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Therapeutic management of follicular cyst in a Cross Breed jersey cow

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Abstract
A four years old primiparous Cross breed Jersey cow was presented with history of not getting conceived after multiple inseminations. On gynecological examination left ovary has follicle size of 19.2 mm diameter with wall thickness of 1mm diameter with absence of corpus luteum. Co-synch protocol was adapted using GnRH and prostaglandin on day 0 and 7 along with oral administration of 8 gram of potassium iodide for 7 days. Second GnRH on day 9 was followed with Artificial insemination on day 9 and 10 with ultrasonographic evidence of ovulatory confirmation on day 11. Pregnancy was subsequently confirmed on day 24 post-insemination.

Keywords: Artificial insemination, co-synch, follicular cyst, ultrasonogram

Introduction
Over the past few years, the average milk production of crossbred cow has been significantly increased from 7.15 kg (2014-15) to 8.39 kg on 2020-21 (AHS, 2021) [1]. The increase in productivity can be attributed to ongoing efforts in genetic selection, nutrition and managemental practices. However, this emphasis on production traits has coincided with a notable decline in dairy cow fertility (Lucy *et al.*,2001) [9]. Follicular cysts are anovulatory follicle that persists on the ovary for 10 days and often much longer, have a diameter greater than 2.5 cm and characterized by either nymphomania or continuous or frequent estrus or by anestrus. In addition to it follicular cyst have a smooth convex surface due to anovulation (Roberts *et al.*, 1971) [14]. Follicles greater than 15 mm in diameter, lasting for a minimum of 7 days with low progesterone concentration, have been identified. Some researchers define cystic ovarian follicles as those measuring at least 17 mm in diameter, persisting for over 6 days, in the absence of a detectable luteal structure via ultrasound examination (Yotov *et al.*, 2014) [19]. Over time new definitions have been suggested, however, a consensus and a clearly defined definition are still lacking. The condition is a consequence of mature follicle that fails to ovulate at the expected time of ovulation during the estrus cycle (Peter *et al.*, 2004) [13]. Research using ovarian ultrasonography indicates that follicle typically ovulate at 13-17 mm in diameter (Ginther *et al.*,1989) [4] hence the follicle which persisting at that diameter or greater may be classified as cystic (Hatler *et al.*, 2003) [6]. Follicular cyst are much more prevalent than luteal cyst; While the precise cause of ovarian follicular cysts remains undetermined, it is acknowledged that they form when one or more follicles fail to ovulate and consequently do not regress, instead continuing to grow and produce steroids (Vanholder *et al.*, 2006) [17]. The current case demonstrated a multifaceted treatment regimen for follicular cysts and its successful outcome in a dairy cow.

Case history and clinical observation
A four years old primiparous Cross breed Jersey cow was presented to the Large Animal Gynaecology Unit, VCC, VCRI, Namakkal with a history of calved two years back and not getting conceived after multiple inseminations. Furthermore the cow exhibited cyclic signs with irregular inter-estrous interval. The cow was treated with intra uterine therapy for two times in last six months.

On clinical examination, all the vital parameters were in the normal range; Rectal examination revealed relaxed cervix with similar uterine horns with moderate tonicity. Based on general examination, the cattle exhibited sterility hump. For further investigation transrectal ultrasonography was performed and explored 19.2 mm follicle in the left ovary and two follicles of 6.3 and 7.4 mm in the right ovary without corpus luteum.

Treatment and Discussion

Co-synch Protocol was implemented by administrating Inj. GnRH @ 20 µg on day 0 followed by Inj. Prostaglandin 500 µg on day 7 and second GnRH @ 10 µg on day 9 IM with fixed time artificial insemination on day 9 and 10. In addition to it, Inj. Dexamethasone @ 40 mg, Inj. Vit AD_3E @10 ml, Inj. Tonophosphan 15 ml I/M along with oral administration of Bolus. Cyclomin 7 and potassium iodide of 8 gram diluted with warm water for 7 days.

While ultrasonography may not provide absolute accuracy, it remains a reliable method for distinguishing ovarian cysts in cows (Bors and Bors 2022) [2]. The most cost-effective approach for treating follicular cysts is to initiate treatment promptly upon diagnosis, without waiting for a voluntary period during which spontaneous recovery might occur (Brito and Palmer, 2004) [3]. Hence the present case was initiated for therapeutic intervention on the day of observation. GnRH is the most effective treatment in which 72 to 85% cows return to normal cyclic ovarian activity (Brito and Palmer 2004) [3]. Subsequent ultrasonographic examination revealed a follicle size of 11.3 mm diameter in right ovary and cystic corpora lutea with 23.2 mm diameter in left ovary evinced that luteinization was evidenced in response to GnRH. On day 9 examination disclosed that a dominant follicle size of 12.4 mm diameter in right ovary and 13.6 mm diameter of corpora lutea in left ovary indicated luteolysis. Follow-up on day 11 revealed absence of dominant follicle with color flow Doppler ultrasound suggested the ovulated site on right ovary. The absence of heat signs from day 18 to 21 post insemination, coupled with an ultrasound examination on day 24 revealed an embryo in the uterus, suggests pregnancy.

