

Table 1. Haematology of GCT dog.

Haematology	Hb (g%)	TEC (mill/ μ L)	TLC (1000/ μ L)	PLT (1000/ml)	N (%)	L (%)	E (%)	M (%)
GCT	10	3.4	27	155	76	23	-	1

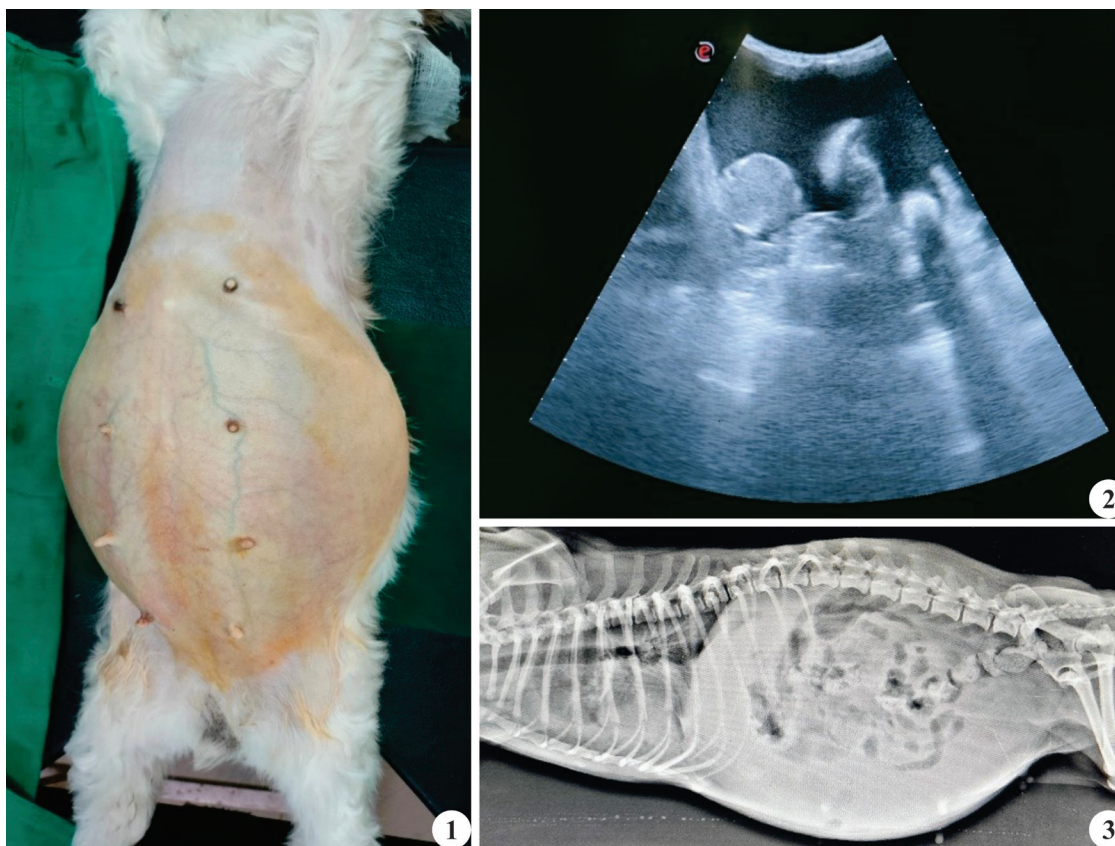


Fig. 1. Dog showing distended abdomen; **Fig. 2.** Ultrasound image showing effusion in abdomen; **Fig. 3.** X-ray showing distended abdomen due to effusion with intestines floating.

mucous membrane, buthada temperature of 102.7^oF and distended abdomen. On palpation of the abdomen, fluid thrill was noticed. Canine ovarian tumors that remain asymptomatic for extended durations pose a significant risk for clinical diagnosis. In certain instances of non-functional germ cell tumors, the absence of reproductive symptoms or misdiagnosis can lead to delays in imparting the necessary treatment. Delays in diagnosing large, non-functioning GCTs and reports of incidental findings have been recorded⁶. Haematology and biochemical analysis of the dog revealed anemia, leucocytosis, hypoalbuminemia and hyper globulinemia which were a few of the paraneoplastic syndromes observed in many canine tumors⁷ (Table 1 & 2). Abdominal ultrasonography revealed hypoechoic ascitic

fluid with normal visceral organs (Fig. 2). X-ray of lateral abdomen revealed ascitic fluid in ventral abdomen displacing intestines dorsally (Fig. 3). Pleural effusions in cranial lung lobe could be observed. In instances where abdominal effusion is present, cytological evaluations along with transabdominal ultrasonography prove to be valuable diagnostic tools for identifying these tumors⁸.

