ASSESSMENT OF RECTAL PALPATION AS A TECHNIQUE FOR THE DETECTION OF *CORPORA LUTEA* AND ESTIMATION OF THE STAGE OF PREGNANCY IN ZEBU COWS

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ABSTRACT

Twenty eight multiparous Bunaji cows were used to evaluate rectal palpation as a technique for identifying the presence or absence of corpora lutea (CL) and estimating the stage of pregnancy in Zebu cows. Overall correlations (85.7%) between rectal palpation findings and progesterone (P4) levels were more than non-correlations (14.3%). Correlations between CL diagnosis or lack of CL and progesterone levels were 78.8% and 88.4% respectively. Estimation of the stage of pregnancy by rectal palpation correlated with the stages based on calving dates in 77.1, 55.6 and 60.9% of the cases during the first, second and third trimesters of pregnancy, respectively. In general, rectal palpation was a reliable method of detecting CL and estimating the stage of pregnancy in the Zebu cows.

INTRODUCTION

Veterinarians are frequently requested to examine cows for ovarian cyclic activities and pregnancy as part of fertility control programmes. Among the examinations usually carried out is rectal palpation of the ovaries for ovarian structures (Zemmeris, 1970) and progesterone assays to assess luteal function (Eduvie and Segun, 1982). One of the methods of oestrous synchronisation in cattle involves the use of a single

injection of prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) to cause luteolysis (Nancarrow, 1976). This means a functional corpus luteum (CL) has to be identified for this scheme to succeed.

The usefulness and limitation of rectal palpation as a technique for monitoring ovarian function has been assessed in the foreign breeds of cattle (Boyd and Munro, 1979; Watson and Munro, 1980). Information on the use and value of this technique in Zebu cows whose CL tend to protrude less from the ovarian surface (Plasse *et al.*, 1970) and are smaller and weigh less (Irvin *et al.*, 1978) than CL of European breeds is very scanty (Vaca *et al.*, 1983).

In postpartum dairy cattle 84% accuracy in the detection of CL and 77% agreement between rectal palpation of CL and milk progesterone concentrations has been reported (Watson and Munro, 1980). Correlation between palpation of CL and serum progesterone concentrations was 71.3% in non-lactating Indobrazil Zebu cows (Vaca *et al.*, 1983).

The value of pregnancy examination cannot be overemphasized as it enables detection of those animals which fail to conceive, at the earliest time following insemination or

matings, for rebreeding. Estimation of the stage of pregnancy is important especially in herds with incomplete or no records, in particular in herds in which pasture breeding is practised and close supervision is impossible. Estimation of stage of pregnancy during the first half of the gestation period can be done fairly accurately but with errors of 1 to 2 weeks during the later period (Zemjanis, 1970).

With the introduction of the artificial insemination scheme in the production programme for the indigenous animals the use of rectal palpation to assess ovarian activity and pregnancy examination has become very necessary. The objective of this study was thus to evaluate rectal palpation as a technique for detection of a CL and estimation of the stage of pregnancy in Zebu cows.

MATERIALS AND METHODS

A total of 28 mature, multiparous postpartum Bunaji cows aged 6 to 11 years and weighing 300 to 430kg were used for this study. The cows grazed during the day and stayed in open paddocks at night. In the dry season grazing was supplemented with hay. Salt licks and water were freely available at all times and an intact bull ran with the cows.

Each cow was palpated rectally 1 or 2 days after calving and weekly thereafter until diagnosed pregnant. Palpation was then done monthly until calving. To assess the accuracy of detection of a CL, blood was collected from 10 open cows through jugular venipuncture at palpation for serum progesterone assay.

Serum progesterone was measured using the Coat-A-Count (R) pro-

gesterone kit (Diagnostic Products Corporation, Los Angeles, U.S.A.) a no extraction, solid phase¹²⁵I radioimmunoassay technique. Rectal palpation findings were then compared with the corresponding serum progesterone concentrations. A correlation between rectal palpation finding and serum progesterone concentration was recorded when a CL was palpated and the corresponding serum progesterone level was 0.5ng/ml or more or no CL was palpated and serum progesterone level was less than 0.5ng/ml (Vaca *et al.*, 1983).

