

A Comparison of Fenprostalene and Oxytetracycline as Treatment for Retained Fetal Membranes in Dairy Cows

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Introduction

Retained fetal membranes (RFM) is a common postpartum disorder of the reproductive system of dairy cows. The incidence, etiology, consequences, treatment and prevention of RFM have been thoroughly discussed.^{1,2,3} Agreement on the best way to manage and treat RFM is not unanimous. Management and treatment schemes are numerous, and there are proponents of each. Regimes of therapy include no treatment, intrauterine antibacterials, systemic antibacterials, uterine contractants, manual removal, no manual removal and various combinations. At the present time the most widely used treatment for RFM is probably intrauterine tetracycline with or without manual removal of the membranes; however, there is an apparent trend away from manual removal.

The ideal therapy for RFM would be non-irritating to the endometrium, non-depressing to the uterine defense mechanism, prevent the development of metritis and promote uterine tone and contractions to discourage the accumulation of fluid. To achieve these desired effects, it would appear that both the proper antibacterials and uterine contractants would be needed. Thus far, the various treatments employed have not consistently brought about the desired results.

Fenprostalene, an analogue of prostaglandin F₂ alpha, has recently been advocated as a treatment for RFM. At least 3 reports indicate the beneficial effects of fenprostalene as therapy for RFM in dairy cows.^{4,5,6} In another trial, however, there was no benefit.⁷

The purpose of this study was to compare fenprostalene and oxytetracycline for the treatment of RFM noting in particular the effect on body temperature, days to expulsion, incidence of postpartum metritis and subsequent fertility.

Materials and Methods

The study was carried out at the Purdue University Dairy Center from May, 1983 through December, 1986. The herd

consisted of approximately 200 Holstein cows housed in free stalls and fed a total mixed ration. From May through October parturition occurred in a grassy grove; the remainder of the year maternity stalls were used. During the test period milk production averaged 17,000 pounds per cow per year and the calving interval was less than 13 months.

Fetal membranes were considered retained if not expelled within 12 hours of parturition. Treatment commenced at approximately 24 hours after parturition. Alternate cows were assigned to either the fenprostalene (FEN) group or the oxytetracycline (OTC) group. Fenprostalene,^a (1 mg) 2 cc, was administered subcutaneously and oxytetracycline,^b 5 gm in 1,000 cc of water, was infused intrauterine via an esophageal feeder bag. The vagina was entered during infusion, however, the only vaginal examination during the fenprostalene treatment was to substantiate the passage of the RFM after no membranes were seen protruding from the vulva. No attempt was made to remove the membranes nor was any traction applied to the exposed portion to aid in their expulsion, however, the exposed membranes were cut off at the base of the udder. Treatments were administered daily until the membranes were expelled and for one day thereafter. Body temperatures were recorded daily.

Postpartum reproductive exams were carried out between 10 and 24 days after parturition with the majority of exams occurring between 2 and 3 weeks postpartum. Diagnosis of metritis was made by rectal palpation and visualization of reproductive tract discharges. The criteria used for the diagnosis of metritis were ballottement of fluid, crepitant feel of the uterine contents, retarded involution and the presence of abnormal discharge. The character of the discharge ranged from thin, watery and fetid early to purulent mucopurulent later. Treatment of metritis included injections of prostaglandin or infusions of oxytetracycline.

^aBovilene - SYNTEX

^bLiquamycin 100 - Pfizer

All cows were bred by artificial insemination beginning at the first estrus after 50 days postpartum.

Results

There were 100 cows with RFM, 50 in each group. The incidence of twins and left abomasal displacement was near equal in the 2 groups. There was significantly more cows ($P<0.05$) with a body temperature greater than 104°F on at least one day during treatment in the FEN group (24) than in the OTC group (14). The incidence of postpartum metritis was significantly higher ($P<0.005$) in the FEN group (30 versus 15) (Table 1). Mean days to expulsion were less ($P<0.05$) in the FEN group (5.96) than the OTC group (6.94) (Table 2). While not recorded, cows treated with fenprostalene more often had a fetid odor from the reproductive tract. When both groups were combined, mean days to expulsion of the membranes was significantly longer ($P<0.05$) following the birth of twins (7.69) when compared to singles (6.09).

TABLE 1. Number of cows, twins, abomasal displacements, increased body temperature and metritis by treatment group.

Treatment Group	Number of Cows	Twins	Left	Body	Metritis**
			Abomasal Displacement	Temp. $>104^{\circ}$ **	
FEN	50	12	4	24	30
OTC	50	11	5	14	15

* Significant ($P<0.05$)

** Significant ($P<0.005$)

TABLE 2. Days to expulsion of RFM by treatment group.

