



Successful Management of Follicular Cyst-induced Dermatoses in a Labrador Retriever Dog

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ABSTRACT

Background: Sex hormone dermatoses are uncommon in dog and causes overproduction of one or more of the sex hormones or exogenous administration. Ovarian cyst-induced hyperestrogenemia increased cortisol, hypertestosteronemia and skin lesions mostly underwent undiagnosed and untreated. This case was documented as clinical pathological changes, diagnosis and treatment of sex hormone imbalance-induced dermatosis due to an ovarian follicular cyst in a Labrador Retriever bitch.

Methods: This clinical investigation was carried out in the month of April'2022 at Veterinary Clinical Complex, Veterinary College and Research Institute, Tirunelveli with a history of prolonged proestrus bleeding, perineal pruritus with reddening, swelling and enlargement of the vulva. Vaginal exfoliative cytology, hormonal assay, ultrasonography, histopathology of skin and haemato-biochemistry were performed.

Result: Physical examination revealed hyperpigmentation and hyperkeratinization of the skin. Vaginal exfoliative cytology and progesterone assay revealed cytological estrus. Ultrasonography revealed >10 mm-sized anechoic structures in both ovaries along with uterine endometrial hyperplasia. Hormonal analysis revealed hyperestrogenemia and increased cortisol and testosterone. A biopsy of the perineal skin revealed hyperplasia and hyperkeratosis. The case was confirmed as sex hormone imbalance-induced dermatosis due to an ovarian follicular cyst. The animal was treated with two shots of Inj. hCG 500IU in 48 hrs interval followed by OHE after three months.

Key words: Bitch, Dermatitis, Follicular cyst, Imbalance, Ovarian cyst, Sex hormone.

INTRODUCTION

Endocrine diseases are commonly seen in veterinary practice and these endocrinopathies have the potential to affect the skin and adnexal structures (Ghaffari *et al.*, 2009). The specific actions of certain hormones on the integumentary system are often poorly explained and, additionally, controversies are augmented due to the lack of standard diagnostic tests. Common clinical dermatological ailments include symmetrical and non-inflammatory alopecia along with dull, dry and faded coat that can be easily epilated; post-clipping alopecia, scaling and comedone formation; variable pigmentary disturbances e.g. easily bruised skin and poor wound healing which increased susceptibility to infections and demodicosis (Bellis, 2011). Canine hormone-induced alopecia may be associated with hyperadrenocorticism, hypothyroidism, imbalances of sex hormones and diabetes mellitus (Van den Broek, 1994; Nelson and Couto, 2015; Merchant and Taboada, 1997). Sex hormone dermatoses are rare in the canines and are attributed to an overproduction of one or more of the sex hormones endogenously or exogenously. Alopecia is the effect of hormones on the hair follicle which inhibits the normal cyclic pattern of hair growth in dogs. There is no breed predisposing factor for hormone-induced dermatopathies in canines, but the condition is commonly reported in Dachshunds and Boxers (Harvey and McKeever, 1998). Hormonally active ovarian cysts are of high clinical relevance in bitches and act as a significant source of hyperestrogenism in bitches

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(Johnston *et al.*, 2001), which results in prolonged oestrus (Arlt *et al.*, 2011; Knauf *et al.*, 2013) and uteropathies (Olson

et al., 1989). The ovarian cyst is a fluid-filled structure (Olson *et al.*, 1989) of any size present outside physiological proestrus and estrus within the ovary (Johnston *et al.*, 2001). It can occur single or multiple on one or on both ovaries (Dow, 1960) and is endocrine active or inactive (Olson *et al.*, 1989). Dogs with ovarian dysregulation, cysts, or neoplasia often exhibit cutaneous and constitutional signs of hyperestrogenism (Muller *et al.*, 2001).

MATERIALS AND METHODS

A three-and-a-half-year, 20 kg, nulliparous Labrador Retriever bitch was presented to the Small Animal Gynaecology and Obstetrics Unit of Veterinary Clinical Complex, Veterinary College and Research Institute, Tirunelveli with a history of prolonged proestrus bleeding *i.e.* since 25 days, perineal pruritus with reddening, swelling and enlargement of the vulva. The owner also reported that the length of interestrus period was 6 months and the lesions on the skin and perineal region appear with proestrus bleeding and persist for up to 3 months and subsides later. Further, the animal was treated locally for allergic dermatitis in the last three estrous cycles with antibiotic and antiallergic therapy, but no improvement was observed. The animal was subjected to physical, clinical, haematobiochemical, VEC, ultrasonographical, hormonal and histopathological examinations.

