



Effect of Addition of Potassium Iodide in Ovsynch Treatment for Management of Follicular Cysts in Hypothyroid Crossbred Dairy Cows

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ABSTRACT

Thyroid activity affects the reproductive capacity of bovines. Hypothyroidism is an important cause of suppression of the release of gonadotrophins (GnRH and LH) leading to anovulation and formation of cystic structures on the ovaries. This study was designed to evaluate the efficacy of Ovsynch plus potassium iodide based treatment for the management of follicular cysts in hypothyroid crossbred cows. A total of 24 cows were randomly and equally divided into two groups viz. Group I (Ovsynch plus KI supplementation @ 10 gm/orally/daily for 5 consecutive days) and Group II (Ovsynch). The serum T4 and iodine profile was significantly increased ($p < 0.05$) to normal range in Group I cows following Ovsynch plus KI treatment. The conception rate for Group I and Group II cows was 75.00 and 50.00%, respectively. It was concluded that the Ovsynch plus KI based treatment regime resulted in better resumption of biochemical profile and subsequent conception rates in cows with follicular cysts and hypothyroidism.

Key words: Dairy cows, Follicular cyst, Management, Ovsynch, Potassium iodide.

Milk productivity is directly depended on the untroublesome reproduction capability of dairy cows. In dairy cows, higher productivity may be attributed to superior genetic selection, better managerial practices etc. (Thusneem *et al.*, 2024). Follicular cyst is one of the major reproductive disorders in dairy cows leading to tremendous economic loss among farmers in terms of increased inter-calving period, decreased productivity, higher cost of management and increased culling rates (Silva *et al.*, 2002; Isobe, 2007; Bors and Bors, 2022; Sarath *et al.*, 2025). It may be defined as anovulatory follicles with a diameter exceeding 20 mm persisting more than 10 days on one or both the ovaries in the absence of corpus luteum (Silva *et al.*, 2012; Murayama *et al.*, 2015). The incidence of follicular cyst is frequent in early post-partum period (<60 days) as in this period cows have great metabolic stress (Gupta *et al.*, 2020). Till date many therapeutic regimes have been developed for the treatment of follicular cyst in dairy cows with limited success and among all treatments suggested Ovsynch is regarded as one of the most common therapies (Jeengar *et al.*, 2014; Ahmed *et al.*, 2017; Chauhan *et al.*, 2020). Thyroid activity affects the functionality of the reproductive axis. Hypothyroidism can suppress the release of GnRH and LH essential for normal ovarian function which can cause anovulation and formation of cystic structures on the ovaries (Mutinati *et al.*, 2013). Hence, the study has been designed to evaluate the efficacy of potassium iodide supplementation along with Ovsynch treatment in hypothyroid cows suffering from follicular cysts.

A total of 24 crossbred cows between 2 to 5 lactations with the history of high milk yield, irregular estrus, homosexuality and repeat breeding were included in the

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study. All the cows were screened twice ultrasonographically (10 days apart) and follicular diameter more than 20 mm were considered the cases of follicular cysts. All the cows were also screened for confirmation of hypothyroidism.

All the cows were randomly and equally divided into two groups. In group I (n=12), cows were treated with Ovsynch protocol + oral feeding of KI @ 10 gm daily for 5 consecutive days. In group II, cows received Ovsynch treatment without any KI supplementation.

Blood was collected from coccygeal vein on the day of initiation of treatment and 10 days after the completion of treatment and serum was separated and stored at -40°C for further biochemical analysis. The serum iodine, thyroxine (T4) and progesterone profile were analyzed by commercially available enzyme-linked immunosorbent assay (ELISA) kits with manufacturer's instruction.

Pregnancy was confirmed ultrasonographically on day 30 post artificial insemination. The conception rate was calculated for each group by number of cows conceived divided by total number of cows treated, multiplied by 100.

