



## Using Double Dose of GnRH for Reducing Incidence of Cystic Ovaries in Cows

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**ABSTRACT:**

Cystic ovarian disease (COD) has been recognized as one of most important problem in dairy farm, it is a managerial and financial problem. 120 Holstein cows with average age between 3 to 5 years were used in this study to determine whether giving GnRH at 14<sup>th</sup> day and 21<sup>st</sup> day after parturition (using two different types of GnRH) has a role in decreasing incidence of cystic ovaries during days open, and is there is any effects of this program on fertility parameters (the interval from calving to conception, number of service per conception, first service conception rate). Also we refered to the season of milking to see how it affects on the incidence of COD. The findings of this study indicate that using two dose of GnRH (Receptal or Cystorlin) at 14 and 21 days after parturition did not give significant difference comparing with the costs of the programs in preventing COD except a moderate result by using Cystrolin especially with cow more than one season which decreased the incidence by 11%. COD may reach to 42% in herd especially the high yielding Holstein cow. No significant effect on fertility parameters positively or negatively by using GnRH in postpartum period.

### 1. INTRODUCTION

One of the most common ovarian dysfunctions during the postpartum period is the formation of a cyst after ovulation failure (Laporte et al., 1994, Opsomer et al., 1998). In cattle, cystic ovarian follicles are generally defined as large (> 2.5 cm) anovulatory follicles that persist on the ovary for at least 10 days in the absence of a corpus luteum. Despite the condition of persistence for 10 days or

more, cysts are however frequently replaced by new ones (Hamilton et al., 1995). Cysts most commonly occur during the first 60 to 90 days postpartum (Laporte et al., 1994).

Cystic ovarian disease (COD) has been recognized as a one of most important problem in dairy farm, it is a managerial and financial problem. There has been a considerable amount of research

published on the disease. In spite of this large body of literature, the etiology of COD is not entirely understood. In addition, preventive management is not yet perfected. Fortunately, knowledge base of COD has increased over the past thirty years. Much of the knowledge has been gained due to the advent of better technology (Cynthia, 2004).

There are three types of cysts occurring on the bovine ovary: follicular cysts, luteal cysts and cystic corpora lutea. Follicular and luteal cysts are the only two true types of cysts that are associated with an abnormal condition in cows. Cystic CL was considered nonpathological (Garverick, 1999).

GnRH is the most common treatment for COD. Treatment results in an immediate increase in LH secretion and luteinization of the cyst. Ovulation of the cows with follicular cysts responding to the second PGF2 $\alpha$  treatment when compared to GnRH alone (Lopez-Gatius et al. 2002). Because differentiation between luteal and follicular cysts is difficult, and because PGF2 $\alpha$  treatment may be beneficial when treating follicular cysts, combining PGF2 $\alpha$  with the GnRH treatment was recommended (Leonardo and Colin 2004).

The objective of this study was to determine the effectiveness of two types of intramuscular injection of GnRH (Receptal and Cystrolin) and their preventive role in postpartum ovarian cysts

Under field study.

## 2. Materials and Methods:

**2.1. Animals:** The animals used in this study belonging to a private dairy farm in Borg el Arab (El-Gadid), Alexandria. 120 Holstein cows with average age between 3 to 5 years, animals housed in free open yards with metal shades and metal fence, each head have a free space about 30 meter square, with a sandy land. The cows were divided according to the production level, first category is the high

lactating cows, which divided into three groups, the first one the average daily yield 40-55 kg, the second group with an average daily yield 30-40 kg. The last group with an average milk yield 20-30 kg. The second group is the low lactating cows average daily yield about 10-20 kg. The average production of the cows in the season were 8-11 tons according to the season of the milking of cows. Milking was automatic and performed three times daily.

Cows were routinely vaccinated. They were fed three times daily with a total mixed ration (TMR) after each milking, with well balanced ration, energy, protein, minerals and vitamins with special attention to trace element and selenium and phosphorus. All sources used were with high quality ration consisting of corn silage, hay and concentrates that consist of yellow corn, soya bean meal, bran, vitamins and minerals. Feed is open to all high lactating cows, and yards have a clean source of water.

Gynaecological examination of cows was conducted in the herd in 5-7 day intervals, first examination was at about 10- 15 days after parturition to investigate uterine involution and checking the health status of uterus and cervix. Second examination was at about 20-30 days to check for complete involution and examining the ovaries, after that near day 35 postpartum, the ovaries were checked for estrus at the day 40 for an early AI for a chance in decreasing days open.

