

TREATMENT OF CYSTIC OVARIAN DISEASE IN COWS WITH GONADOTROPINS

Y. P. S. Dabas, U. K. Atheya, S. C. Sud¹ and B. D. Lakhchaura

College of Veterinary Sciences, G. B. Pant University of Agriculture and Tech.,
Pantnagar-263145, Distt. Nainital, India

Summary

Eighteen multiparous and 8 nulliparous cows with cystic ovarian disease (19 having follicular cysts, 7 with luteal cysts) were administered either 3000 I. U. HCG or 300 µg LHRH. Ten animals responded satisfactorily leading to normal estrus within a period of 15 to 30 days and subsequent conception. In 8 animals cysts recurred and no effect of treatment was observed in 3 patients.

Plasma progesterone concentration was significantly lower in animals having follicular cysts compared to those with luteal cysts.

(Key Words: Cows, Follicular Cyst, Luteal Cyst, HCG, LHRH, Progesterone)

Introduction

Cystic ovarian disease (COD) is one of the important causes of infertility in dairy cattle. Ovarian cysts are often classified as follicular or luteal or follicular-lutein cysts (Roberts, 1971; Grunert, 1982).

The incidence of ovarian cysts in dairy cattle varies from 5.6 to 38.8 percent (Morrow et al., 1966; Whitmore et al., 1974; Britt et al., 1977). According to Morrow et al. (1966) several of the cows that develop ovarian cysts before the first post-partum ovulation re-establish ovarian cycles spontaneously and hence may not be detected although the disease may prolong the post-partum interval of first estrus and conception in 10 to 30% of dairy cows.

The methods of treatment of COD have varied from manual rupture (Dawson, 1957) with as high as 63% of 829 cows later becoming pregnant (Schjerven, 1971) to the administration of LH, HCG or products high in LH activity (Roberts, 1971; Nakao et al., 1978; Bugalia and Kohli, 1981) with or without progesterone (Johnson and Ulberg, 1967; Nakao and Ono, 1977) with the recovery ranging from 61 to 77%.

In the present investigation, attempts were

made to treat the COD in cattle with HCG or LHRH.

Materials and Methods

Twenty six crossbred dairy cattle (18 parous and 8 heifers) with cystic ovarian conditions from two different farms and animals visiting Veterinary Clinics at Pantnagar were included in this study. On the basis of twice weekly per rectal examination for over a period of four weeks, 19 animals (11 parous, 8 heifers) with the history of irregular estrus and possessing soft enlarged follicular structures with no palpable corpora lutea over the ovaries were diagnosed as cases of follicular cysts (FC) and seven anestrus cows having somewhat hard and thick walled structures on the ovaries were termed as cases with luteal cysts (LC). Eleven animals (6 cows plus 5 heifers) had developed cysts following administration of estrogen-progesterone for induction of lactation.

One group of thirteen animals (12 cows + 1 heifer; 7 FC and 6 LC) were injected i/v with 3000 I.U. HCG (Chorulon-Intervet International, Holland) while the other group of 10 animals (3 cows + 7 heifers: all FC) were administered i/v with 300 µg LHRH (UCB-Bioproducs, Belgium) in saline. Three cows served as control and were injected with saline only. All animals following treatment were examined daily per rectally.

Heparinized blood samples from 17 animals collected through the jugular venipuncture on alternate day upto day 10 were centrifuged and

¹Address reprint requests to Dr. S. C. Sud, Department of Physiology, College of Veterinary Sciences, G. B. Pant University of Agriculture and Technology, Pantnagar-263145, Distt. Nainital, India.

Received July 15, 1988

Accepted February 20, 1989

the separated plasma was stored at -20°C pending progesterone estimation by radioimmunoassay procedure (Kamonpatana et al. 1983).

Results

Following HCG/LHRH administration the cysts regressed within 6-8 days in most cases but reappeared in many animals. Of the 13 animals treated with HCG, 6 (2 FC + 4 LC) responded with manifestation of normal estrous signs within a period of 16 to 30 days. They were artificially inseminated and all of them conceived. Out of the 7 remaining cows there was no effect in 3 cases while in the rests cysts recurred following reduction after treatment and estrous cycle remained irregular (table 1).