Ascitic fluid analysis showed a specific gravity of 1.030, total protein was 5 g/dl, albumin was 2.9 g/dl, A/G ratio was 1:1, fluid creatinine was 1.5 mg/dl, fluid glucose was 20 mg/dl, fluid bilirubin was 0.5 mg/dl, fluid cholesterol was 213 mg/dl and fluid triglyceride was 22 mg/dl. Cytological examination of ascitic fluid revealed activated polyhedral to oval shaped pleomorphic

Table 2. Serum biochemistry of GCT dog.

Biochemistry	ALT (U/L)	AST (U/L)	TP (g/dL)	Albumin (g/dL)	Globulin (g/dL)	Creatinine (mg/dL)	BUN (mg/dL)	Glucose (mg/dL)	Calcium (mg/dL)	GGT (U/L)
GCT	28	58	8.8	3.6	5.2	1.54	25	89	10.1	18

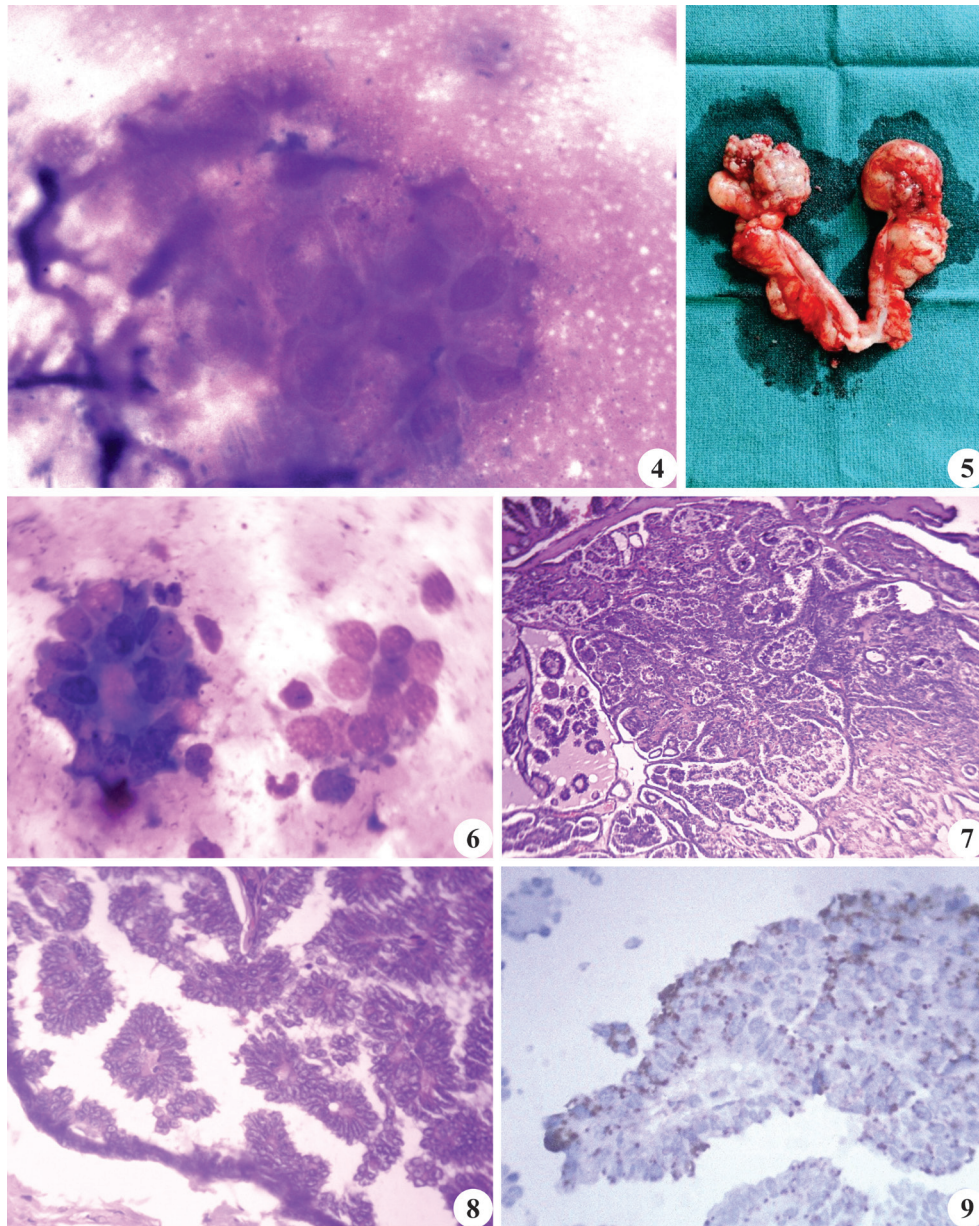


Fig. 4. Ascitic fluid cytology - Clusters of cells showing anaplasia (Fields Stain X1000); **Fig. 5.** Bilateral enlargement of ovaries with nodular surface; **Fig. 6.** Ovary impression smear - Cells arranged in rosette pattern with central eosinophilic call exner body (Fields Stain X1000); **Fig. 7.** Ovary - Diffuse proliferation of granulosa cells forming rosettes (H&E X100); **Fig. 8.** Ovary - Granulosa cells in rosette pattern with central eosinophilic call exner body (H&E X400); **Fig. 9.** Ovary - Brown precipitate in the cytoplasm of granulosa cells (Inhibin-alpha X400).

mesothelial cells with prominent nucleoli (Fig. 4). Exploratory laparotomy was conducted by a team of expert surgeons under inhalant general anaesthesia. Fluid was drained and ovarian mass were observed by palpating the ovarian bursa and metastasis was noticed in abdomen with intestinal mesentery showing few greyish white nodules and spleen having nodular mass. GCT has been linked to metastases in various organs including the mesentery, omentum, liver, kidneys, bladder, diaphragm, uterus and lymph nodes. Additionally, there has been one reported case of metastasis to the myocardium and lungs⁹. Ovariectomy was conducted and ovaries

along with uterus were incised and removed from abdomen.

