

## Does Mechanical Manipulation of the Reproductive Organs Cause a Prostaglandin Release in the Heifer During Embryo Transfer?

One of the problems encountered in embryo transfer (ET) in cattle is the wide variation in pregnancy rates. Many factors, of either embryonic, maternal or environmental origin, influence the result of the ET (Sreenan & Diskin 1987). An important environmental factor is the method of transfer. Pregnancy rates are generally lower following non-surgical, compared with surgical transfer. In addition, the skill and experience of the operator is of great importance. Furthermore, pregnancy rates tend to decrease the longer the transfer catheter remains in the uterus (Rowe *et al.* 1980). One suggested reason for this is uterine trauma or irritation caused by the catheter with a subsequent endometrial inflammation. As the uterine environment is of great importance for the establishment of pregnancy, an inflammatory reaction would certainly diminish the chances for embryo survival. There is a possibility that the endometrium becomes damaged mechanically during the transfer procedure. This might be more pronounced in animals where ET is difficult to perform, due to anatomical reasons and/or, an inexperienced operator. Furthermore, when a longer time is needed for passing the cervix and placing the embryo in the tip of the uterine horn, the pregnancy rate seems to be influenced negatively.

Activation of the arachidonic acid cascade and formation of e.g. prostaglandins are parts

of the inflammatory response (Weissmann *et al.* 1980). Prostaglandins can thus act as inflammatory mediators. Since prostaglandins have well-known effects on reproduction, such as luteolysis and abortion, they can cause reproductive disturbances.

The purpose of the present study was to examine if there was a prostaglandin mediated reaction in the uterus after a non-surgical ET, as reflected in increased prostaglandin metabolite levels in the general circulation.

Four heifers of the Swedish Friesian Breed (SLB) were used as recipients. The animals were synchronized with 500 µg cloprostenol (Estrumat® vet., Pitman-Moore, Uxbridge, England) intramuscularly early in the luteal phase. On day 7 ± 1 in the oestrous cycle (day 0 = first day of standing heat), a simulated ET was performed according to our standard method (Greve 1981), including low epidural anaesthesia (5 ml Xylocain, 20 mg/ml, Astra, Södertälje, Sweden). French straws (0.25 ml) were loaded with phosphate buffered saline (PBS) supplemented with 1% foetal calf serum and kanamycin (0.25 µg/ml), and placed in a Cassou insemination gun (IMV, l'Aigle, France). The insemination gun was passed through the cervix into the horn ipsilateral to the corpus luteum. The tip of the gun was moved to the upper third of the uterine horn where the PBS was expelled. The transfer procedure was classified as easy, me-

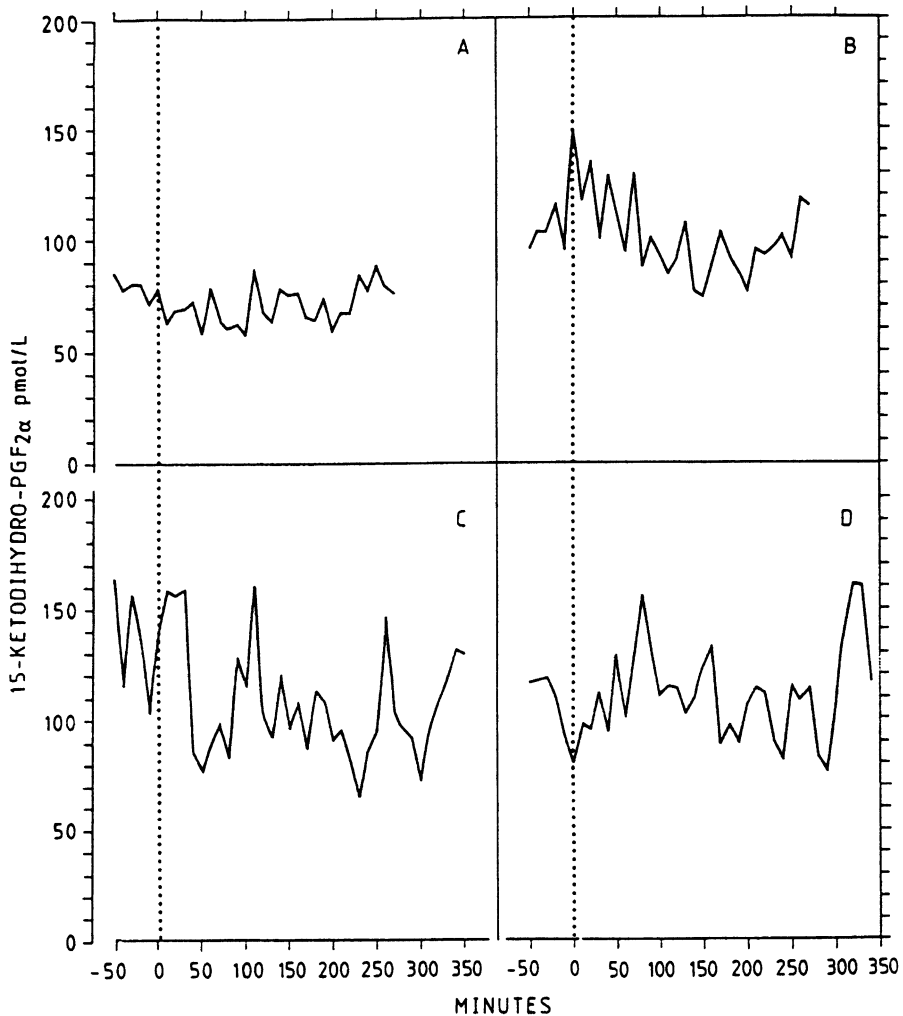


Figure 1. Levels of 15-ketodihydro-PGF<sub>2α</sub> in the four heifers (A-D). Dotted vertical line indicates time for the ET procedure.

dium or difficult to perform, based on the difficulties of the manipulation and the time required to place the tip of the catheter in the desired position. To facilitate the blood sampling, a cannula was inserted into the jugular vein prior to the ET. Blood samples were withdrawn every 10 min beginning 50 min be-

fore the ET and continuing for about 5 h (270-350 min) after the ET. The samples were centrifuged immediately and the plasma frozen. The concentration of the main metabolite of prostaglandin (PG) F<sub>2α</sub> was analysed by radioimmunoassay (Granström & Kindahl 1982).

The performance of the ET procedure in heifers A-D was classified as medium, easy, difficult and medium respectively. The procedure did not cause any significant changes in the PGF<sub>2α</sub> metabolite pattern (Fig. 1). Furthermore, when the level of the PGF<sub>2α</sub> metabolite was correlated with the ease of the transfer, no obvious correlation was seen. Even though the hormone patterns differ among the animals, all four are within the normal range at this stage of the oestrous cycle (e.g. Kindahl *et al.* 1976). A certain variation in basal levels is always seen during the cycle. A slight tendency of initially higher levels of the PGF<sub>2α</sub> metabolite can be seen concomitantly and in conjunction with the manipulation in all heifers except one (heifer A). This might be a reflection of the handling of the heifer and the procedure of inserting the cannula, as well as the ET performance, including the low epidural anaesthesia.

The result of the present study suggests that a non-surgical ET procedure does not initiate a release of prostaglandins to a significant degree during the 1st h after the manipulation.

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