The expected date of calving calculated from the estimated stage of pregnancy at each palpation was compared with the actual date of calving and a correlation or noncorrelation between the estimated and actual stage (based on actual calving date) was recorded. For example a cow diagnosed 90 days pregnant on 15 August 1983, would be expected to calve on or about 15 February 1984, assuming gestation to last about 270 days (Egbunike and Togun, 1980). This expected date of calving was then compared with the actual calving date to determine correlation or noncorrelation. A correlation was recorded when the expected calving date was within 1 week of the actual calving date. At palpation no reference was made to the finding of the previous palpation and the cows were examined at random to avoid bias.

Statistical analysis:

The Student's t-test was used for all comparisons. The overall correlated and noncorrelated data (table 1), for the 10 open cows were compared. The correlations when CL was palpat-

TABLE 1.

Correlations and Noncorrelations between overall Rectal Palpation findings (i.e. CL and lack of CL) and Progesterone levels during the Postpartum Period.

Postpartum period (weeks)	No of observations*	Correlated* diagnosis	Noncorrelated diagnosis.
1	10	10(100%)	0(0%)
2	8	8(100%)	0(0%)
3	9	9(100%)	0(0%)
4	5	5(100%)	0(0%)
5	9	9(100%)	0(0%)
6	9	9(100%)	0(0%)
7	10	7(70%)	3(30%)
8	10	8(80%)	2(20%)
9	10	6(60%)	4(40%)
10	9	7(77.8%)	2(22.2%)
11	9	6(66.7%)	3(33.3%)
12	8	6(88.9%)	2(11.1%)
13	7	6(87.5%)	1(12.5%)
14	6	6(100%)	0(0%)
Total	119	102(85.7%)	17(14.3%)

*Numbers are less than 10 due to loss of serum samples or lack of palpation result.

*The difference between correlated and noncorrelated diagnosis was significant ($P < 0.01$).

(i.e. serum progesterone concentration $> 0.5\text{ng/ml}$) were also compared with correlations when CL was not palpated (i.e. serum progesterone concentration $< 0.5\text{ng/ml}$) (Table 2). Comparisons were also made between the number of detected CL that correlated and that which did not correlate with serum progesterone levels. Similar comparisons were made for correlations and noncorrelations between the diagnosis of lack of CL and progesterone levels. Correlation and noncorrelation between rectally estimated stages of pregnancy and the stages based on dating dates were also compared.

RESULTS

Table 1 shows the correlations and noncorrelations between the overall rectal palpation findings (i.e. both the presence and absence of CL) and serum progesterone levels during the postpartum period. The overall cases of correlated (102 or 85.7%) were more ($P < 0.01$) than those of noncorrelated diagnosis (17 or 14.3%). In 6 of the 17 noncorrelated diagnosis, CL was detected when P_4 level was less than 0.5ng/ml while CL was not detected when P_4 level was more than 0.5ng/ml in the remaining 11 cases. There was a hundred percent

TABLE 2

Correlations and Noncorrelations between diagnosis or Lack of corpora Lutea (CL) and Progesterone (P_4) levels during the Postpartum Period.

Postpartum period (weeks)	Correlations between CL and P_4 levels	Noncorrelations between CL and P_4 levels	Correlations* between lack of CL and P_4 levels	Noncorrelations between lack of CL and P_4 levels
1	0	0	10	0
2	0	0	9	0
3	0	0	9	0
4	1	0	4	0
5	0	0	9	0
6	1	0	8	0
7	3	1	4	3
8	3	1	5	1
9	5	1	1	3
10	2	2	5	0
11	4	1	2	2
12	3	1	3	2
13	2	0	4	0
14	2	0	4	0
Total	26	7	76	10
		33		86

*Correlations and noncorrelations between diagnosis or lack of CL and progesterone levels were different ($P < 0.05$).

