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Clinical Article

MANAGEMENT OF FOLLICULAR CYST ASSOCIATED WITH CYSTIC ENDOMETRIAL HYPERPLASIA IN A LABRADOR SHE DOG

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SUMMARY

Ovarian affections are uncommon but it may affect the health and fertility of the she dogs. A case of follicular cyst associated with cystic endometrial hyperplasia in a 7 year old female Labrador retriever and its surgical management through ovariohysterectomy is reported.

Keywords: Follicular cyst, Ovariohysterectomy, She dog

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An ovarian cyst is a fluid-filled structure within the ovary. It can be of any size, may be endocrinologically active or inactive (Olson *et al.*, 1989), may occur single or multiple and may involve one or both ovaries (Kumar *et al.*, 2019). There are different types of ovarian cysts namely follicular cysts, cysts of subsurface epithelial structures (SES), cystic Rete ovarii, lutein cysts and cystic corpora lutea (Johnston *et al.*, 2001). Usually follicular cysts are thin-walled cysts containing clear watery fluid and are lined with granulosa cells. Hence, they simulate the graffian follicle and are believed to occur due to failure of release of luteinizing hormone (LH) or inability of the graffian follicle to respond to LH (Lopate and Foster, 2010). Many reports stated that the incidence of cystic disease in dog ovaries increases with age (Schlafer and Miller, 2007). The most common clinical signs exhibited by the she dogs affected with follicular cyst are irregular estrous cycle, especially prolonged proestrus and estrus (Johnston *et al.*, 2001). The present case study deals with follicular cysts associated with cystic endometrial hyperplasia and its surgical management in a she dog.

A 7 year old pluriparous, Labrador retriever was presented to Small Animal Gynaecology and Obstetrics unit of Madras Veterinary College Teaching Hospital with a history of prolonged serosanguinous vaginal discharge and attracting male dogs since 3 months. On clinical examination, all the physiological parameters were within normal limits. Gynaecological examination revealed oedematous and swollen vulva, pink and moist vaginal mucous membrane and serosanguinous discharge from vagina without foul smell. Upon vaginal exfoliative cytology (VEC), more than 80 percent of superficial and cornified cells were observed with red blood cells and very few neutrophils (Fig. 1). Ultrasonographic examination revealed varying sized multiple anechoic areas in both ovaries (Fig. 2) and thickening of endometrial lining. Blood was collected for hematological, biochemical and hormone estimation. Both hematological and biochemical parameters were within normal limits and the serum estradiol and progesterone levels were 39.9 pg/ml and 1.1 ng/ml, respectively. Based on the history, clinical signs and special diagnostic procedures like VEC, ultrasonography and hormonal profile, the case was diagnosed as follicular cysts. As the owner was not interested in breeding of the animal in the future and also considering her age, ovariohysterectomy (OHE) was opted.

Under intravenous anesthesia with ketamine and diazepam, laparotomy revealed multiple follicular cysts on both ovaries along with enlarged uterine horns (Fig. 3). Ovariohysterectomy (OHE) was performed through the midventral approach (Arunmozhi *et al.*, 2015). The surgical wound was approximated as per standard procedures and post-operative antibiotic and supportive treatments instituted. Skin sutures were removed on the seventh day and the animal had an uneventful recovery. The incision of the uterine horns revealed serosanguinous discharge, thickened endometrial lining with multiple fluid filled cysts in the endometrium suggesting Cystic Endometrial Hyperplasia (Fig. 4). Histopathological findings of the ovary in the present case revealed multiple thin walled cysts containing pale eosinophilic fluid in their lumen along with few debris and degenerated cells distorting the normal ovarian architecture (Fig. 5). The cysts were lined by single or multiple (2-4) layers of flattened/cuboidal/low columnar granulosa cells and occasional theca cells with no luteinization and were larger than normal late tertiary follicles. Marked areas of congestion/haemorrhages were observed in the

