A case study of reproductive pathology in bitches

Shiyamala S, Ramesh S and Hemalatha S

Abstract
The aim of the study was to estimate the macroscopic and histopathological appearances of female genital organs. A total number of ten canine carcasses of different breeds, age and body conditions were chosen for the present study. Increased occurrence of lesions in reproductive organs was recorded in dogs of 5 years and above age. Macroscopically, cystic changes and haemorrhage in the ovary, Mild congestion, haemorrhage and edema of the uterus. The detailed histopathological evaluation revealed cystic ovary, fibroplasia, atrophied follicles, and haemorrhagic ovary. Degeneration, edema, atrophy of glands and hyperplasia in the endometrium. Cystic dilation of glands in cervix. It was concluded that old age female had a higher risk of developing endometrial pathologies.

Keywords: Canine, gross, histopathology, female reproductive organs

Introduction
The dog is the most important pet, a very important patient and an increasingly more important laboratory animal. Since their domestication more than 14 thousand years ago a strong link between dogs and humans has been established. Nowadays that link persists even stronger, since the affection for and loving care given to this species has generated a tremendous industry devoted to caring for its health, nutrition, training, etc. The physiology of molecular regulatory mechanisms in canine reproduction remains unexplored, since bitches have a single oestrous cycle during a breeding season, as they are monoestrous and have spontaneous ovulation [1]. Many of the regulatory mechanisms of canine reproduction differ distinctly from those in other species [2]. Factors which may play a significant role in the appearance and development of various female genital abnormalities. Pathologies present in the canine’s reproductive tract might be varied congenital, endocrine, autoimmune, infectious, traumatic and neoplastic. Genital disorders such as anatomic abnormalities, hormonal disturbances, or disorders of infectious aetiology reduce fertility or prevent bitches from mating or conception. Fertility problems in mature bitches occur any time during the estrous cycle as result of failure to mate, missed conception or premature termination of pregnancy. Uterine diseases directly connected with the oestrous cycle are an important cause of infertility, such as endometritis, pyometra/pyometritis and metritis in carnivorous females. Hormonal disorders resulting from the long proliferation phase, persistence of ovarian follicles or ovarian cysts and bacterial infections have a pronounced influence on the uterus, leading to its degeneration. The purpose of this study was to randomly screen the reproductive organs of female dogs at necropsy.

Materials and Methods
The study was conducted in the Department of Veterinary Pathology, Madras Veterinary College, Chennai 7. Ten female canine carcasses belonging to different breeds, ages, and body conditions received were subjected to a detailed necropsy. The gross lesions, if any, in vagina, cervix, uterus, fallopian tube and ovary were recorded. The representative tissue samples from reproductive organs were collected in 10 per cent buffered formalin, processed routinely, and the paraffin tissue sections were stained with Haematoxylin and Eosin [3] and histopathological studies was carried out.
Results

The mean age was occurrence of the female reproductive pathology lesions 5.3 years. Increased occurrence of lesion in reproductive organs were recorded in dogs of 5 years and above age. German shepherd and non-descript dogs recorded more occurrence than that of the other breeds like Pug, Dachshund and Labrador Retriever which were recorded. No significant gross lesions were observed in the female reproductive organs except for cystic changes (Fig 1) and haemorrhage (Fig 2) in the ovary. Mild congestion and edema of the uterine endometrium (Fig 3, 4 & 5) and presence of dead fetus (Fig 6) in uterus with congestion and haemorrhage in endometrium. The histopathological lesions observed were as below: Cystic ovary (Fig 7 & 8) of single large or multiple variable sized follicular cysts lined by internally granulosa cells and externally by theca cells or consisting of single layer of cells with vacant or with abundant eosinophilic material within the lumen. A few follicular cysts showed faint blush contents. The stroma around the follicular cysts showed moderate fibroplasia (Fig 9 & 10) and atrophy of follicles (Fig 11). Haemorrhagic ovary (Fig 12 & 13) focally extensive haemorrhage with infiltration of numerous neutrophils and few lymphocytes (Fig 14), degeneration of the follicular epithelial cells were observed in most of the developing follicles. Endometrial degeneration, edema (Fig 15 & 16), atrophy of glands (Fig 16), hyperplasia, vacuolar degeneration and desquamation of the surface epithelium with presence of a few neutrophils and lymphocytes diffusely scattered in the endometrium (Fig 17). The stromal connective tissue was edematous with atrophy of glands congestion and dilatation of blood vessel were observed. Endometrial glands were variably dilated with clear space (Fig 19) and scant moderate amount of eosinophilic fluid along with few viable degenerate epithelial cells or cystic in appearance. The epithelium lining the glands and cysts (Fig 20) with or without papillary projection. A few neutrophils were present in the interstitial stroma.