Diagnosis was done by rectal palpation and clinical signs, the criteria used on palpation per rectum were the presence of multiple follicles on the ovary with at least one follicle being >17 mm in diameter, the absence of a corpus luteum (CL) on either ovaries, and the lack of tonicity of the uterus. Cows were examined at days 25 and 35 postpartum, and at day 45 after AI. Animals which return to estrus less than 17 day or repeat breeder animals which take more than 3

AI and get in estrus again were examined for normal cyclicity of ovaries and absence of any problems. Cystic animals were grouped according to the drug used and interval of treatment.

The objective of this study was to determine whether giving GnRH at 14<sup>th</sup> day and 21<sup>st</sup> day after parturition (using two different types of GnRH) has a role in decreasing incidence of cystic ovaries during days open, and is there is any effects of this program on fertility parameters, (the interval from calving to conception, number of service per conception, first service conception rate,). Also we refered to the season of milking to see how it affects in the incidence of COD.

All cows were divided to two groups each one includes three subgroups as follows: Group (A) contained cows in the first season of milking, which were divided into; Group (A1) (n= 16), cows were treated with two dose of Receptal (buserlien acetate) 5 ml, at 14<sup>th</sup> and 21 day after parturition. Group (A2) (n= 12) cows were treated with two dose of Cystrolin 2 ml (Gonadorelin diacetate tytrahydrate), at 14<sup>th</sup> and 21 day after parturition. Group (A3) (n= 16) control cows, without any hormonal treatment.

Group (B) contained cows more than one season, which were divided into; Group (B1) (n= 31) cows were treated with double dose of Receptal 200mg, at 14<sup>th</sup>

and 21 day after parturition. Group (B2) (n= 14), cows were treated with double dose of Cystrolin 100mg, at 14<sup>th</sup> and 21 day after parturition. Group (B3) (n= 30) control cows without any hormonal treatment.

All groups were regularly examined at 15, 25 and 35 days after parturition. All changes were carefully recorded including changes in the ovaries, and health status of uterus and ovaries.

### 3. RESULTS

Table (1) represents percentage of COD incidence in cows in 1<sup>st</sup> season (37.5%, 35%, 37.5%, A1, A2, A3, respectively). While cows more than one season were represented in table (2), giving highest incidence of COD in control group (B3) 46.6%, and group (B1) and group (B2) which treated with GnRH (Receptal and Cystrolin), 38.7%, 35.7% ,on the other hand when we look to percentage all over the herd with no regarding to the season we found that in table (3) cows which treated with Receptal at 14 day and 21 day post partum, the incidence of COD is 38% while the incidence of COD in cows treated with Cystrolin is 33% and the percentage of incidence in control animals is 42%.

The fertility parameters were represented in table (5) showing the conception rate in first service in the three groups (36%, 34.6%, 34.7%).

**Table 1. Cows in first season of milking**

Drug used	Number of cows in groups	COD cows	Percentage of incidence
Receptal (A1)	16	6	37.5%
Cystrolin (A2)	12	4	33%
No drug used (control) (A3)	16	6	37.5%

**Table 2. cows more than one season.**

Drug used	Number of cows in groups	COD cows	Percentage of incidence
Receptal (B1)	31	12	38.7%
Cystorlin (B2)	14	5	35.7%
No drug used (control) (B3)	30	14	46.6%

**Table 3. cows without regarding to the season.**

Drug used	Number of cows in groups	COD cows	Percentage of incidence
Receptal (C1)	47	18	38%
Cystorlin (C2)	26	9	33.3%
No drug used (control) (C3)	46	20	42%

**Table 4. Fertility parameters in the three groups.**

	Number of cows in group	Number of service for the group	Number of cows conceived from 1 <sup>st</sup> service	days to 1 <sup>st</sup> service
Receptal 200mg	47	107	17	66
Cystorlin 100mg	26	57	9	65
No drug used (control)	46	101	16	65

**Table 5. Fertility parameters in the three groups.**

	Days open	First service conception rate	Over all conception rate	Service per conception
Receptal 200mg (C1)	104	36%	43.9%	2.2
Cystorlin 100mg (C2)	106	34.6%	45.6%	2.2
No drug used (control) (C3)	105	34.7%	45.5%	2.2

## Discussion:

An ovarian cyst is an anovulated follicle-like structure (greater than 2 cm in diameter) that may persist on the ovary (usually for more than 10 days) or may regress to be replaced by other cysts (Peter, 1988). Also 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. Two types of pathologic cysts are recognized, follicular and luteal. Follicular cysts may be single or multiple involving one or both ovaries and are usually thin-walled. Luteal cysts are usually single structures on one ovary and generally are thicker-walled than follicular cysts. Follicular cysts can progress to become luteal cysts through the luteinization process (Augustine and Peter, 2000).

