

## Vaginal fold prolapse and transmissible venereal tumour related to ovarian remnant syndrome in a bitch: a case report

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**ABSTRACT:** A four-year-old cross-breed and neutered bitch weighing 24 kg, was presented with vaginal bleeding for one month and a vaginal mass identified two previously. An ovariohysterectomy operation was performed at two years of age; however, mating subsequently continued. Vaginal bleeding and an irregular-shaped, oedematous vaginal mass (12 × 9 × 7 cm) were detected on clinical examination. The bitch also exhibited leukocytosis and erythrocytopenia. Abundant erythrocytes together with neutrophils, lymphocytes, intermedier cells and transmissible venereal tumour cells were observed in vaginal cytology. Abdominal ultrasonography showed cystic ovarian tissue (2.42 × 1.36 cm) next to the right kidney. Chemotherapy was performed once a week for six weeks leading to a gradual declined in the size and oedema of the mass and to a stop in bleeding. Subsequently, the vaginal mass was extirpated and the ovarian remnant tissue was removed via laparotomy on the same day. The bitch was found to be healthy on examination four months later.

**Keywords:** bitch; ovarian remnant syndrome; transmissible venereal tumour; vaginal fold prolapse

Ovariohysterectomy is the procedure of removing both ovaries and uterine tissue for the purpose of sterilisation, as well as treatment and prevention of genital pathologies (ovarian and uterine tumours, traumatic and infectious uterine lesions like pyometra, glandular cystic hyperplasia, post-partum metritis etc.), and hormonal disorders (mammary hyperplasia and/or neoplasia, vaginal prolapse, diabetes etc.) (Kalkan and Alacam 2005; Fontbonne et al. 2007).

Ovarian remnant syndrome (ORS) is a complication resulting from a failure to remove all of the ovarian tissue during the ovariectomy or ovariohysterectomy operation. It has been recently reported that due to the re-vascularisation of the remaining ovary or ovarian tissue, pro-oestrus and oestrus signs such as bloody vaginal discharge, vulvar swelling and behavioural changes (attraction of male dogs, allowing mating) occur (Wallace 1991; DeNardo et al. 2001).

True vaginal prolapse is the protrusion of the whole vaginal mucosa through the vulva. Although true vaginal prolapse is commonly observed in cows, sheep and goats, it rarely occurs in bitches

(McNamara 1997). As a response to oestrogen (hyperaemia, oedema) during pro-oestrus and oestrus, one or more mucosal folds in the vagina may protrude into the vaginal lumen (Schaefers-Okkens 2001).

Another gynaecological disorder more common in temperate climates is canine transmissible venereal tumour (CTVT). It generally occurs in dogs with uncontrolled sexual behaviour. This disease is transmitted not only by mating but also by viable tumour cells through injured mucosa and skin during licking and sniffing (Nielsen and Kennedy 1990; Murgia et al. 2006).

The present report describes the evaluation of a bitch diagnosed with ORS, TVT and vaginal fold prolapse concomitantly.

### Case description

**History.** A 4-year-old cross-breed and neutered bitch weighing 24 kg, was presented to the clinic of Obstetrics and Gynaecology, Faculty of Veterinary Medicine, University of Istanbul, with vaginal



Figure 1. The appearance of the vaginal mass on the first day of medical exam

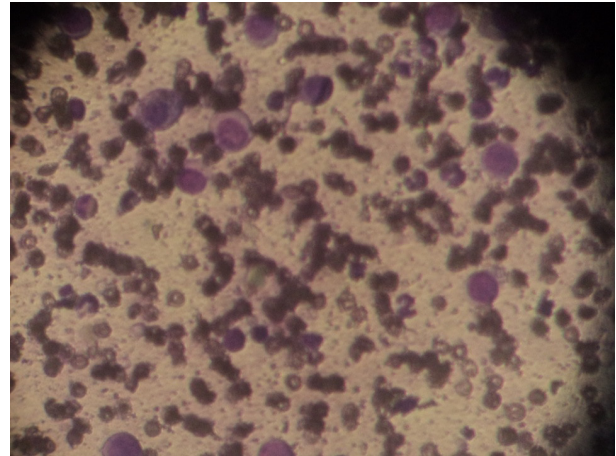


Figure 2. The microscopic image of the vaginal smear on the first day of medical examination