RESULTS AND DISCUSSION

Physical examination revealed cutaneous asthenia (Fig 5.), calcinosis cutis (Fig 1), comedones (Fig 2), hyperpigmentation (Fig 3), hyperkeratinization (Fig 4) of skin along with enlarged and firm vulva and congested vaginal mucus membrane with symmetrical alopecia in the presented case which is prominent in the caudal aspects of thighs (Fig 6). On clinical examination, all vital parameters were in the normal range. Haematobiochemical examination revealed eosinophilia (11%) and hypocholesterolaemia (103 mg/dl) with hypertriglyceridaemia (118.5 mg/dl). A vaginal exfoliative cytology (VEC) was performed to assess the stage of estrous cycle which revealed >80% superficial cell index (Fig 7). On ultrasonographical examination, 11.24 × 12.81 mm (Fig 8) and 10.3 × 7.51 mm (Fig 9) sized anechoic cavities were observed on right and left ovaries respectively along with uterine endometrial hyperplasia (7.42 mm wall thickness, Fig 10). Further, ultrasonography of adrenal glands revealed normal size, echogenicity and blood flow (Fig 11 and 12). Serum Hormonal profile was performed to differentially diagnose the endocrinopathies which revealed progesterone level as 3.02 ng/ml, increased estrogen (68.73 pg/ml), increased testosterone (4.37 ng/dl), normal thyroid profile *i.e.* T3 (2.52 ng/ml), T4 (1.05 µg/dl), TSH (<0.10 µIU/ml) and increased cortisol (3.89 µg/dl). Histopathological examination of skin from the perineal region revealed squamous metaplasia of follicular epithelium (Fig 13.) along with hyperplasia of the epidermis and hyperkeratosis (Fig 14.). On the basis of history, physical,

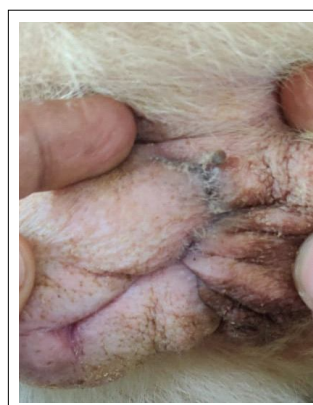


Fig 1: Calcinosis cutis.



Fig 2: Comedone.



Fig 3: Hyperpigmentation.

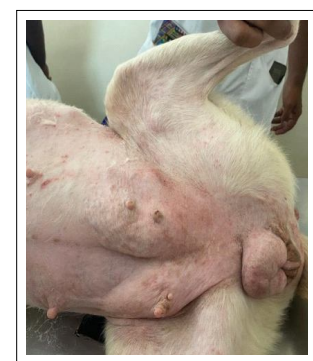


Fig 4: Hyperkeratinization.

ultrasonography, haematobiochemical, hormonal and histopathological examination confirmed as sex hormones induced dermatoses due to ovarian follicular cyst.

The animal was treated with two shots of inj. hCG 500 IU intramuscularly SID in 48 hours interval and tab. Zincovit SID orally for 14 days. Further, an ultrasonographical examination was repeated after 48 hrs of the second shot of inj. hCG which revealed the absence of anechoic cavity caudal to the kidney. Four months later, skin lesions of the perineal region, ventral abdomen and vulva disappeared and as per the owner's request animal was subjected to ovariohysterectomy during cytological anoestrus to avoid the recurrence of endocrinopathy and dermatoses. Histopathological examination of uterine horns revealed metaplastic changes in endometrium *i.e.* tadpole-shaped/tapered endometrial glandular cells indicative of hyperplasia of endometrial glands (Fig 15 and 16). The animal had an uneventful recovery.

Frank *et al.* (2003) reported endocrine diseases in the dog were commonly manifested with dermatological lesions among that hypothyroidism and hyperadrenocorticism were the most common endocrinopathies whereas dermatoses associated with sex-hormone imbalance were ill-defined and undergo undiagnosed (Ballis, 2011). In the present study, the cutaneous lesions and symmetrical alopecia on the perineal and thigh region were differentially diagnosed with hormonal assay which revealed a normal thyroid profile, hyperadrenocorticism, hypoestrogenism and hyperandrogenism which was in accordance to Frank *et al.* (2003) who reported endocrinopathies induced dermatoses in bitches.

