

## Student Clinical Report

# Risk of Iatrogenic Abortion by Rectal Palpation in the Cow: A Review Correlation of Pregnancy Diagnosis Methods and Embryonic Mortality in the Dairy Cow

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### Summary

Rectal palpation for early pregnancy diagnosis in dairy cattle is a common practice in the dairy industry. It would be ideal to know the pregnancy status of a cow at 18–24 days post insemination, prior to the onset of the next estrus period. Although at this time an accurate and economical method of such early pregnancy diagnosis is not available, veterinarians use rectal palpation of the reproductive tract to determine pregnancy beginning at approximately 30 days post insemination. The practitioner needs to be aware that this procedure can be a significant iatrogenic cause of fetal attrition.

Palpation per rectum is relatively inexpensive, easily accomplished and 95 percent accurate as a means of diagnosis of the outcome of a breeding (Zemjanis, 1970). In addition, it is useful to detect abnormalities of the reproductive tract (such as pyometra, segmental aplasia of the Muellerian duct system, ovarian cysts, fetal deaths, macerations, and mummies), and determine the stage of gestation.<sup>4</sup>

A certain percentage of embryonic deaths (ED) occurs normally in cattle, and the reason is not always known. Many occur naturally due to some abnormality of the developing fetus or its environment. Some occur as a consequence of an acquired infection by the dam. One study, done in 1977, showed that ED occurs in 10–28 percent of pregnancies. It occurred between day 14 and day 70 post insemination, with most deaths occurring between 28 and 43 days. A study done in 1978 stated that the rate of embryonic death varies between 9–28 percent in cows with normal fertility.<sup>13</sup> Embryonic death is more prevalent in cows with histories of reproductive abnormalities, particularly endometritis.<sup>7</sup>

Manual rupture of the amnionic vesicle can induce embryonic death. A study done in 1963 by Ball and Carroll concluded that it requires very little pressure to rup-

ture the vesicle at 39–45 days of gestation, but becomes increasingly more difficult as the pregnancy advances. At 69 days the vesicle is relatively difficult to rupture, and an attempt to do so may actually produce rectal or uterine damage.<sup>3</sup> There are three methods of manual rupture: 1) rupture of the amnionic vesicle and crushing of the fetus in cows pregnant 35–66 days; 2) decapitation of the fetus in cows pregnant 66–120 days; and 3) rupture of the amnion without crushing the fetus in cows pregnant less than 70 days. In one study of these three methods, all cows aborted between 10–45 days post treatment, except three out of 29 in the group in which the amnion was ruptured but the fetus was not crushed. These three did not abort. The average days to abortion were 26.5 and 21.5 for methods one and two, respectively. The range of days to abortion for method three was 14–42. Average days to estrus following treatment was 38 for method one and 32 for method two, with a range from 13–61 days. It was also noted that the possibility of fetal mummification exists with manual abortion methods.<sup>8</sup>

The key point to the above discussion is that rupture of the amnionic vesicle is accomplished with relative ease at days 30–45 of gestation, a common time for routine pregnancy diagnosis. This may suggest that manual abortion can be performed unintentionally during rectal palpation for pregnancy diagnosis.

Choices other than rectal palpation do exist for early pregnancy diagnosis, although at this time these tests are not economical nor practical for widespread use. The milk progesterone test has been determined to be 100 percent accurate for diagnosing non-pregnant animals and 80 percent accurate for diagnosing pregnant animals. No luteal activity and, therefore, non-pregnancy is determined by a concentration of progesterone of <0.5 ng/ml in fat free milk. Pregnancy is determined by a concentration of progesterone of >0.5 ng/ml. The test is run at 0, 21, and 24 days post breeding. The 20 percent error in accuracy is due to abnormalities of the reproductive tract which still allow for luteal activity.<sup>4</sup> Ultrasound is another option,

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although it is not practical and not accurate as a method of early pregnancy determination presently.

### Rectal Examination

There are three methods of palpation for pregnancy diagnosis per rectum at less than 70 days post insemination, as described by Abbitt.<sup>1</sup> One method involves palpation of fluid in an enlarged uterine horn. This method, to be referred to as "fluid fluctuation" (F), is most effective if the palpator is informed of a known breeding date. Fluid fluctuation is potentially the least traumatic method to the gravid uterus. Palpation of the amniotic vesicle (A) is possible beginning at 27 days post service, and can be used to establish an approximate (within 1–2 days) breeding date for pregnancies of unknown duration or can lead to a decision between two consecutive breedings. A third method is slipping of the chorioallantoic membrane (M) between the thumb and index finger, which can first be accomplished at 35 days post breeding. This method is potentially misleading in that membranes containing no amniotic vesicle may be palpated, which possibly indicates a subsequent abortion. It is also known that the chorioallantoic membrane may persist for variable periods following spontaneous or induced abortions.<sup>1</sup>