correlation between rectal palpation findings and progesterone levels during the first 6 weeks postpartum. Correlations and noncorrelations between diagnosis or lack of CL and progesterone levels are shown in table 2. Out of the 102 (26+76) cases of **correlated** diagnosis correlation of CL with progesterone levels accounted for 25.5% (26 cases) while correlation of a lack of CL with progesterone levels accounted for 74.5% (76 cases). These correlations were significantly different ($P < 0.05$). There were correlations between CL diagnosis or lack of CL and progesterone levels in 26 of 33 (78.8%)

correlated and noncorrelated diagnosis of CL or lack of CL and progesterone levels were significant ($P < 0.05$). A summary of correlations between rectal palpation findings and progesterone levels is presented in table 3. Table 4 shows the correlations between rectally estimated stages of pregnancy and the stages based on calving dates. There were more correlated (64.8%) ($P < 0.05$) than noncorrelated (35.2%) observations. The percentage of correlated estimates was highest during the first trimester of pregnancy (77.1%) followed by the third (60.9%) and lowest during the second trimester (55.6%). The overall

TABLE 3

Summary of Correlations between Rectal Palpation findings and Serum Progesterone (P_4) levels during the Postpartum Period.

	<i>Number of observation</i>	<i>Correlated observations</i>	<i>Percentage (%)</i>
Overall correlations between rectal palpation findings and P_4 levels	119	102	85.7
Correlations between CL diagnosis and P_4 levels	33	26	78.8
Correlations between lack of CL and P_4 levels	86	76	88.4

TABLE 4

Correlations between Rectally estimated Stages of Pregnancy and the Stages based on Calving Dates.

<i>Period of gestation (months)</i>	<i>Number of observations</i>	<i>Number of correlated observations*</i>	<i>Number of noncorrelated observations*</i>
1-3	35	27(77.1%)	8(22.9%)
4-6	27	15(55.6%)	12(44.4%)
7-9	46	28(60.9%)	18(39.1%)
Total	108	70(64.8%)	38(35.2%)

*Overall correlations and noncorrelations between rectally estimated stages of pregnancy and the stages based on calving dates were different ($P < 0.05$).

and 76 of 86 (88.4%) observations, respectively. Differences between correlation was 64.8% of the total number of observations.

DISCUSSION

The overall percentage of 85.7% correlations between rectal palpation findings and serum progesterone levels

indicates that this technique is reliable for identifying the presence or absence of a corpus luteum on the ovary of the Bunaji cow. This percentage is higher than the 77% overall agreement between rectal palpation findings and plasma (Boyd and Munro, 1979) or milk (Watson and Munro, 1980) progesterone concentrations in dairy cows. From these

results it seems easier to misdiagnose a CL on an ovary than to misdiagnose a lack of it. This is confirmed by the hundred percent correlations between rectal palpation findings and progesterone concentration during the first 6 weeks when most of the ovaries lacked CL than during the subsequent weeks when a good number of ovaries had CL.

The percentage of correlation between CL detection and progesterone levels in this study (78.8%) agree with the 76% reported for Indobrazil zebu cows (Vaca *et al.*, 1983) but is lower than that reported for Friesian cows (84%) (Watson and Munro, 1980). While this finding and that by Vaca *et al.*, (1983) may confirm the claim that the CL of the zebu cow protrudes less from the ovarian surface than that of the European breed of cow (Plasse *et al.*, 1970), the difference between the findings in the two breeds may also be due to differences between the operators of the technique. In this study, the absence of a CL on an ovary was recognized in 88.4% of the cases as against 69% observed by Watson and Munro (1980). The difference between these two results may however be due to the fact that less animals in this study had CL than in the other study.

From the results obtained in this study on estimation of the stage of pregnancy, it is obvious that it is easier to accurately estimate the stage of pregnancy during the first trimester than any other period of pregnancy. This, of course, is quite desirable as it will enable a veterinarian to advise a farmer early after breeding on the pregnancy status of the animals. The findings in this study agree with the observation by Zemjanis

(1970) that rectal palpation of the uterus between 4 and 7 months of pregnancy is relatively difficult. The overall correlations of 64.8% between the estimated stage of pregnancy and the stage based on calving date, appears fairly low. This could be due to either true errors on the part of the operator or errors resulting from estimations obtained on the basis of a fixed gestation period of 9 months since individual cow variations in gestation period cannot be ruled out.

In general, it can be concluded from the findings in this study that the technique of rectal palpation is reliable and useful in a routine herd fertility control programme. This is further strengthened by the fact that the result of rectal palpation is available immediately compared with laboratory tests.

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