UTERINE MOTILITY IN CATTLE PRIOR TO AND POST PARTURITION (PRELIMINARY RESULTS)

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ABSTRACT

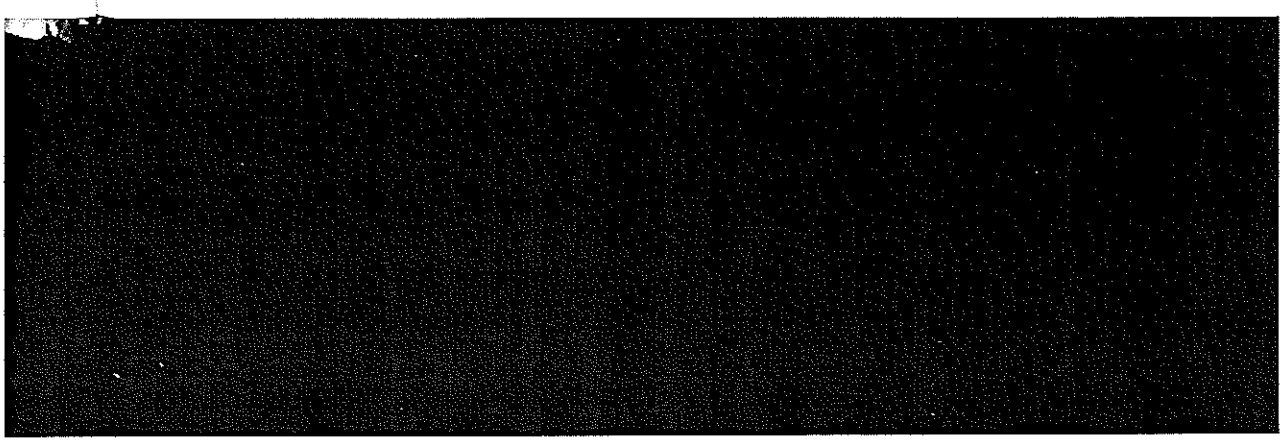
Recordings of electrical activity of six different areas of the uterus were obtained from cows before and after delivery. The alternation of periods of activity and quiescence represents the basic motility pattern of the pregnant uterus. There is continous spiking activity in the hours after delivery with contractions moving predominantly in a cervical direction.

INTRODUCTION

In the cow, the mechanical effect of hormonal variations involved in parturition on the uterus have been recorded around the time of parturition by Zerobin and Spörri (1972) and by Giama (1975). In contrast, little is known about the concomitant patterns of electrical activity. Using four groups of electrodes Taverne et al. (1974) reported the existence of distinct electrical activity during the last week of pregnancy and a tubocervical propagation of the contractions in the first hours post partum. This communication reports on the electrical spiking activity of six different parts of the uterus at the approach of delivery and during the week after parturition.

MATERIAL AND METHODS

Three Blue White Belgian parous cows were used. About ten days before parturition, six pairs of electrodes, 2 meters long and made from insulated nickel-chrome wire (Stabilohm from Johnson Matthey London) were inserted in two cows (no 1 - no 2) through the serosa and muscular layers of the pregnant horn according to the technique described by Rucke-