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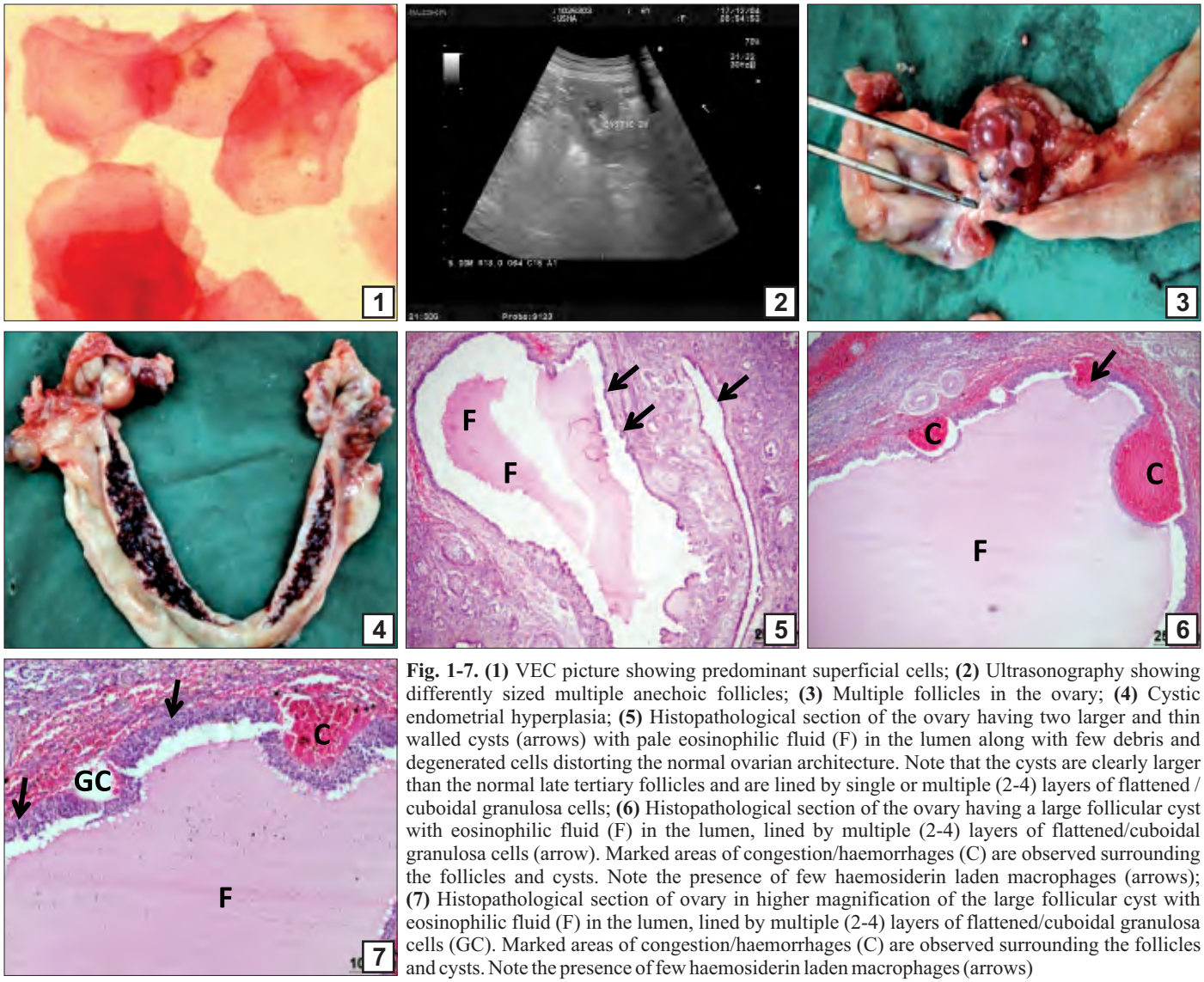

