

## PATHOLOGICAL OBSERVATIONS ON OVARIAN GRANULOSA CELL TUMOR IN DOG

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DOI 10.29005/IJCP.2023.15.2.189-191}

[Received: 22.06.2023; Accepted: 09.11.2023]

**How to cite this article:** Kamdi, B.P., Ingole, R.S. and Erra, S. (2023). Pathological Observations on Ovarian Granulosa Cell Tumor in Dog. *Ind. J. Canine Pract.*, 15(2): 189-191.

Ovarian granulosa cell tumors (GCTs) are a common type of neoplasm in domestic animals, originating from the sex-cord stromal cells of the ovary. A 12 year female Boxer dog, had a history of pyometra. After the Ovariohysterectomy, surgically removed ovarian mass was sent to our Department of Pathology for histopathological analysis. This paper discusses the findings from macroscopic and microscopic studies, confirming the presence of an ovarian granulosa cell tumor through histopathological examination.

**Keywords:** Granulosa cells, Ovary, Pyometra, Tumors.

Ovarian tumors can arise from the outer epithelium (papillary cystadenoma, cystadenocarcinoma), the interior sex cords and stroma and germ cells (dysgerminoma and teratoma). Sex-cord stromal tumors, originating from the specialized stromal cells of the ovary, are well-known for their malignancy in domestic animals. They are classified either as granulosa tumor (GCT), thecoma or luteoma. These tumors are typically unilateral, smooth-surfaced and round, with a diameter ranging from 20 to 30 cm (Foster *et al.*, 2006). Among the various types of sex-cord stromal tumors, granulosa cell tumors (GCTs) are relatively rare in canine compare to equines and bovines. GCTs arise from sex-cord stromal cells and have been observed in female dogs along with other types of sex-cord stromal tumors.

Histologically, the granulosa cells in GCTs resemble normal granulosa cells and are often arranged in a manner similar to Graafian follicles. In poorly differentiated GCTs, tumor cells can form sheets. Call-Exner bodies, which are rosettes of granulosa cells, may be present in some cases, particularly in mares. These bodies consist of a radial aggregate of neoplastic cells around a central eosinophilic structure and serve as a valuable microscopic feature for diagnosing

GCTs (Tavasoli and Solati, 2011). Occasionally, GCTs exhibit a histological pattern where granulosa cells are irregularly accumulated by a supporting stroma of spindle cells (Maclachlan and Kennedy, 2002). While sex-cord stromal tumors are typically benign in mares and cows, GCTs can be malignant in female dogs (Maclachlan and Kennedy, 2002; Zanghi *et al.*, 2007). Although, GCTs frequently reported from the animals, there are few reports from canine from the country. Therefore the present paper reports histopathological findings of an ovarian granulosa cell tumor in a 12-year-old female Boxer dog.

### Materials and Methods

A 12 years Boxer female dog was presented to Veterinary Clinic, with a history of chronic white purulent vaginal discharge and pyometra. The dog was operated for routine ovariohysterectomy and both the ovaries and uterus after surgically excised, were referred to the Department of Veterinary Pathology, for histopathology of the mass. The right ovary was enlarged. Tumor mass was fixed in 10% neutral buffered formalin solution, dehydrated in different grades of alcohol, cleared in xylene, embedded and impregnated with paraffin wax, thin sections (5 to 6  $\mu$ ) were cut with

*Volume 15 Issue 2, December, 2023*

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rotary Leica microtome and stained with routine staining, hematoxylin and eosin for microscopical observations.