Of the 10 animals, treated with LHRH, only 4 animals responded satisfactorily leading to appearance of estrus within 15 to 28 days and subsequ

ent conception (table 1). Two of the non-responding animals developed endometritis while in the remaining four, the cysts firstly regressed but re-developed. No significant change in respect of ovarian picture and estrous irregularity was noticed in the control group.

The data further indicated that HCG gave satisfactory response in 66.6% of cases with LC and 28.5% in cases with FC while LHRH gave satisfactory response in 80% of the cases having follicular cysts (table 2).

Data on plasma progesterone (P_4) concentration (table 3) indicated that animals suffering from follicular cysts had significantly lower plasma P_4 compared to those having luteal cysts. In two animals with FC, HCG treatment firstly decreased and the increased P_4 levels. One of these animals was successfully treated. In animals having luteal cysts two types of responses were obtained: those animals ($n=2$) in which cysts recurred, the plasma

TABLE 1. CLINICAL RESPONSE OF COWS WITH OVARIAN CYSTS TO LHRH AND HCG

Item	LHRH (300 μg)		HCG (3000 I.U.)	
	FC ¹		FC ¹	LC ²
Number of cows	10		7	6
Positive response	10		4	6
Days from treatment to first estrus	19.7		26.5	23.2
Number of cows conceiving	4		2	4
Number of cows conceiving on first service	4		2	4
Number of service per conception	1		1	1
Days of treatment to conception	17		26.5	23.2
Number of cows not conceiving (repeat breeder)	4			

¹FC = Follicular cyst

²LC = Luteal cyst

TABLE 2. EFFECT OF THE HCG/LHRH TREATMENT OF CYSTIC OVARIAN DISEASE

Effect of treatment	Luteal cyst		Follicular cyst	
	HCG	LHRH	HCG	LHRH
No. of animals	6		7	10
Initiation of estrous cycle	4(66.6) ¹	—	2(28.5)	8(80.0)
Conception	4(66.6)	—	2(28.5)	4(40.0)
Recurrence of cysts	2(33.3)	—	2(28.5)	2(20.0)
No effect			3(42.8)	4(40.0)

¹Figures in parenthesis indicate percent.

CYSTIC OVARIAN DISEASE

TABLE 3. PROGESTERONE CONCENTRATION (ng/ml) IN DAIRY CATTLE WITH OVARIAN CYSTS FOLLOWING ADMINISTRATION OF HCG (3000 I.U.) OR LHRH (300 µg)

Sl. No.	Ovarian cysts	Treatment	No. of animals	Plasma progesterone (ng/ml)						
				Days						
				-1	0	2	4	6	8	10
1	Follicular	HCG	2	1.28±0.32	1.1 ±0.1	0.64±0.03	0.78±0.14	3.0 ±1.8	2.8 ±1.0	2.7 ±0.7
2	Luteal	HCG	3	3.0 ±0.98	3.2 ±0.98	2.32±0.99	1.73±0.17	1.11±0.14	0.67±0.08	0.77±0.21
3	Follicular	LHRH	9	0.96±0.11	0.90±0.10	1.20±0.12	1.0 ±0.11	1.32±0.15	2.07±0.22	2.53±0.29
4	Luteal	Control	1	4.0	3.8	3.6	4.2	4.6	4.6	4.2
5	Follicular	Control	2	0.78±0.16	0.78±0.04	0.66±0.06	0.9 ±0.1	0.72±0.08	0.81±0.11	0.78±0.04

Day '0' indicates day of HCG/LHRH injection.

P₄ progressively declined but in the animal (n=1) which later exhibited estrus signs and became pregnant, the P₄ level firstly decreased until day 8 and then increased on day 10.

In all animals receiving LHRH treatment (FC cases), the plasma P₄ were generally low previous to treatment. In successfully treated animals (n=4) there was a small decrease in plasma P₄ but it was elevated later particularly on days 8 and 10. In the animals in which cysts recurred (n=4) there was also elevation of P₄ on day 8 and 10 the values almost equal to those seen in treated cases.