In the present study, the mean follicular diameter and endometrial thickness was recorded as 2.37 ± 0.07 and 0.68 ± 0.02 cm, respectively which was confirmatory of follicular cyst in crossbred dairy cows (Silva *et al.*, 2012; Gunaranjan *et al.*, 2021). The clinico-gynaecological findings were observed as edematous vulvar swelling, clear vaginal discharge, toned uterine horns and multiple numbered cysts in both the ovaries (Shambhavi *et al.*, 2022).

The mean serum T4 profile (45.40 ± 1.41 nmol/L) was significantly lower ($p < 0.05$) in all 24 cows with confirmed follicular cysts which was also supported by the findings of Meena *et al.* (2017), who recorded significantly lower concentration of plasma T4 in cows with ovarian cysts than cows without cysts. The lower level of circulating serum T4 profile in cows with follicular cysts might be due to impaired thyroid or peripheral deiodinase activity (Mutinati *et al.*, 2013). The mean serum T4 concentration was significantly increased (92.95 ± 1.96 nmol/L) to attain normal level in Group I cows following Ovsynch+KI treatment than Group II cows with Ovsynch treatment (55.44 ± 1.06 nmol/L).

In all cows with follicular cysts, the mean serum iodine concentration was 36.59 ± 0.653 $\mu\text{g/L}$, which was in accordance with the findings of Sarma *et al.* (2023). However, the serum iodine concentration increased to reach normal range (70.52 ± 1.82 $\mu\text{g/L}$) in Group I cows than Group II cows (55.44 ± 1.063 $\mu\text{g/L}$).

In the current study, the significantly lower serum T4 and iodine profile was depicting hypothyroidism resulting impaired fertility (Silva *et al.*, 1978). The KI supplementation along with the classical Ovsynch treatment helped to restore the normal serum profile of T4 and iodine in Group I cows than Group II cows who only had Ovsynch treatment.

The mean serum progesterone concentration in all cows prior to treatment was recorded as 0.635 ± 0.042 ng/ml which was also supported by Meena *et al.* (2017) in cows with ovarian cysts. However, the mean serum progesterone concentration was significantly increased in Group I cows (3.92 ± 0.028 ng/ml) in comparison to Group II cows (1.79 ± 0.044 ng/ml) which was in agreement with the records of Ahmed *et al.* (2016) in crossbred cows.

The conception rate in Group I cows following Ovsynch plus KI based treatment and Group II cows following only Ovsynch treatment was found to be 75.00 and 50.00 per cent, respectively. However, the lower overall conception rate of 47.50 per cent was noticed in cows with ovarian cyst treated with Ovsynch plus progesterone injection and oral

KI supplementation (Meena *et al.*, 2022). Iodine supplementation assisted to achieve higher conception rate and decreased irregular calving interval as it repaired the normal thyroid activity which tended to be lower in cows with follicular cysts (Mutinati *et al.*, 2013). Pushp *et al.*, (2016) also reported that the incidence of maximum follicular cysts disappearance and presence of luteal tissue post treatment following combine use of GnRH analogue injection plus oral KI supplementation @ 10 gm for 5 consecutive days (80.00%) than single GnRH analogue (70.00%), KI (nil) or Ovsynch (50.00%) treatment.

CONCLUSION

In conclusion, hypothyroidism is an important cause of follicular cysts in cows due to impaired hormonal axis. Mostly, hypothyroidism was neglected in cows who was suffering from follicular cysts leading to variations in the success of its any treatments. We suggest, ruling out of impaired thyroid activity along with the clinico-gynaecological findings for better management of follicular cysts in dairy cows. In terms of resumption of biochemical profile and subsequent conception rate, Ovsynch plus KI based treatment was found to be better than only Ovsynch treatment in cows with follicular cysts and impaired thyroid activity.

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Author contribution

N. Ahmed and D. Borpujari designed the study. All the authors participated in the study and drafting of the manuscript.

Informed consent

The prior approval from the Institutional Animal Ethics Committee was obtained for use of animals in this study.

Conflict of interest

Authors have no conflict of interest in this study.

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