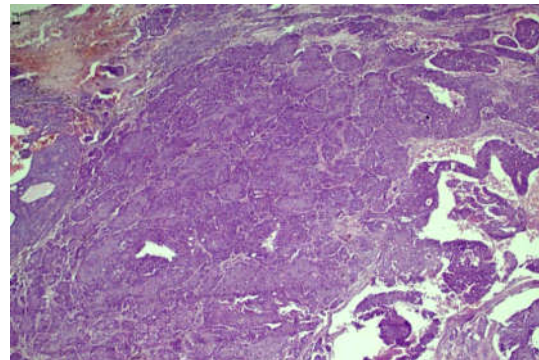
### Results and Discussion

In this study, we found the case of a canine granulosa cell tumor (GCT). The tumor exhibited a solid gross appearance with a smooth surface and had a soft consistency. Upon sectioning, a yellowish-orange discoloration was observed along with few fluid filled cysts. The diameter of the tumor mass was measured to be approximately 4 x 6 cm (Fig.1). Histopathological analysis revealed the presence of polygonal neoplastic cells arranged in various patterns, including predominantly follicular patterns, minimal

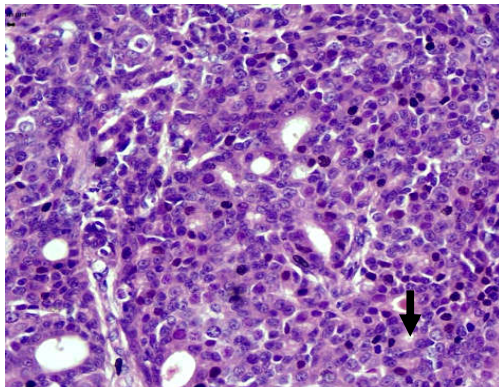
Sertoli cell-like patterns, and diffuse nodular patterns supported by fibrovascular stroma surrounding cystic spaces of varying sizes filled with clear fluid (Fig. 2 and 4). Neoplastic cells have indistinct cell borders, a moderate amount of pale eosinophilic, granular cytoplasm and one to two round nuclei with finely-stippled chromatin and a distinct nucleolus. A few Call-exner bodies were also identified, characterized by a small central round or oval space filled with eosinophilic follicular fluid and surrounded by a collar of radially arranged granulosa cells (Fig.3 & 4). Multifocally within the neoplasm there is fibrin, hemorrhage, edema, lakes of eosinophilic acellular material (secretory product), hemosiderophages and cholesterol clefts.



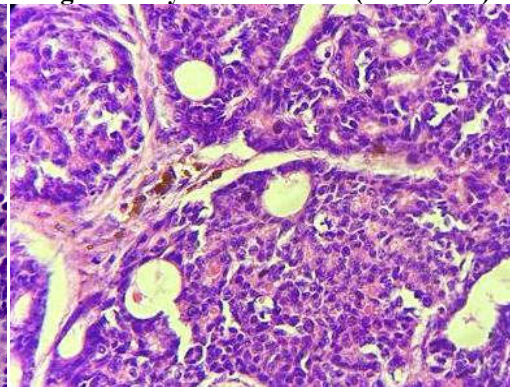
**Figure 1:** Gross image of enlarged right ovary showing serosal hemorrhages



**Figure 2:** Microphotograph Showing neoplastic cells arranged in solid nodules resembling granulosa cells with hemorrhages and cystic structures (H&E, 40x)



**Figure 3:** Microphotograph showing round to oval cells with eosinophilic cytoplasm and indistinct cell borders along with few Call-Exner bodies (black arrow) (H&E, 100x)



**Figure 4:** Microphotograph of ovary mass showing neoplastic cells often palisade along the stroma forming rosettes surrounding eosinophilic material (Call-Exner body). (H&E, 100x)

In the present case, the tumor was localized in the right ovary as also reported by Erdogan *et al.* 2015. In our case, the dog had pyometra and vaginal discharge as also recorded by Perez-Marin *et al.*, 2014. Although, a higher percentage of canine granulosa cell tumors are malignant and have the potential to metastasize to regional lymph nodes and organs however we could find normal regional lymph nodes. Based on the microscopic pattern observed and findings of Call-Exner bodies in this tumor, it was diagnosed as granulosa cell tumor.

### Conclusions

In conclusion, our study contributes a case report of a functional GCT in a female dog. While granulosa cell tumors have been extensively reported by researchers in dogs, this case adds to the existing body of literature and highlights the importance of considering GCTs in the differential diagnosis of canine reproductive tract tumors.

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