Discussion

The recovery rate (number of cows conceived/number of cows treated following 3,000 I.U. of HCG administration in animals with COD was 6/13 or 46.1%, the conception taking place within 24.3 ± 1.9 days. This conforms well with the report of Nakao et al. (1978) who injected 1,000 MU (equivalent to 30,000 I.U.) of HCG in 12 cows i/m and only 4 cows responded with conception within 64 ± 51 days. Several other workers (Elmore et al., 1975; Laing, 1979; Koppinen et al., 1984) have used LH, HCG or products high in LH in doses ranging from 1,000 to 10,000 I.U. and reported establishment of estrous cycle within a period of 28 to 30 days after treatment and recovery rate of 65-80% although the 1st service conception rate varied from 38 to 58%.

Only 4 out of 10 animals recovered in the LHRH-treated group within a period of 19.7 ± 1.7 days after treatment. In 2 animals there was recurrence of cyst and 4 animals began to exhibit

regular estrous cycle with repeat breeder symptoms. In the studies by Bierschwal et al. (1975), Elmore et al. (1975), Seguin et al. (1976) and Kesler et al. (1979) GnRH caused around 80% of cows to re-establish ovarian cycles within 28 to 30 days of the treatment. The percentage of cows conceiving to first service was 37.55 percent. In the present study this percentage was 40%.

The occurrence of repeat breeder syndrome appear to be independent of the pre-existing cystic condition and could have been due to the uterin infection, as two animals suffered with endometritis. Low conception rate at first insemination after cyst regression in cattle with endometritis was also observed by Zoldag (1984). Our results are in line with Richardson et al. (1982) who reported that an injection of 100-250 µg GnRH stimulates luteal tissue formation in bovine follicular cyst and about 75-85 percent of treated cows responded positively to GnRH with normal estrus in 67 percent within 10-30 days after treatment.

High P₄ concentration (above 1 ng/ml) was observed in the cows having luteal cysts, while in case of follicular cysts the P₄ concentration was below 1 ng/ml. Similar pattern of P₄ was observed by Glencross and Munro (1974), Kesler et al. (1980), Zoldag (1984), Narayana and Honnappa (1985) in case of luteal cysts and follicular cysts, respectively.

Animals with follicular cysts after i/v injection of HCG or LHRH showed a substantial rise in P₄ concentration by day 6 while P₄ level of animals with luteal cysts decreased below 1 ng/ml within 6-8 days. Kesler and Garverick (1982) had reported

increased level of P₄ in the cases of follicular cysts and decreased level in the cases of luteal cysts within 9 to 13 days after GnRH treatment.

Some of the animals with follicular cysts showed periodical high (more than 1 ng/ml) plasma P₄ concentration and this is corroborative with the findings of Kesler et al. (1980) and Narayana and Honnappa (1985). Aberrant luteal tissues either in the form of luteinized cystic follicles or small accessory corpora lutea peculiar to cows with cystic ovaries (Tanabe and Brofee, 1982) or the possible diagnostic inaccuracies in per rectal examinations (Dawson, 1975) are presumably accountable for the wide variations in plasma P₄ concentration noted in the present study.