A correlation between pregnancy diagnosis methods and embryonic mortality has been established. The embryonic loss due to rectal palpation is greater if performed at less than 50 days than at greater than 50 days of gestation. Vaillancourt<sup>13</sup> determined an embryonic mortality rate of 7.2 percent when the membrane slip technique was employed at less than 50 days versus 5.6 percent at greater than 50 days. Abbitt<sup>1</sup> determined these rates to be 8.5 percent and 3.7 percent, respectively, in 1978.<sup>1,13</sup>

A study by Franco<sup>4</sup> determined fetal attrition due to early pregnancy diagnosis by rectal palpation by comparing the number of confirmed pregnancies by rectal palpation at 90 days and by milk progesterone tests using 14 samples taken up to 63 days of gestation. Rates of 9.5 percent and 11.5 percent, respectively, were found. The attrition rate determined by the milk progesterone test may have been over estimated as a result of the 20 percent error inherent to the test, as discussed previously. The study also showed that cows with conceptus loss between day 24–63 and had lower average milk progesterone concentrations on day 21 and 24 as compared with those animals that carried normal calves. Additionally, as the concentration of milk progesterone increased on day 23, the probability of a subsequent confirmed pregnancy was enhanced.<sup>4</sup>

Two trials correlating pregnancy diagnosis methods and fetal attrition were performed by Abbitt<sup>7</sup> in 1978. Trial one involved rectal palpation by one experienced clinician at 35–42 days post breeding to determine pregnancy and a second palpation 30–90 days later to confirm pregnancy or abortion status. Results were as follows:

Method	% Embryonic Mortality
F	5.8
F + A	6.5
F + M	9.0

These differences were not statistically significant. Trial two involved rectal palpation by one clinician and one trained but inexperienced veterinary student at 35–70 days post breeding. The trial showed that student palpation had no additional effect on fetal loss, which was evaluated by calving at term. There was a significant difference between two of the clinicians (4.2 percent vs. 9.2 percent loss). The results from this trial were significant when the methods of pregnancy diagnosis were compared.

Method	% Embryonic Mortality
F	3.8 <sup>a</sup>
F + A	6.0 <sup>ab</sup>
F + M	9.1 <sup>b</sup>

Like superscripts are statistically significant. Clinician differences were attributed to the duration and intensity of palpation. The mean interval between breeding and palpation for the cows that calved and the cows that failed to calve were as below:

Method	Calving	Not Calving
F + A	50.0	45.9
F + M	53.3	49.2

Again, this shows that fetal loss is greater in cows that were palpated earlier in gestation.<sup>1</sup>

### Conclusions

Some significant conclusions may be made from the above studies. Presently, rectal palpation for pregnancy diagnosis when properly performed is safe. The prevalence of anestrus is much greater than the prevalence of ED following palpation. Therefore, the eventual economic loss due to anestrus and the discontinuation of palpation would greatly exceed the loss due to ED caused by rectal palpation.<sup>13</sup> Approximately 75 percent of cows in a survey that experienced prenatal mortality after pregnancy had histories of endometritis, cervicitis, or suspected early embryonic death; this suggests that prior abnormalities may contribute to fetal losses.<sup>7</sup> These conditions may be aggravated by multiple palpations at the time of pregnancy diagnosis.<sup>7</sup> Slipping of the fetal membranes is less damaging to the embryo of fetus as gestation advances; likewise, palpation of the amnion is also less damaging as gestation advances, especially after 50 days. Palpation at a later date (>46–50 days) or using fluid fluctuation alone as a pregnancy diagnosis criterion may not be a detrimental and should be used, when possible, in cows bred less than 70 days. Palpation of the amnion may be needed if a

bull is with cows and breeding dates are unknown, to determine pregnancy versus disease status, any other indications of abnormality, and accurate estimation of the duration of gestation. Slipping of the chorioallantoic membrane should be avoided unless absolutely necessary to determine pregnancy versus disease status.

Because current methods of early pregnancy diagnosis will continue to be employed, and clinician must be aware of the vulnerability of the embryo to vigorous palpation. Utmost care must be utilized when combining fluid fluctuation, palpation of the amnionic vesicle, and slipping of the chorioallantoic membrane as criteria for diagnosing pregnancies. Cognizance of possible complications resulting from early pregnancy diagnosis methods by rectal palpation may cause clinicians to redesign their pregnancy diagnosis regimen.

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*Editor's Note: Ms. Bessoff received the first prize of \$200 for her student clinical report.*