Haematobiochemistry revealed eosinophilia, increased triglyceraldehyde and cholesterol which was an indicator of stress and increased cortisol level (Frank *et al.*, 2003). Further, to rule out adrenal tumors, enlargement, or Cushing's disease-induced hyperadrenocorticism ultrasonography was performed (Ballis, 2011) which revealed normal size and echogenicity of adrenals (Nelson and Cuoto, 2015) along with anechoic follicular cysts on both ovaries and endometrial hyperplasia which was also suggested by Eker and Salmanoglu (2006) who reported the preovulatory follicle size in bitches as an average follicular size 0.48 cm - 0.67 cm and follicle > 5 mm diameter underwent cyst formation (Schlafer and Miller, 2007). Knauf *et al.* (2014) reported that hormonally active ovarian cyst produces oestradiol-17 β (2.0-68.0 pg/ml) and progesterone (0.1 to 63.0 ng/ml) which is in agreement with our study. Frank *et al.* (2003) reported that hyperestrogenism inhibits anagen initiation which causes bilaterally symmetrical alopecia sparing the head and extremities along with hyperpigmentation which diffusely present in areas of alopecia or may be present as macular lesions with a ventral distribution which was a concurrent finding in the present case. In the present investigation, histopathological changes were in agreement with Ghaffari *et al.* (2009) who reported hyperplasia of epithelial cells downward into the dermis



Fig 5: Cutaneous asthenia: Ehler's daulos syndrome.



Fig 6: Enlarged vulva and symmetrical alopecia in the presented case which is prominent in the caudal aspects of thighs.

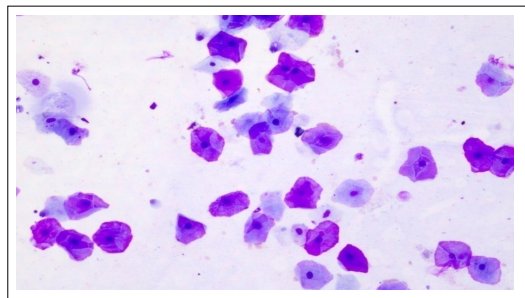


Fig 7: >80% Superficial cells Index numerous superficial with some squamous cells (40 \times).

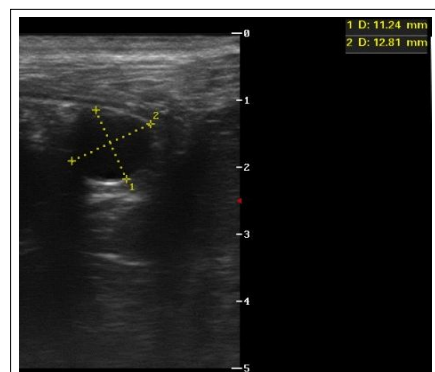


Fig 8: 11.24 \times 12.81 mm sized anechoic cavity on right ovary.

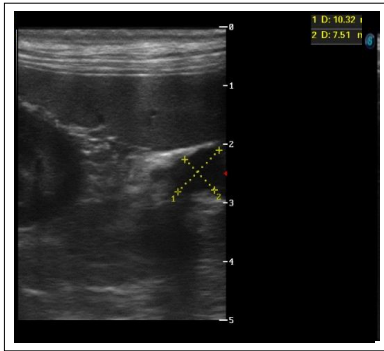


Fig 9: 10.3x 7.51 mm sized anechoic cavity on left ovary.

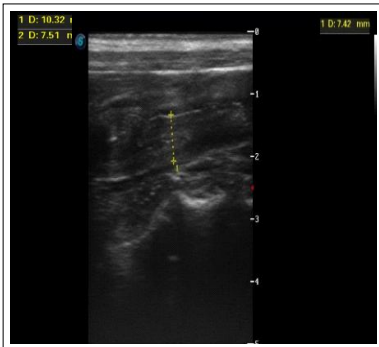


Fig 10: Endometrial hyperplasia 7.42 mm.

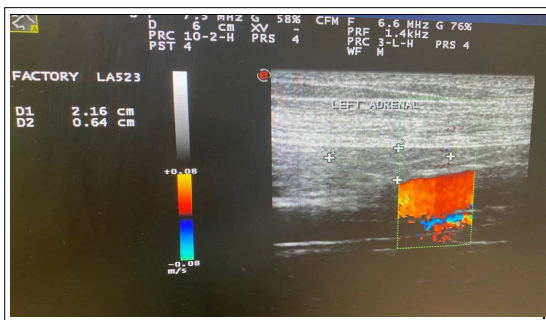


Fig 11: Left Adrenal: Normal sized, echogenicity and blood flow.



