %, 2.51 % and 2.96 %, respectively. The most common lesion was inflammatory changes in the uterine and vaginal disorders.
This study gives detailed information on genital tract abnormalities in cows, which causing sterility or infertility and heavy economic losses. In our opinion, these results and findings will useful for owners, clinician veterinarian and researchers about this topic.

5. References