Literature Cited

- Bierschwal, C.J., H.A. Garverick, C.E. Martin, R.S. Youngquist, T.C. Cantley and M.D. Brown. 1975. Clinical response of dairy cows with ovarian cysts to GnRH. *J. Anim. Sci.* 41:1660-1665.
- Britt, J.H., D.S. Harrison and D.A. Morrow. 1977. Frequency of ovarian follicular cysts, reasons for culling and fertility in Holstein-Friesian cows given gonadotropin-releasing hormone at two weeks after parturition. *Amer. J. Vet. Res.* 38:749-751.
- Bugalia, N.S. and I.S. Koli. 1981. Comparative efficacy of prolution depot, gonadotrophin L.H. and potassium iodide in nymphomaniac Rathi cows. *Haryana Agricultural Univ. J. Res.* 11:575-577.
- Dawson, F.L.M. 1957. Bovine cystic ovarian disease a review of recent progress. *Br. Vet. J.* 113:112-133.
- Dawson, F.L.M. 1975. Accuracy of rectal palpation in the diagnosis of ovarian function in the cow. *Vet. Record.* 96:218-220.
- Elmore, R.G., C.J. Bierschwal, R.S. Youngquist, T.C. Cantley, D.J. Kesler and H.A. Garverick, 1975. Clinical responses of dairy cows with ovarian cysts following treatment with 10,000 I.U. HCG or 100 mcg GnRH. *Vet. Med/Sm. Anim. Clin.* 70:1346-1349.
- Glencross, R.G. and J.B. Munro. 1974. Oestradiol and progesterone in plasma of a cow with ovarian cysts. *Vet. Record.* 95:169.
- Grunert, F. 1982. *Blue Book for the Veterinary Profession*, N. 31:31-35.
- Johnson, A.D. and I.C. Ulberg. 1967. Influence of exogenous progesterone on follicular cysts in dairy cattle. *J. Dairy Sci.* 50:758-761.
- Kamonpatana, M., C. Parnpai, C. Ngramsurijaroj, and Srisakwattana. 1983. Plasma progesterone, oestron and cestrone sulphate levels during the first half of gestation in swamp buffaloes. *Br. Vet. J.* 139:256-261.
- Kesler, D.J. and H.A. Garverick. 1982. Ovarian cysts in dairy cattle: A Review. *J. Anim. Sci.* 55:1147-1159.
- Kesler, D.J., H.A. Garverick, A.B. Caudle, R.S. Elmore, R.S. Youngquist and C.J. Bierschwal. 1980. Reproductive hormone and ovarian changes in cows with ovarian cysts. *J. Dairy Sci.* 63:166-170.
- Kesler, D.J., H.A. Garverick, R.G. Elmore, R.S. Youngquist and C.J. Bierschwal. 1979. Reproductive hormones associated with the ovarian cyst response to GnRH. *Theriogenology* 12:109-114.
- Keppinen, J., M. Vesanen and M. Alanko. 1984. Ovarian cysts in dairy cattle—some aspects of diagnosis, treatment with GnRH and HCG and subsequent milk progesterone values. *Nordisk Veterinaermedicin.* 36:26-31.
- Laing, J.A. 1979. Fertility and infertility in domestic animals, 3rd edn. London, Bailliere, Tindall.
- Morrow, D.A., S.J. Roberts, K. McEntree and H.G. Gray. 1966. Post-partum ovarian activity and uterine involution in dairy cattle. *J. Amer. Vet. Med. Assoc.* 149:203.
- Nakao, T., Y. Numata, M. Kubo and S. Yamauchi. 1978. Treatment of cystic ovarian disease in dairy cattle. *Cornell Vet.* 68:161-178.
- Nakao, T. and H. Ono. 1977. Treatment of cystic ovarian disease in dairy cattle, Comparative observation on the effects of an intramuscular injection of corticosteroids and an intravenous injection of a combination of human chorionic gonadotropin and progesterone. *Cornell Vet.* 67:50-64.
- Narayana, K. and T.G. Honnappa, 1985. Plasma progesterone profile in cystic ovarian disease of dairy cows. *Ind. J. Anim. Reprod.* 6:8-13.
- Richardson, G.F., W.F. Brann Jr. and R.A. Godke. 1982. Clinical use of gonadotropin-releasing hormone and prostaglandin in cattle. *Modern Veterinary Practice* 63:533-538.
- Roberts, S.J. 1971. *Veterinary obstetrics and genital diseases*. 2nd edn. C. B. S. Publishers and Distributors, Delhi.
- Schjerven, L. 1971. A clinical study on cystic ovarian disease in dairy cattle with special reference to incidence, treatment and factors related to recovery and fertility. Thesis, Oslo Veterinary College, Norway.
- Seguin, B.E., E.M. Convey and W.D. Oxender. 1976. Effect of gonadotropin releasing hormone and human chronic gonadotropin in cows with ovarian follicular cysts. *Amer. J. Vet. Res.* 37:153-157.
- Tanabe, T.Y. and R.D. Brofee. 1982. Treatment of cystic ovarian follicles in dairy cows with chronic gonadotropin. *Theriogenology* 18:497-512.
- Whitmore, H.L., W.J. Tyler and L.E. Casida. 1974. Incidence of cystic ovaries in Holstein-Friesian cows. *J. Amer. Vet. Med. Assoc.* 165:693-694.
- Zoldag, L. 1984. Ovarian cysts in dairy cows. I. Differential diagnosis of follicular and luteal cysts. II. Factors influencing the result of therapy. *Magyar Allatorvosok Lapja.* 39:467-470 (Cited *Vet. Bull.* 55:1070).