bleeding for one month and a vaginal mass identified two weeks previously (Figure 1). Accompanying complaints were loss of appetite and weakness. The owner indicated that the bitch continued mating despite being neutered two years ago.

**Clinical features.** On physical examination the rectal temperature, pulse and respiratory rates of the patient were within reference ranges. Vaginal bleeding, vulval oedema and an irregularly shaped vaginal mass (12 × 9 × 7 cm) protruding through the vulva in a pendulous fashion were identified on palpation and inspection of the genital tract.

**Diagnosis.** Copious amounts of erythrocytes, neutrophils, lymphocytes, intermedier cells and ovoid cells containing intracytoplasmic vacuoles were observed in the vaginal cytology stained with Diff-Quick stain (Figure 2). According to the

haemogram results, leukocytosis and erythrocytopenia were determined while all other parameters were in normal ranges. An anechogenic area (2.42 × 1.36 cm) was identified behind the right kidney in the ultrasonographic examination of the abdomen (Figure 3).

**Outcome.** After the diagnostic evaluation of the bitch, preoperative chemotherapy was planned in order to reduce the size of the vaginal mass and stop the bleeding. Five mg/kg of enrofloxacin (5% Baytril-K<sup>®</sup>, Bayer, s.c., s.i.d.) and 150 µg/kg of Vit B<sub>12</sub> (Dodex<sup>®</sup>, Vetas, i.m, s.i.d.) were prescribed for the treatment of leukocytosis and lethargy. Vincristine sulphate (0.025 mg/kg; Vincristine<sup>®</sup>, Kocak Pharma) was administered intravenously to the bitch once a week for six weeks. Haematology and vaginal cytology were checked before each cy-



Figure 3. The ultrasonographic image of the ovarian remnant tissue



Figure 4. The ovarian remnant tissue after surgical removal

cle of chemotherapy. Vaginal bleeding stopped directly after the first week of chemotherapy. During the chemotherapy treatment the size of the vaginal mass gradually decreased. Finally, it could only be detected by vaginal inspection. One week after the last chemotherapy, it was decided to perform surgical removal of the residual ovary and vaginal mass. General anaesthesia was induced with 6 mg/kg of propofol (Pofol<sup>®</sup>, Dongkook, Korea) intravenously followed by isoflurane (Isoflurane<sup>®</sup>, Rhodia Organique, UK) in oxygen (2%). Residual ovarian tissue (Figure 4) was removed with a median incision made just behind the umbilical cord sign. The vaginal mass was extirpated without need for episiotomy during the operation.

## DISCUSSION

The most common method to neuter dogs and cats is ovariohysterectomy and ovariectomy. In cases where the ovarian cortex is not completely removed, a complication called ovarian remnant syndrome (ORS) occurs (Wallace 1991). There is no report describing that the oestrogen released from adrenal glandula can cause pro-oestrus and oestrus symptoms in dogs and cats. Therefore, the existence of pro-oestrus and oestrus signs after neutering is related to a functional ovarian tissue (Wallace 1991; Prats 2001). Although the anamnesis is helpful for a tentative diagnosis of ORS, clinical examination, vaginal cytology, hormone stimulation test, ultrasonography and experimental laparotomy provide accurate alternatives for the diagnosis (Wallace 1991; DeNardo et al. 2001; Romagnoli 2001; Sangster 2005). Vulval oedema and bloody vaginal discharge can be observed during the physical examination. Vaginal cytology findings of a bitch with ORS are usually correlated with signs of pro-oestrus such as the existence of red blood cells, neutrophil granulocytes and intermedier cells (Post 1985). Anechoic or hypoechoic structures observed during the ultrasonic inspection around the kidney area indicate the existence of ovarian parenchyma in the follicular phase (Davidson and Baker 2009). The results obtained from the examination of the bitch in this case were consistent with the above-mentioned findings.