Fig 12: Right Adrenal: Normal sized, echogenicity and blood flow.

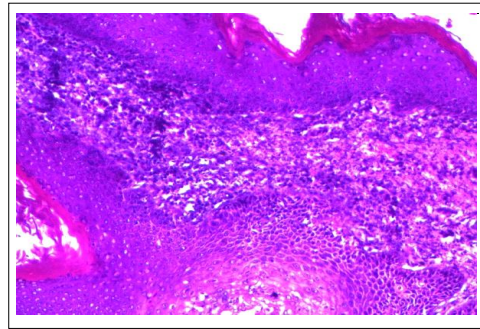


Fig 13: Skin-Squamous metaplasia of follicular epithelium (100x).

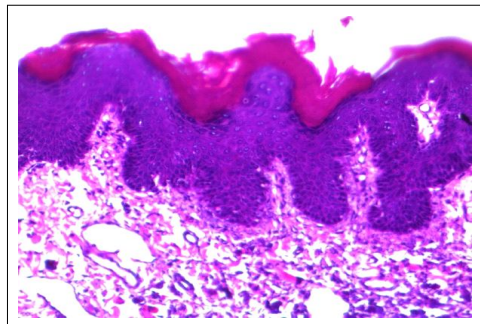


Fig 14: Skin-hyperplasia of epidermis with hyperkeratosis (100x).

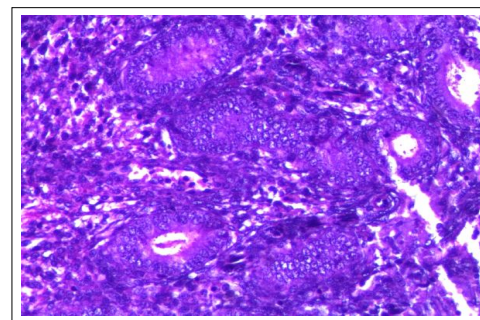


Fig 15: Hyperplastic endometrial gland (400x).

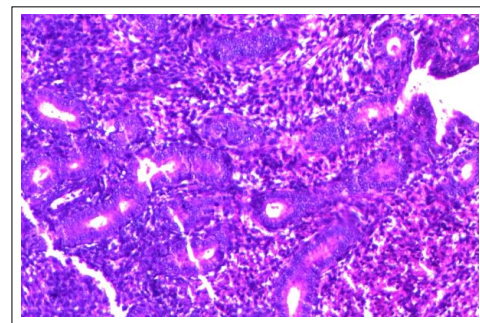


Fig 16: Metaplastic changes in endometrium: Tadpole shaped/ tapered endometrial glandular cells indicative of hyperplasia (100x).

(acanthosis), an epidermoid cyst that contained both follicular keratosis and follicular dilation with the presence of melanin pigments (hyperpigmentation).

In our study, VEC revealed cytological estrus and serum progesterone concentration was 3.02 ng/ml which was observed during preovulatory LH surge indicative of persistent follicle or no ovulation and prolonged estrus (Concannon *et al.*, 1975). Sasidharan *et al.* (2021) reported that insufficient LH surge, intrafollicular changes in gonadotrophin receptors and growth factors are the possible reasons behind the occurrence of hormonally active ovarian cysts that predisposes the bitch to the development of cystic endometrial hyperplasia-pyometra complex and hyperestrogenism which was in agreement with our investigation. Canine ovarian cysts were successfully treated with hCG at doses between 450 and 3000 IU per animal or GnRH analogue buserelin at doses between 0.8 and 6 µg per animal in 63% of bitches and Ovariohysterectomy is a curative treatment procedure in most cystic ovarian disorders to prevent the potential recurrence (Knauf *et al.*, 2013; Risvanli *et al.*, 2016) which was in agreement with our case.

CONCLUSION

The present case can be concluded as the detailed history collection, suggestive signs, ultrasonography as the imaging modality for the clinical diagnosis confirmed by assay of ovarian steroids and histopathology along with differential diagnosis and prompt sequential treatment had successfully managed the case of sex hormones imbalance induced dermatoses due to hormonally active follicular cyst which mostly underwent un diagnosed in field conditions.

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Conflict of interest: None.

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