The prostaglandins most widely used in animal husbandry and veterinary medicine are unquestionably the PGA2's. Those have clear luteolytic action in some animals of interest to breeders (Cooper and Forre 1974, McGowan et al. 1981). In cattle, these compounds are mainly used to induce and synchronize parturition (Obie 1974) and the problem is linked to some preventive effects on WMA (Elmanson et al. 1970).

During tests of induction of parturition in cows using a new PGF2α analogue (alfaprostol), we noted a certain sedative effect in addition to the specific inducive action.

The PGF2α compounds are known, besides their luteolytic action, to have other effects, often on organs and systems (Wolfe & Coceani 1979, Schrøter 1971) such as the respiratory and circulatory systems, and antagonistic effects depending on the type of prostaglandin.

We therefore deemed it worth investigating further the possibility of this new analogue having other activities and focussed on the cardio-respiratory system and basal temperature, keeping records of any other objective clinical signs.

A group of 30 young cows (600-100 kg.; 6 x BW) was used, and the findings were compared with those in 20 non-pregnant Italian Friesian cows (500-600 kg.). Those animals were given in high i.m. doses of alfaprostol bearing in mind that optimal luteolytic doses are 15 mg/100 kg live weight for cows and 2 mg/rabbit for swine. The concentration of alfaprostol is 1 mg/ml of propylene glycol.

The cows were divided into 7 groups of 6, and 6, 12 or 21 ml i.m. of alfaprostol, 6, 12 or 21 ml i.m. of propylene glycol alone, or 12 mg of alfaprostol to a group pretreated with 4 mg/kg body of atropine. The cows were divided into 4 groups of 5 in such a way that 10 and 45 mg of alfaprostol in 3 ml i.m. of propylene glycol was injected, both with 45 mg of the drug-induced bradycardia.

The animals were kept and the following parameters were kept: a) Heart rate, using a cardioscope cardiograph; b) Respiratory pattern; c) Rectal temperature profile.

RESULTS

After doses from 2-10 times the therapeutic level, the treated cows' heart rate was reduced, and the ECG tracings showed these values returned to normal after 120 min. after treatment, with no further alterations to the ECG record. Propylene glycol alone — as reported by Groen et al. (1970) — did not reduce the heart rate, but much less than the drug-induced bradycardia. When 12 mg/animal was given to acutely pretreated cows, no bradycardia was observed; this suggests the vagal reflex is involved in the slowing of the heart rate observed in the other groups.

The bradycardic action of alfaprostol is thus in accordance with the description by Dusting and Vane (1963), as regards the properties of PGF2α in inducing bradycardia through a vagal reflex. Trautti et al. (1967) also reported that PGF2α had a vagal effect in sheep.

In the cows we found no changes in the morphology of the ECG tracing, even though doses equivalent to 5 times the luteolytic level were given to these animals.

Only very large doses of alfaprostol raised the number of respirations in both species as already reported by Kadwitz et al. (1974) and Clement et al. (1979) for other types of PGF2α. There was, however, a difference in the case of response, the pigs responding earlier than the cows.

Rectal temperature recorded immediately after drug administration and after propylene glycol remained constant in the pigs; at larger doses there was a slight rise in temperature starting after 30 min. in the cattle.

After administration of alfaprostol, especially at the high doses, the cows but not the pigs showed a state of sedation lasting about an hour.

CONCLUSIONS

It is interesting that the compound causes bradycardia in cows but not in pigs. We found no signs of excitation (biting the cage bars, urination and defecation) such as those reported by Maffeo et al. (1973) using natural PGF2α, and Kett and Mead (1970) with analogues.