Musal and Tuna (2005) and Sontas et al. (2010) reported cases of concomitant occurrence of ORS, TVT and stump pyometra in bitches. However, no uterine tissue was noted in the ultrasonographic

exam and laparotomy in our patient. Although there has been a report by Jurka and Hawrynska (2008) about a unique case of both ORS and vaginal hyperplasia, this is the first reported case of the bitch having concomitant ORS, TVT and vaginal fold prolapse. In the present case report, oestradiol released by the remaining ovarian tissue induced pro-oestrus and oestrus signs in the bitch. Therefore, the bitch probably continued mating and was most likely infected by TVT through copulation. Additionally, it is likely that the vaginal fold prolapse occurred due to the response of the vaginal tissue to oestradiol released by the remaining ovarian tissue.

Purswell (2000) suggested the use of the terms 'vaginal oedema' or 'vaginal fold prolapse' for cases of vaginal tissue protruding into the vaginal lumen and especially seen through the vulvar lips, as there is no true vaginal prolapse or hyperplasia. This condition develops as a result of hyperaemia that is followed by oedema due to the increased oestrogen levels during pro-oestrus and oestrus (Schaefer-Ockens 2001). Kim et al. (2008) reported a vaginal fold prolapse case developing as a result of multiple follicular cysts in the ovary of a bitch. According to their report, the vaginal tissue responded to GnRH treatment but three months later recurrence occurred. Thus, the authors decided to surgically remove the ovarian tissue and vaginal mass. The vaginal mass of the bitch in this presented case was quite large as a result of TVT. In order to decrease the haemorrhaging and size of the mass, treatment was initiated with chemotherapy.

Although canine TVT has been shown to suppress the immunity of the host, thereby allowing tumour growth, it is considered as a benign tumour (Scarpelli et al. 2010). Chemotherapy with anti-mitotic agents, immunotherapy, radiotherapy and surgical excision are the recommended treatment options for canine TVT (Das and Das 2000). In the current case, vincristine sulphate (Vincristine<sup>®</sup>, Kocak Pharma, 0.025mg/kg *i.v.*) was administered to the bitch once a week for six weeks together with supportive care using vitamin complex. Any side effects were monitored during chemotherapy.

Although it has been reported that metastasis of TVT is uncommon (Purohit 2013), metastatic growth has been reported in mammary glands (Bastan et al. 2008; Nak et al. 2008; Varughese et al. 2012), lymph nodes (Adams and Slaughter 1970; Perez et al. 1994), brain (Adams and Slaughter 1970), cutaneous tissue (Ayyapan et al. 1994), or-



bital area, brain (Adams and Slaughter 1970) and in the nasal cavity (Parent et al. 1983). In this patient, no evidence of metastasis was observed on the first examination, subsequent controls and the following year.

## CONCLUSION

Ovarian remnant syndrome is a surgical error which leads to continued secretion of ovarian hormones. Bitches with ORS cannot become pregnant but become more susceptible to the pathologies like ovarian cysts and tumours, stump pyometra, TVT, vaginal fold prolapse and skin diseases caused by hyper-oestrogenism. In the present case report, the bitch continued her sexual activity after the ovariohysterectomy operation and developed TVT due to uncontrolled matings. Additionally, oestrogen secretion from the residual ovary caused vaginal fold prolapse. Although ORS is characterised as a syndrome, it is in fact an iatrogenic complication. Ovaries should be removed totally using proper surgical techniques and great care must be taken during ovariohysterectomy procedures in order to avoid residual ovary-related pathologies.

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