Cows with follicular cyst have waves of follicular growth associated with increased estradiol secretion, but lack a preovulatory LH surge during the growth of anovulatory follicle.

The prevailing hypothesis regarding the formation of ovarian cysts suggests an alteration in release of luteinizing hormone (LH) by the hypothalamic-pituitary-gonadal (HPG) axis. The abnormal LH release is believed to result from changes in the feedback mechanism of estrogens on the hypothalamus-pituitary axis. Moreover, various factors can influence the release of GnRH and LH at the hypothalamo-pituitary level. At the ovarian level, cellular and molecular alterations in the growing follicle are thought to contribute to anovulation and cyst formation (Bors and Bors 2022) [2]. Elevated levels of kisspeptin can increase circulating concentrations of LH in Holstein cows and ovariectomized Jersey cows. Kiss1 neurons play a crucial role in regulating GnRH release and modulating the HPG axis (Whitlock *et al*, 2011) [18].

The increased expression of bovine vascular endothelial growth factor (VEGFA-164, VEGFA-164b, and VEGFR2) observed in cysts compared to dominant follicles precisely at the onset of anovulation, implies a significant involvement of these growth factors in the pathogenesis of ovarian cysts and their associated angiogenic dysregulation (Stassi *et al*., 2019) [16]. The etiopathogenesis of ovarian cysts in dairy cattle involves a complex interplay of factors, including the disruption of several physiological processes such as folliculogenesis, steroidogenesis, and ovulation. Additionally, factors such as stress, herd management practices, nutritional status, body condition, metabolic disorders, altered mRNA expression, and Matrix Metalloproteinases and their inhibitors contribute to this multifaceted condition. Metabolic, endocrine, and environmental changes likely disrupt the neuroendocrine feedback at the level of Kiss (Bors and Bors 2022) [2].

Non hormonal treatment includes manual rupture and follicle aspiration using ultrasound guided needle (Mimoune *et al* 2021) [11] trans-gluteal follicular cyst aspiration for non-responsive cyst (Satheshkumar *et al*., 2022) [15]. Manual rupture, although an age-old procedure, often leads to haemorrhaging and subsequent local adhesions. However, it may be deemed a viable option if hormonal therapy is not financially feasible. Hormonal treatment includes human chorionic gonadotropins, GnRH, Prostaglandin, progestogens with different response (Mimoune *et al* 2021) [11]. As an Economical treatment Ovsynch Protocol was practiced using GnRH and Prostaglandins. The initial injection of GnRH aims to stimulate follicular growth and induce ovulation or luteinization of any cystic follicle that may be present, leading to the formation of a corpus luteum. Subsequently, a $PGF_2\alpha$ injection is administered seven days later to halt progesterone synthesis, allowing any existing dominant follicle to persist and mature for ovulation. A second GnRH injection is administered after 48 hours to improve ovulation synchronization and prevent ovulation failure (Hanzen *et al*., 2008) [5].

In terms of estrus induction and pregnancy rates, iodine supplementation enhances the conception rate during the initial estrus and minimizes irregular breeding intervals. This is attributed to iodine's potential to boost thyroid activity, particularly beneficial in cows with ovarian cysts where thyroid function tends to be low (Meena *et al.*, 2017) [10]. The combination of Ovsynch protocol with oral administration of potassium iodide, and fixed-time insemination yields favourable pregnancy rates (Meena *et al.*, 2022) [11]. While the Ovsynch protocol may seem the most rational approach, pregnancy rates from timed inseminations remain low, reflecting outcomes observed with other hormonal therapies (Jeengar *et al.*, 2014) [8]. Corticosteroids inhibit the secretion of gonadotropins and ACTH from the pituitary gland in follicular cysts, thereby facilitating the restoration of endocrine function (Ijaz *et al.*, 1987) [7]. Therefore, a comprehensive approach was taken in the current case, employing a combination of GnRH, prostaglandins, potassium iodide and corticosteroids to manage various aspects and regulate ovarian activity, ultimately aiming to enhance fertility.