Grossly, both the ovarian masses appeared nodular with soft consistency and haemorrhagic areas (Fig. 5). On cut section, mass appeared haemorrhagic with mild oozing of fluid. Impression smears showed clusters of polyhedral to oval granulosa cells arranged in rosette manner forming pink eosinophilic Call-Exner bodies in the centre (Fig. 6). Histopathology of both ovarian masses showed haemorrhages, engorged blood vessels and neoplastic cells arranged in solid and tubular to

acinar pattern, supported by fibrous connective tissue. Some areas showed serous eosinophilic fluid. The cells were cuboidal to columnar type with centrally placed vesicular nuclei containing single to multiple nucleoli and surrounded by moderate quantity of pale foamy cytoplasm. In focal areas of acinar structures, clusters of cells were arranged in rosettes around protein droplets, suggesting the formation of 'Call-Exner' bodies (Fig. 7 & 8). Mild lymphocytic infiltration was observed. GCTs are defined by the significant presence of cells exhibiting morphological characteristics typical of granulosa cells. Additionally, cells that resemble theca externa, theca interna, and collagen-producing fibroblasts are often found and may exceed the number of granulosa cells. The existence of stromal components, such as theca cells, may indicate a non-neoplastic reaction of the ovarian stroma to the proliferation of granulosa cells, rather than representing neoplastic activity in certain instances¹². Bilateral ovarian granulosa tumor was reported in mares¹⁰. Immunohistochemical evaluation of inhibin alpha revealed positive staining in the granulosa cells as brown amorphous precipitate in cytoplasm (Fig. 9). Positive immunostaining for inhibin is a distinctive characteristic of both normal and neoplastic granulosa cells, associated with sex-cord differentiation. Therefore, inhibin can be considered as a histogenetic marker for granulosa cell tumors and thecomas, while acting as a negative marker for non-stromal ovarian neoplasms¹¹.

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