Discussion

Ovarian diseases of female dogs were uncommon and affect health, fertility or even life of the animal. Follicular cystic ovaries were hormonally active, ovarian cysts of high clinical relevance in bitches, they are a significant source of hyper oestrogenism in bitch \[5, 6\], which may result in prolonged estrus and uteropathies. Follicular cysts are endocrine active and produce oestadiol 17 ß and progesterone \[7\]. Follicular cysts are usually thin walled lined with a granulosa cell layer and contain clear fluid. Follicular cysts arise because of a failure of luteinizing hormone release or a lack of response of a Graffian follicle to LH \[8\]. The mean age of diagnosis of bitches with follicular cysts was 8 years. The size was varying from a few mm up to 300 mm \[9\]. Corpus luteum produce progesterone \[10\]. Bitches with cystic ovaries might show persistent estrus, irregular estrus behaviors, cystic endometrial hyperplasia and pyometra. Luteal cysts are lined by luteal tunic and have thicker and opaque wall. The luteal cysts originate from follicular cyst, after granulosa cells had undergone complete or partial luteinisation. They produce progesterone in low concentration. Age 2-13, size 1.5-3 cm in diameter \[11\]. We conclude that occurrence of female genital system pathologies in the present study was similar to findings reported by other authors. The prevalence of genital pathologies in the studied population of female was higher. In females, old age had a higher risk of developing endometrial pathologies. The majority of pathologies were likely to have been of relative minor significance for fertility and few would have caused sterility. Hypothyroid bitches were predisposed to stillbirth and their pups were more likely to suffer perinatal mortality. Cases of endometrial degeneration were quite frequent, suggesting the presence of adverse environmental factors. Endometritis, should be investigated in each and every unexplained case of infertility in bitches. Monitoring the prevalence of reproductive diseases in stray dogs would be of great epidemiological interest to assess the risk for spread of congenital or acquired diseases. Ovarian cysts have great clinical relevance in bitches. Cysts are commonly found in older female dogs, but evolve silently and remain undiagnosed for longer periods. There is a scarcity of information of etiology, diagnosis and treatment. Although, follicular cysts are rarely referred in the canine practice, they may present with hyperestrogenism syndrome that draw the clinician or the owner’s attention. The simultaneous prolonged action of estrogen and progesterone could therefore explain the proliferative cystic changes that are characteristic for this pathology. Other claimed clinical signs vary with the breed, season, diet and geographical location \[12\]. Ovarian fibroplasia is rare in most of the animal species and appear to be frequent in humans. The unusually high occurrence of fibroplasia in the ovaries of female dogs. Atretic follicles consist of fragmented oocyte with distinct nucleus. More than 10 per cent of the growing follicle population in young ovaries was atretic, as opposed to 30 per cent in the older bitches. Inflammation of ovary is a rare condition that has been reported in the dogs. There is no treatment. Definitive diagnosis requires histology of ovarian tissue and documentation of diffuse infiltration of the ovaries with mononuclear inflammatory cells, resulting in dysfunction. In the future, results of experiments must include molecular assays which will clearly demonstrate the genetic grounds of this inflammatory disease. Also, the knowledge coming from molecular analyses may provide a new target in the clinical treatment of this most frequent disease in domestic bitches.

<table>
<thead>
<tr>
<th>Bitch</th>
<th>Breed</th>
<th>Age (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>German Shepherd</td>
<td>8.5</td>
</tr>
<tr>
<td>2</td>
<td>Pug</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Non-descriptive</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Non-descriptive</td>
<td>4.5</td>
</tr>
<tr>
<td>5</td>
<td>German Shepherd</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>Dachshund</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Labrador</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Non-descriptive</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>Non-descriptive</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>German Shepherd</td>
<td>7</td>
</tr>
</tbody>
</table>
Plate-1

**Fig 1:** Ovary (right) – Cyst on the surface

**Fig 2:** Ovary (left) – Haemorrhage on the surface

**Fig 3:** Uterus - Mild congestion on the endometrium

**Fig 4:** Uterus – Congestion and edematous

**Fig 5:** Uterus – Congestion on the endometrium

**Fig 6:** Uterus – Aborted foetus

Plate-2

**Fig 7:** Ovary – Cystic follicle – H&E 10x

**Fig 8:** Ovary – Large cyst lined by cuboidal epithelium – H&E 4x
**Fig 9:** Ovary – Fibroplasia – 4x

**Fig 10:** Ovary – Fibroplasia and atretic follicles – H&E 10x

**Fig 11:** Ovary - Atretic follicles – H&E 10x

**Fig 12:** Ovary – Congestion and Focal haemorrhage – H&E 10x

**Fig 13:** Ovary – Haemorrhage – H&E 10x

**Fig 14:** Ovary – Large infiltration of leukocytes – H&E 10x

**Fig 15:** Uterus – Mild degeneration & mononuclear cell infiltration – H&E 40x

**Fig 16:** Endometrium - Endometrial atrophy & Oedema – H&E 10x
Fig 17: Uterus – Endometritis – H&E 10x

Fig 18: Endometrium - Endometrial sloughing of epithelium – H&E 10x

Fig 19: Uterus – Cystic dilatation of gland – H&E 4x

Fig 20: Cervix - Cystic dilation of glands – H&E 4x

References