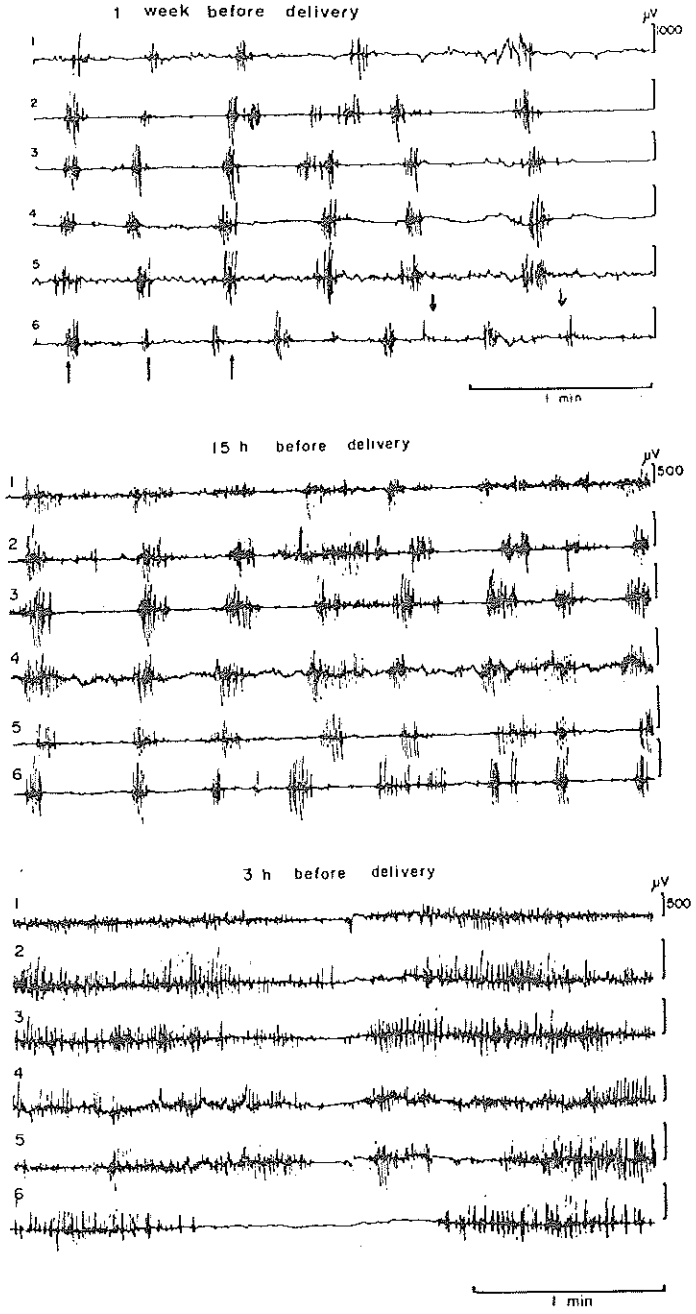
busch (1973). One cow(no 3) was implanted just after parturition. The six pairs of electrodes were implanted every 20 cm along the great curvature of the pregnant horn. The first implantation (no 1) was located 30 cm from the utero-tubal junction. Cow's no 1 and 2 electrical activity was recorded from 3 days after surgery and continued until parturition on an eight-channel polygraph (EP-8Medelec-Van Gogh) during periods of 2 to 3 hours each day. Continous recordings were performed the last day of pregnancy. The calf was obtained from the first cow by foetotomy and the recordings were continued for ten hours after foetotomy. The calf of the second cow was obtained by acæsarean section. For cow no 3 the recording started 90 minutes after normal parturition. All the recordings were examined by visual inspection and the activity summed up for 20 minutes periods by curvimetry.

RESULTS AND DISCUSSION

The electrical activity during this period was related to changes in hormones: progressive increase of oestrogens (Robertson, 1974) and decrease of progesterone (Fairclough et al.,1975), increase of prostaglandin $F_{2\alpha}$(Edquist et al.,1978) and oxytocin (Schams et al., 1979). During the week before parturition the periods of activity occupied 34 % of the recording time; 72 % 20 hours before and 92 % just before calving. Furthermore, the spike burst activity had a tendency to form trains during the initiation of parturition (Fig. 1).

In the hours following parturition the spiking activity was continuoued. The mean frequency of bursts decreased progressively : 0.35 and 0.15 burst/min., 2 and 5 hours, respectively, after birth. The mean duration of each activity phase showed first a decrease and afterwards an increase. This increase coincided more or less with the afterbirth expulsion observed 4 and 5 hours after parturition for cows number 3 and 1. The bursts had a mean duration of 55, 132, 186, 280, 446 secondes, respectively, 5, 10, 43, 53 and 81 hours after parturition. No particular changes in the burst

Figure 1: Electrical activity of the uterus at various moments before parturition.
Note ascending (↑) and descending (↓) propagation.



frequency were seen after placental expulsion. In the days following parturition, activity phases appeared at a frequency of 0.4/hour.

