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CASE REPORT

Large Follicular Cyst in a Holstein Cow

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ABSTRACT

This case report is based on a large follicular cyst (55x42 mm) in a five years old Holstein cow diagnosed by ultrasonography. The serum progesterone (P4) and estradiol 17-β (E2) levels were 2.589 ng/ml and 116.497 pg/ml, respectively at the 1st examination. The cyst started luteinization with the treatment of 10 µg i.m. GnRH and 1000 IU i.v. hCG. On ultrasonographic examination on 9th day, cyst measured 33x31 mm. Following 500 µg $PGF_{2\alpha}$ i.m. administration, the cow exhibited signs of oestrous. Serum collected at this stage revealed P4 and E2 to be 14.438 ng/ml and 141.337 pg/ml, respectively. Three days after the $PGF_{2\alpha}$ application, the ultrasonography revealed the lysis of the luteinized cyst and P4, E2 levels were detected 0.435 ng/ml and 131.067 pg/ml, respectively. Afterward the cow had normal outward appearance. The uterus and ovaries were normal on rectal palpation. The cow was artificially inseminated and became pregnant.

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INTRODUCTION

Approximately 5.6-18.8% of dairy cows develop ovarian cysts (Kesler and Garverick, 1982). Ovarian cysts are defined as follicular structures that are larger than 2.5 cm in diameter and that persist for at least 10 days in the absence of a corpus luteum (Kesler *et al.,* 1980; Coleman, 2008). Cysts most commonly occur during the first 60-90 days of postpartum after ovulation failure without obvious clinical signs and do not regress and maintain their growth and steroidogenesis (Vanholder, 2005). Etiology of ovarian cysts is multifactorial and it depends on the phenotypic, genetic and environmental factors. High milk yield, hot season, stress and negative energy balance may contribute for the development of cystic ovarian follicles through the metabolic adaptations that occur to sustain the animal's high level of production (Amer and Mahdi, 2008; Braw-Tal *et al*., 2009). It is evident that ovarian cysts are the result of the dysfunction of the hypothalamic-pituitary-gonadal axis (Rosenberg, 2010).

Cystic ovarian follicles are one of the main factors that cause subfertility in dairy cattle, as they prolong the calving interval and 10 to 30% of conception in dairy cows (Coleman, 2008; Salvetti *et al*., 2010). Clinical signs of cystic ovarian follicles are variable; anoestrus occurs frequently during the postpartum period both with follicular and luteal cysts, irregular estrus intervals, nymphomania, relaxation of the pelvic ligaments and masculinization can be seen during lactation period (Vanholder, 2005). Follicular cysts may be single or multiple on one or both ovaries with a thin wall (≤3 mm) and the follicular fluid is uniformly anechogenic, while luteal cysts have a thicker wall (>3 mm) with echogenic rim. Also, the latter often have echogenic spots and web-like structures in the follicular fluid. Follicular cysts produce estrogens in the absence of other follicles, this production can cease in a variable time period (Kesler and Garverick, 1982). Rectal palpation, ultrasonography and the detection of the progesterone concentrations in milk or plasma are the main diagnostic methods for the cystic ovarian structures in dairy cattle (Hooijer, 2003).

Currently, human chorionic gonadotropin (hCG) and pituitary content with high LH extracts are used for treatment. Synthetic gonadotropin-releasing hormone (GnRH) has been used for the treatment of ovarian cyst successfully (Bierschwal *et al.,* 1975; Amiridis, 2009). A good reproductive performance affects a cow's active herd life and dairy herd economics (Vanholder, 2005). The aim of this paper is to report a 55x42 mm follicular cyst and its treatment in a 5 year old Holstein cow.

History and clinical examination: A five years old Holstein cow with outward physical appearance that did not differ from cows with normal ovarian function was examined. Although she was inseminated several times but failed to conceive. The external genitalia were relaxed

and enlarged during this period. A wide range of estrous behavior patterns and nymphomania symptoms were also observed in the cow.

Diagnosis: A follicular cyst was detected in the left ovary by routine rectal palpation which revealed that the cyst was thin walled and flaccid. The absence of luteal structure as demonstrated by ultrasonography (Agrosan, France). For this purpose 7.5 MHz linear-array intrarectal transducer was used. The cyst was 55x42 mm in diameter in the first ultrasonography (Fig. 1). All collected serum samples were analyzed by ELISA system (Bio-tec µ-Quant-USA) for serum concentrations of progesterone and estradiol 17-β. The serum progesterone and estradiol 17-β levels were 2.589 ng/ml and 116.497 pg/ml, respectively at the first examination before the treatment.