Treatment Group	Mean Days to Expulsion*	Range in Days to Expulsion
FEN	5.96	2-10
OTC	6.94	2-14

* Significant ($P<0.05$)

While there was a trend toward better reproductive performance in the FEN group, there were no significant differences between groups in the number of cows pregnant, days to conception, services per conception, first serve conception and number culled for reproduction (Table 3). To compare the rebreeding performance of cows with RFM and metritis and cows with RFM only both treatment groups were combined. Again there was a tendency for better reproductivity in cows with RFM only, however, the differences were not significant in the measurements of fertility examined (Table 4).

TABLE 3. Number pregnant, days to conception, services per conception, first service conception and number culled for reproduction by treatment groups*.

Treatment Group	Number Pregnant	Days to Conception**	Services per conception**	Percent First Service Conception	Number Culled for Reproduction
FEN	28 (56%)	104.8	1.71	57.1	8
OTC	27 (54%)	120.7	1.74	44.4	8

* Calculated on Pregnant Cows Only

** Mean

TABLE 4. Number pregnant, days to conception, services per conception, first service conception and number culled for reproduction for cows with RFM and Metritis or RFM only.*

Treatment Group	Number Pregnant	Days to Conception**	Services per conception**	Percent First Service Conception	Number Culled for Reproduction
RFM and Metritis	23 (51%)	117.8	1.83	52	10
RFM Only	32(58%)	109.0	1.66	50	6

* Calculated on Pregnant Cows Only

** Mean

Discussion

If increased uterine contractions would aid in earlier expulsion of the fetal membranes and enhance uterine health, and if fenprostalene were uterotonic, then it would possibly be a beneficial treatment. In 2 studies a single injection of fenprostalene significantly increased uterine motility in estradiol primed ovariectomized ewes⁸ and cows.⁹ These results led the investigators to conclude that the long-lasting oxytocic properties of fenprostalene would make it a suitable drug for promoting evacuation of the uterus. Evaluation of the effect of daily injections of fenprostalene on days 1-4 postpartum in cows with and without RFM revealed no significant effect on uterine motility and no cumulative effect due to repeated injections could be demonstrated.¹⁰

Three clinical trials in which fenprostalene was used as the treatment for RFM showed some benefit over controls. In one study there was a significant decrease in time to expulsion of the membranes and percent of cows with postpartum metritis when one injection was given immediately after the diagnosis of RFM (approximately 12 hours postpartum).⁴ Dairy cows with RFM and treated with fenprostalene one time 8 to 14 hours postpartum required less treatments for metritis than controls.⁵ In a third trial a significantly greater percentage of cows treated once 6 hours postpartum had passed the fetal membranes by 4 days and required less subsequent treatments.⁶ conversely, there was no enhancement of expulsion in a

group of cows given fenprostalene 12-24 hours postpartum.⁷

In the present study fenprostalene treatment commenced later (approximately 24 hours postpartum) and was administered repeatedly compared with earlier beginning (<12 hours postpartum) and shorter duration (one time) in the 3 beneficial reports. More cows in the FEN group were febrile, had metritis and a fetid odor from the reproductive tract. This could be explained by the likelihood that daily instillation of antibiotics in the OTC group depressed bacterial growth enough to lessen the febrile response, metritis and odor.

Cows in the FEN group expelled the membranes one day sooner or OTC group cows retained the membranes one day longer. As others have observed, intrauterine antibiotics will very likely slow the expulsion rate of the fetal membranes so it is reasonable to assume that this accounts for the difference.

The subsequent rebreeding performance of the groups was not significantly different. Since there was a two-fold increase in metritis in the FEN group yet fertility was equal to the OTC group, either the metritis therapy, the uterine defenses or the combination of both were effective in overcoming the possible detrimental effects of metritis. Alternatively, oxytetracycline is irritating to the endometrium and repeated infusions may have depressed uterine defense mechanisms and this could possibly have depressed fertility in the OTC group.

As noted by others, RFM without associated metritis is not as depressing to fertility as RFM and metritis. While there was so significant difference in fertility between the 2 groups, there was a trend toward better performance in cows with RFM only.

In conclusion, it would appear that fenprostalene, as used in this study, had no advantage over oxytetracycline infusions as therapy for RFM in cows.

Summary

A comparison of fenprostalene and oxytetracycline as therapy for RFM was made in 100 cows in a dairy herd. Significantly more cows in the fenprostalene group had body temperatures exceeding 104° F ($P<0.05$) and metritis ($P<0.005$). Fenprostalene treated cows expelled the fetal membranes one day sooner ($P<0.05$). There was no significant difference in subsequent fertility of the groups.

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