During the first hours post partum, 84 % of the contractions moved in a cervical direction and while 16 % moved towards the top of the horn (Fig. 2).

Three hours after parturition intravenous injections of 5 or 10 I.U. of oxytocin were without effect on electrical activity. No change of the electrical activity was observed during or after the milking that was performed each day.

The electromyographic techniques used in this study seems suitable to investigate the part taken by foetal movements in the organization of uterine activity and the α and β mimetic compound's effect on the myometrial receptors before and after parturition.

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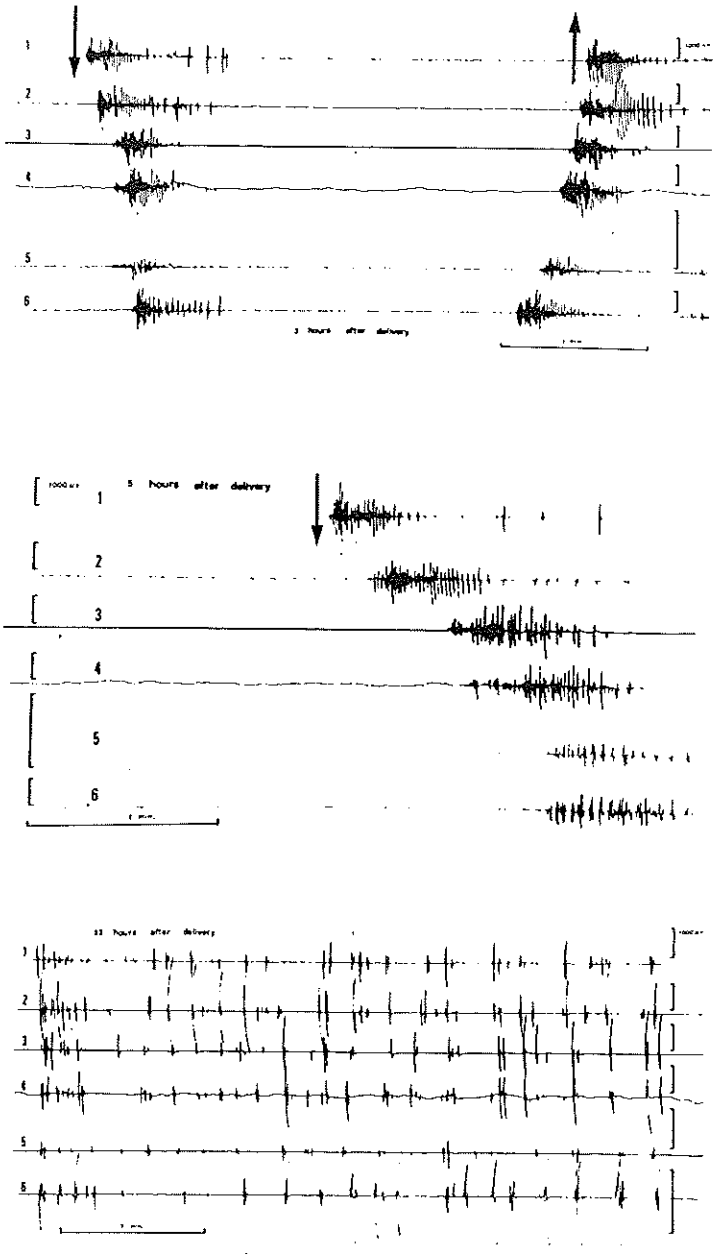
Figure 2: Electrical activity of the uterus at various moments after parturition.
Note ascending (↑) and (↓) descending propagation.



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