Treatment: The cow was treated with a GnRH (Buserelin acetate, Receptal ®, Intervet, Turkey, 10 µg i.m.) and hCG (Pregnyl®, Organon, Turkey, 1000 IU, i.v.) combination on the first day of diagnosis and the first blood sample was collected for determination of progesterone and estradiol 17-β levels before the treatment. After 9 days, an ultrasonographic examination was made. The cyst was found to be smaller and measured as 33x31 mm in diameter and luteinization was also observed (Fig. 2). Prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) (Cloprostenol, Estrumate® Sanofi-Dif, Turkey, 500 µg i.m.) was administered. A second blood sample was collected for hormone assay. In the study the luteinized cyst was observed last by ultrasonography on the 9th day of the treatment and the complete lysis of the luteinized cyst was observed on the 12th day which means lysis took 3 days.

Three days after the $PGF_{2\alpha}$ application, the last ultrasonography was performed which revealed that the lysis of the luteinized cyst was visible. The cow came to heat in approximately 70 hours after the $PGF_{2\alpha}$ injection and was inseminated twice on 70th and 80th hours and became pregnant. During this period progesterone concentration was reduced in line with the treatment (Table 1).

DISCUSSION

Kesler *et al.* (1980) reported that cysts may regress and new follicular structures may form into other anovulatory cysts. In some cases, cysts may persist for 40 days and additional follicles may accompany to these persistent structures (Hamilton *et al.,* 1980). In this case the cystic structure was diagnosed at the time of rectal palpation.

Hooijer (2003) reported that GnRH and hCG demonstrate equally endocrine and clinical responses but GnRH has an advantage over hCG for its minimal antigenicity for the treatment of cystic ovarian cysts and prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) has also been used for its luteolitic activity and the oestrous symptoms could be observed within 2 to 3 days. The cystic structure in this case was treated with the combination of GnRH and hCG. There wasn't any antigenic reaction. Also for the luteolytic activity $PGF_{2\alpha}$ was administered after 9 days.

Manual rupture of the cystic structures by rectal palpation of the ovary can be injurious and cause reduced fertility (Kesler *et al*., 1980). Despite a correct diagnosis, a follicular cyst may not respond to GnRH treatment. Such cysts may respond to hCG making use of fairly large protein molecules which may stimulate antibody formation in the recipient. Repeated treatment with GnRH does not result in anaphylaxis. In this case manual rupture of the cyst was not performed and there was no problem encountered after the administration of GnRH and hCG combination. With this combination it is not critical whether the cyst is follicular or luteal even a misdiagnosed large smooth central cavity (Augustine, 1997).

The interval from GnRH treatment to estrus has been reduced by $PGF_{2\alpha}$ administration 9 days after GnRH. The cow exhibits signs of oestrus 2 to 3 days after $PGF_{2\alpha}$ treatment (Kesler and Gaverick, 1982). In this case the same preparation was administered to lyse the luteal cyst and the cow exhibited signs of oestrus within 2 to 3 days.

Cystic ovaries commonly occur in Holstein-Friesians than in Jersey, Guernsey or Ayrshire cows and also varies among sire-lines within breed (Coleman, 2008). In this case the cow that experienced cystic ovary was also a Holstein. Higher levels of estrogen were found in cows with cysts (Coleman, 2008) in line with our case.

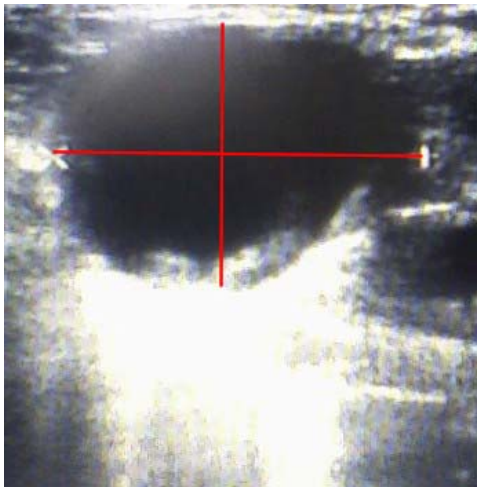

Fig. 1: The cyst was 55x42mm in diameter in the first ultrasonography

Fig. 2: The cyst was found to be smaller and measured as 33x31 mm in diameter and luteinization was also observed

Table 1: Serum progesterone (ng/ml) and estradiol 17-β (pg/ml) levels at various days

Serum sampling days	Progesterone	Estradiol 17-β
0	2.589	116.497
9	14.438	141.337
12	0.435	131.067

In conclusion, this report confirms that both GnRH and hCG combination can be effective for the treatment of cystic ovaries in cows.

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