Gonadotropin-releasing hormone (GnRH) has been used in the postpartum period, however, the studies have yielded mixed results. Results show little or no positive impact on the subsequent fertility of treated cows (Gaines, 1994). Herds with good reproductive performance showed a benefit from routine treatment with GnRH but in herds with poor reproductive performance little effect was noted (Nash, et al, 1980). Archbald, et al., in 1990 said that Treatment on day 23 in cows without a corpus luteum reduced days open by 26 days. Treatment on day 15 may help cows that are free from puerperal infections (Peter and Bosu, 1988). GnRH given 13 to 14 days postpartum helped cows undergoing slow involution of the reproductive system with no other clinical problems (Foote and Rick, 1999). It may also reduce the number of days to first estrus without altering reproductive performance (Beckett and Lean, 1997).

On the other hand Etherington et al. 1983 said that, treatment with GnRH on day 15 postpartum resulted in a significant increase in the subsequent incidence of pyometra and prebreeding anestrus.

In this study, no remarkable differences in fertility parameters between cows treated with GnRH (Receptal or Cystrolin) and with not treated cows, in the other way we found a small effect from GnRH especially Cystrolin in preventing the incidence of COD especially in cows more than one season. In this point Britt et al, in 1977 stated that GnRH has also been used prophylactically to reduce the incidence of ovarian cysts. Administering the hormone 8 to 23 days and 12 to 14 days (Zaeid et al, 1980) after calving was found to reduce the number of cows that developed ovarian cysts or were culled for infertility.

When we compare the incidence of COD between the animals in 1<sup>st</sup> season and animals more than one season (control groups), (A3 and B3), (37.5% and 46.6%), we will find a remarkable difference between them, and this percentage indicates the effect of age on the incidence of COD, so in the point of parity we agreed with Peter (1997) when he talked about the effect of parity on the incidence of COD, also a Norwegian research by (Nelson et al., 2010) stated that cows in higher parity have an increased risk of being diagnosed with COD.

We obtain a general percentage all over the herd 42% we can imagine it is not true percentage but now days with rapid development of genetic and high selection to sire give more milk and the huge amount of milk which act as big stress factor on the animal, it is a normal percentage. Allrich (2001) have concluded that ovarian cysts reduce reproductive efficiency on almost every dairy farm in the United States. It has been estimated that the incidence of ovarian cysts ranges from 5 to 20 percent in most herds. A recent Wisconsin field

study of dairy herds reported that the incidence of ovarian cysts ranged from a low of 16.2 to a high of 47.4 percent. Mature cows have a higher incidence (39 percent) of ovarian cysts than do first-calf heifers (11 percent). Risk of COD increased with increased herd milk yield in the previous or current lactation (Gröhn et al., 1990). The expected probability of COD appearance in third lactation cows was 3.1 times higher in a cow producing 12,000 kg (305-day milk yield) than a cow producing 6,000kg (Fleischer et al., 2001). When we have a look in our animal in the study we found their milk production about 8 tons for the first season and more than 10 tons in next seasons.

When we come back to the effect of GnRH as a preventive to COD and its importance in fertility parameters in the other field trial we will find Britt (1977) nearly agreed with us, when he made the first published field trial was conducted using 204 Holstein Friesian cows in four privately owned Michigan dairy herds. During one of the biweekly herd visits, each cow was given either saline solution or 200 MgGnRH between 8 and 23 dayspostpartum partum. The mean time of treatment was  $14.8 \pm 0.4$  days postpartum. The incidence of ovarian follicular cysts, reasons for disposal and reproductive performance were determined. The frequency of ovarian cysts was significantly greater in saline-treated controls compared to GnRH-treated cows, 15.3% versus 5.7%, respectively. Measures of reproductive performance were not significantly different between GnRH-treated and control cows.

In conclusion, the findings of this study suggest that using two dose of GnRH (Receptal or Cystorlin), at 14 and 21 days after parturition did not give a significant difference comparing with the costs of the programs in preventing COD except a moderate result by using Cystorlin especially with cow more than one season which decreased the incidence by

11%. COD may reach to 42% in herd especially the high yielding Holstein cow. No significant effect on fertility parameters positively or negatively by using GnRH in postpartum period.

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