Fig. 1-7. (1) VEC picture showing predominant superficial cells; **(2)** Ultrasonography showing differently sized multiple anechoic follicles; **(3)** Multiple follicles in the ovary; **(4)** Cystic endometrial hyperplasia; **(5)** Histopathological section of the ovary having two larger and thin walled cysts (arrows) with pale eosinophilic fluid (F) in the lumen along with few debris and degenerated cells distorting the normal ovarian architecture. Note that the cysts are clearly larger than the normal late tertiary follicles and are lined by single or multiple (2-4) layers of flattened / cuboidal granulosa cells; **(6)** Histopathological section of the ovary having a large follicular cyst with eosinophilic fluid (F) in the lumen, lined by multiple (2-4) layers of flattened/cuboidal granulosa cells (arrow). Marked areas of congestion/haemorrhages (C) are observed surrounding the follicles and cysts. Note the presence of few haemosiderin laden macrophages (arrows); **(7)** Histopathological section of ovary in higher magnification of the large follicular cyst with eosinophilic fluid (F) in the lumen, lined by multiple (2-4) layers of flattened/cuboidal granulosa cells (GC). Marked areas of congestion/haemorrhages (C) are observed surrounding the follicles and cysts. Note the presence of few haemosiderin laden macrophages (arrows)

surrounding follicles and cysts (Fig. 6). Few focally extensive areas of haemosiderin laden macrophages were found (Fig. 7).

Follicular cyst is a thin walled cyst lined with granulosa cell layer. Failure to produce a sufficient amount of gonadotropins, in particular of LH which is essential for follicular growth and ovulation (Knauf *et al.*, 2014), may be the cause for development of these cystic follicles. The size may vary from a few mm upto 300 mm (Ervin and Homans, 1986). In the present study, the size of the follicular cysts were ranging between 150 mm to 200 mm. An elevated level of estrogen of 39.9 pg/ml was observed in the present case. Follicular cysts that are lined by granulosa cells secrete estrogen resulting in estrogen mediated effects on the she dog's reproductive tract (Johnston *et al.*, 2001; Post *et al.*, 1991). Affected she dogs may show persistent oestrus, irregular oestrus behavior, cystic endometrial hyperplasia, endometrial metaplasia and pyometra (Lopate and Foster, 2010). In addition, permanent high concentrations of estrogen may lead to several diseases such as alopecia, hyperpigmentation, seborrhoea, bone marrow failure and pancytopenia (Gaunt and Pierce, 1986). Bilateral, symmetrical alopecia on the caudal part of both thighs (Ghaffari *et al.*, 2009), lichenification and hyperkeratosis are also important symptoms associated with excessive estrogen impregnation (Sforna *et al.*, 2003). Diagnosis is based on prolonged estrus behavior, vaginal bleeding, prolonged presence of superficial cells in vaginal exfoliative cytology and elevated levels of estrogen > 20 pg/ml (Sridevi, 2015). The estrogen therapy used to prevent implantation also contributes in development of pyometra through over proliferation of endometrium and lengthening the period in which the uterine cervix remains open (Singh *et al.*, 2019). In most cases, ultrasonography is sufficient to diagnose ovarian cysts (Fontbonne, 2011) which appear as focal hypoechoic and anechoic structures. Ultrasonographic examination in the present case revealed varying sized

multiple anechoic areas in both the ovaries and thickened endometrial lining suggestive of CEH.

Histopathological examination of uterus revealed, diffuse hyperplasia of uterine endometrial glands characterized by numerous cystic and active proliferating glands along with increased mitotic activity and frequent apoptosis. The glands appear largely cystic, tortuous and dilated and larger cysts are lined by a single layer of flattened epithelium and smaller ones lined by two or three layers of cuboidal epithelium. The uterine endometrium had undergone degeneration and the underlying stroma appeared oedematous and markedly hemorrhagic. In cystic endometrial hyperplasia, hypertrophy of endometrium with islets of anechoic foci represents dilated cystic glands. Gross examination of the uterus gives a cobblestone appearance by thickened endometrium with distended cystic glands (Sridevi, 2015). Histologically, the follicular cysts are lined by cuboidal to columnar cells without ovum (Jayakumar *et al.*, 2014). Failure of hormonal treatment were reported by several authors (Fayrer-Hosken *et al.*, 1992; Arlt *et al.*, 2011). In the present case the dog was showing prolonged estrus due to the presence of a follicular cyst in both the ovaries and prolonged exposure to estrogen had predisposed the uterus to cystic endometrial hyperplasia. Hormonal treatment was not tried because of the failures reported and ovariohysterectomy was performed as a curative measure since the age of the dog was a limitation for future breeding.

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