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BOVINE UTERINE PRESSURE AND THE RESPONSE TO OXYTOCIN
AS MEASURED BY A NEW APPARATUS

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ABSTRACT

A new apparatus for measuring uterine pressure (UP) was developed from an artificial insemination tube, modified by sealing one end and creating a side opening which was covered by a rubber diaphragm. It was a wholly pneumatic system. Because every recording tube was different, each was tested *in vitro* using a syringe-barrel apparatus which could apply a range of pressures and measure the resistance factor of the diaphragm. By simple calculation, the resistance factor for each diaphragm could be used to standardise the *in vivo* recordings and so provide an estimated force or pressure of the uterine musculature. The sensor diaphragm was sensitive and responded to applied pressure on a linear scale up to 450mmHg.

The UP comprised uterine tonicity pressure (32-1010mmHg) and uterine contraction pressure (0-110mmHg). The UP therefore was much higher than the traditional intra-uterine pressure which had been interpreted by research workers previously to consist of the uterine contraction pressure alone.

The uterus of the normal cow was more active and responsive to oxytocin during estrus. In the diestral period, the uterine activity was reduced and there were times when the uterus was quiescent. In spayed cows, the uterine activity was much reduced, and in many recordings there were no active uterine contractions. Estrogen could produce estral behaviour in spayed cows and it slightly increased the uterine activity. Such activity was much less in degree than that observed during estrus in normal cows.

Urination, defecation, bellowing or arching of the back had no long-lasting effect on uterine contraction tracings, though either urination or defecation produced a transient fall in uterine tonicity. Environmental disturbances such as a tractor operating nearby did not affect the pattern of uterine activity which had a contraction frequency ranging from 0 to 22 per 10 minutes.

Some intramuscular injections of oxytocin (5 of 16) did not produce any action on a uterus which was later found to be responsive to intravenously administered oxytocin. The epidural route of oxytocin administration accounted for fewer failures (1 of 13), but the intravenous route was most consistent of all provided the uterus was undergoing regular contractions.

Five units of oxytocin given intravenously did not produce any significant increase in uterine activity whereas 10 - 20 units given 40 minutes later produced a maximum increase. Doses of 40 - 60 units given after another 40 minutes, did not produce a further increase in uterine activity.

The duration of action of oxytocin lasted for more than 9 hours when the recording was taken continuously; but when the animal was allowed rest periods interspersed with recording periods, the duration was found to be always greater than 1 hour and in 7 out of 15 recordings, more than 3½ hours.

The effect of adrenaline on uterine activity was stimulatory for a few moments only and this was followed by 2 - 4 minutes of inhibition. Xylazine in the form of "Rompun" had a stimulatory effect on uterine activity.

There are indications that the spontaneous muscular contractions of the non-pregnant uterus are governed by a complex of influences including endogenous hormones. To determine the relative importance of the different components would seem to be an interesting and important field of study that might possibly lead to the more rational use of therapeutic drugs about the time of parturition.

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