Conclusion

Advancements in ultrasonography have significantly enhanced the diagnostic aid for diagnosing the follicular cyst. In addition to combination of GnRH and prostaglandin, administration of potassium iodide and corticosteroids helps in regulating ovarian function, ultimately with the goal of improving fertility. Despite the absence of genetic predisposition for cystic ovarian degeneration, emphasizing increased conception rates over milk production should be a long term goal. Early diagnosis and treatment of follicular cysts, coupled with timely artificial insemination, can enhance conception rates.

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Conflict of interest
No conflict of interest relevant to this study was reported.

References
1. Basic Animal husbandry Statistics. Chapter II. Summary of Animal husbandry Statistics. Government of India. Ministry of Fisheries, Animal Husbandry and Dairying, New Delhi; c2021. p. 10.
2. Bors SI, Bors A. Ovarian cysts, an anovulatory condition in dairy cattle. Journal of Veterinary Medical science. 2022;82(10):1515-1522.
3. Brito LFC, Palmer CW. Cystic ovarian disease in cattle. Large Animal Veterinary Rounds. 2004;4:1-6.
4. Ginther OJ, Knopf L, Kastelic JP. Temporal associations among ovarian events in cattle during estrous cycles with two and three follicular waves. Journal of Reproduction and Fertility. 1989;87:223-230.
5. Hanzen CH, Bascon F, Theron L, Lopez-gatius F. Ovarian cysts in cattle. Part 3: Therapeutical aspects. Annals of the Veterinary Medicine. 2008;52:103-115.
6. Hatler TB, Hayes SH, Fonseca LFL, Silvia WJ. Relationship between endogenous progesterone and follicular dynamics in lactating dairy cows with ovarian follicular cysts. Biology of Reproduction. 2003;69:218-223.
7. Ijaz A, Fahning ML, Zemjanis R. Treatment and control of cystic ovarian disease in dairy cattel: A review. British Veterinary Journal. 1987;143:226-237.
8. Jeengar K, Chaudhary V, Kumar A, Raiya S, Gaur M, *et al*. Ovarian cysts in dairy cows: old and new concepts for definition, diagnosis and therapy. Animal Reproduction. 2018;11:63-73.
9. Lucy MC. Reproductive loss in high producing dairy cattle: where will it end? Journal of Dairy Science. 2001;84:1277-1293.
10. Meena M, Purohit GN, Kumar D, Saraswat CS. Thyroidal and progesterone hormones in cows with ovarian cysts and effects of therapy with levothyroxine, KI, GnRH and progesterone or Ovsynch. Advances in Animal and Veterinary Sciences. 2017;5(12):514-519.
11. Meena MK, Meena, S, Meena M, Purohit GN. Field approach to treat ovarian cysts in dairy cows. The Pharma Innovation Journal. 2022;11(7):2250-2253
12. Mimoune N, Yassine M, Khelef D, Kaidi R. Ovarian cysts in cattle: a review. Veterinarska Stanica. 2021;52(5):587-603. doi.org/10.46419/vs.52.5.10
13. Peter AT. An update on cystic ovarian degeneration in cattle. Reproduction in Domestic Animals. 2004;200s;39:1-7.
14. Roberts SJ. Injuries and diseases of the puerperal period. In: Veterinary Obstetrics and Genital Diseases (Theriogenology). 2nd ed. [Indian reprint]. CBS Publishers and Distributors, New Delhi, India; c2004. p. 482-484.
15. Sathesh kumar S, Prabaharan V, Raja S, Prakash S. Trans-gluteal follicular cyst evacuation: a successful technique to correct non responsive follicular cyst in cows. Haryana veterinarian. 2022;61:SI:40-43.
16. Stassi, AF, Gasser F, Velázquez MML, Belotti EM, Gareis NC, Rey F, *et al*. Contribution of the VEGF system to the follicular persistence associated with bovine cystic ovaries. Theriogenology. 2019;138:52-65.
17. Vanholder T, Opsomer G, Kruif A De. Aetiology and Pathogenesis of Cystic Ovarian Follicles in Dairy Cattle: a Review. Reproduction Nutrition Development. 2006;46:105-119.
18. Whitlock BK, Daniel JA, Wilborn RR, Maxwell HS, Steele BP, Sartin JL. Effect of kisspeptin on regulation of growth hormone and luteinizing hormone in lactating dairy cows. Journal of Animal Science and Biotechnology. 2011;2:131-140.
19. Yotov SA, Atanasov AS, Georgiev GB, Dineva JD, Palova NA. Investigation on some biochemical parameters and effect of hormonal treatment in anoestrous dairy cows with cystic ovarian follicle. Asian Pacific Journal of Reproduction. 2014;3:41-45.