

PLASMA PROGESTERONE CONCENTRATIONS AND REPRODUCTIVE EFFICIENCY FOLLOWING INDUCED OVULATIONS IN LACTATING DAIRY COWS

J.M. BORMAN^A, J. MALMO^B and K.L. MACMILLAN^A

^A Dept of Veterinary Science, University of Melbourne, Werribee, Vic 3030

^B Maffra Veterinary Centre, Maffra, Vic 3860

Oestradiol benzoate (ODB) and gonadotrophin-releasing hormone (GnRH) are frequently used in oestrus synchronisation programs to induce ovulation. In a recent study (J.M. Borman, unpublished results), inducing ovulation with GnRH was associated with elevated plasma progesterone (PP4) concentrations during metoestrus in non-lactating cows. Progesterone plays an important role in early embryonic development, and PP4 in maternal circulation is associated with success or failure of pregnancy (Mann and Lamming 1999). The aim of this experiment was to determine if PP4 were higher in lactating cows when ovulation was induced with GnRH, and if there was any relationship with pregnancy status.

Two hundred and two lactating dairy cows on 1 farm (74.3 ± 6 days in milk, producing 28.2 ± 0.5 L of milk/day; mean ± s.e.m.) were synchronised using the CIDR cattle insert ‘Controlled Breeding Program’ (Genetics Australia), and randomly assigned to 1 of 3 treatments. Ovulation was allowed to occur spontaneously (Spont) or induced with 1 mg of ODB (ODB) or 250 µg of GnRH (GnRH). Before commencing the program, cows were classified as cycling or anoestrus based on expression of behavioural oestrus. Anoestrus cows were assigned to either ODB or GNRH since they were unlikely to ovulate spontaneously. Artificial insemination was based on oestrus (Spont and ODB) or at a set time (GnRH). Blood samples were collected (for progesterone analysis) on d 5 and d 12 after mating start date (MSD) from every cow that was inseminated in the first 3 days of mating. Pregnancy diagnosis was performed by ultrasound at 5 weeks after MSD. Conception rates were analysed by logistic regression, and PP4 were analysed by ANOVA.

On d 5 after MSD, PP4 differed between treatments (P < 0.001) and there was a treatment by pregnancy status interaction (P<0.05). On d 12 after MSD, PP4 concentrations were similar. Figure 1 shows PP4 on d 5 after MSD for pregnant and non-pregnant cows. The PP4 concentrations differed for pregnant cows, but were similar for non-pregnant cows. Conception rates for ODB were greater than for GnRH (P<0.05), with Spont being intermediate.

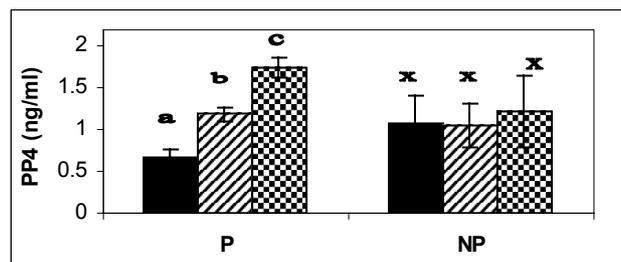


Figure 1. Plasma concentrations of progesterone (PP4) on day 5 after mating start date for cows that were pregnant (P) or not pregnant (NP) after ovulations that occurred spontaneously (■) or were induced with ODB (▨) or GnRH (▩) (see text for details). Values are means ± s.e.m. Values with same notation are not significantly different (P>0.05).

The post ovulatory rise in progesterone is important for establishing pregnancy (Mann and Lamming 1999). In cows that became pregnant, induction of ovulation was associated with elevated PP4. Conception rates were higher when ovulation was induced with ODB compared with GnRH. In conclusion, induction of ovulation with GnRH was associated with elevated PP4 in pregnant cows on d 5 post MSD, but was not related to rates of conception rate.

MANN, G.E. and LAMMING, G.E. (1999). *Reprod. Domestic Anim.* 34, 269-274.

Email: k.macmillan@unimelb.edu.au