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Clinico-Haematological Evaluation of two Anaesthetic Regimens for Embryo Transfer in Goats*

WILLIAM, B.J., D. KATHIRESAN, V. LEELA, A. PALANISAMY, G.D. RAO AND K. NACHIMUTHU

Department of Animal Biotechnology,
Madras Veterinary college, Madras-7

Surgical embryo transfer in goats require an ideal anaesthetic state which will facilitate maximum embryo recovery from donors and better pregnancy rate and kidding rate in recipients. Use of inhalation anaesthetics require special equipments, hence intravenous or intramuscular agents are preferred to practice the technique in field condition. In addition, the commonly used inhalation agents like nitrous oxide, and halothane respectively resulted in reproductive loss (Mazze *et al.*, 1986) and early abortion (Critchlow *et al.*, 1991).

The desirable qualities in selection of anaesthetics for embryo transfer programmes could be, an anaesthetic or anaesthetic combination which would render maximal embryo retrieval from donors and would not interfere with the embryo or life of the embryo in the recipients till kidding. In addition muscular relaxation, easy exteriorization and manipulation of uterus and associated structures are also warranted in both collection and transfer to prevent post operative adhesions. Hence the present study was conducted to evaluate two anaesthetic regimen with the commonly used agents diazepam (Singh and Kumar, 1988). Xylazine (Kumar *et al.*, 1986) and ketamine (Coulson *et al.*, 1991).

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MATERIALS AND METHODS

The study was conducted on 6 donors and 12 recipients programmed and prepared for embryo collection and transfer. The does were divided equally into group I and II.

Ketamine (11mg/kg) was administered as intravenous injection 15 miniutes after intramuscular injection of xylazine in group I. Kelamine at dose rate of 15 mg/kg was given 5 minutes after intravenous injection of diazepam in group II. The parameters studied were quality and duration of induction, anaesthesia and recovery. The clinical parameters studied were respiratory rate, heart rate and rectal temperature. The haematological parameters included were haemoglobin, total erythrocyte count, total leucocyte count and packed cell volume. The parameters were studied before sedation, before induction, after induction, after handling uterus, after closure of laparotomy and after recovery. The other parameters studied were skeletal muscle relaxation, embryo retrieval rate in donors and pregnancy rate in the rcipients.

RESULTS

The two anaesthetic regimens for embryo transfer under study provided smooth induction with the induction time 2.62±0.35 minutes in group I and 3.06±0.44 minutes in group II. The duration of anaesthesia was significantly shorter ($P>0.01$) in group II (20.46±1.84 minutes) as compared with group I (44.33±3.61 minutes). The quality of anaesthesia was excellent in relation to muscle relaxation and exteriorization of uterus in group I. Spontaneous movements, limb hypertonicity of muscles were noticed in group II. Group II donors received a second injection of ketamine (5.00 mg/1 kg BW) to maintain anaesthesia for completion of embryo collection. No significant differences were noticed in the recovery time (22.96±2.21 VS 17.28±2.15 minutes). The recovery was smooth. No incidence of regurgitation or aspiration was noticed in both the groups. Swallowing and pelpebral reflexes were persistant in both the groups throughout the anaesthetic period.

The mean respiratory rate in both xylazine and diazepam premedicated groups decreased

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significantly ($P<0.01$) after sedation. No significant changes were noticed in the heart rate and mean rectal temperature. No significant changes were noticed in both the groups with respect to haemoglobin, total erythrocytic count, total leucocytic count and packed cell volume.

The intra tubal embryo retrieval rate was 96.42 per cent in xylazine premedicated donors whereas the same was 90.61 per cent in diazepam premedicated donors. But handling of uterus and cannulation were easily performed in xylazine premedicated does. The success rate in recipients was 66.66 per cent in xylazine and zero per cent in diazepam premedicated groups.

DISCUSSION

The induction was quicker in both xylazine and diazepam premedicated does because of ketamine binding ability with opiate receptors (Finck and Nagai, 1982). When ketamine was combined with xylazine, the duration of anaesthesia was significantly increased due to the adjunct action of xylazine. The spontaneous movements, limb stretching and facial muscle tremors during induction and anaesthesia in diazepam premedicated does could be due to the hypersynchronous activity of ketamine on cortical area (Tamasy *et al.,* 1975). Ketamine in combination with xylazine provided excellent muscle relaxation resulting in easy handling of uterus because xylazine was a centrally acting muscle relaxant (Samy and Tantawy, 1981). The hypertonicity induced by ketamine was masked by xylazine (Amend *et al.,* 1972). The vital reflexes like deglutition, pharyngeal palpebral reflexes were intact and were protected by ketamine (Ramakrishna *et al.,* 1981).

The respiratory depression could be due to the effect of xylazine on medullary centres (Leela and Bhlokre, 1985) and of diazepam on enhancing the inhibitory neurotransmittors - r amino butyric acid (Muir and Hubbell, 1991). Though xylazine interfered with carotid sinus baroreceptors reflex response (Garner *et al.,* 1971) and diazepam induced bradycardia (Muir and Hubbell, 1991) ketamine maintained the heart rate due to its stimulation of sympathetic nerve trunks (Thurmon *et al.,* 1973), inhibition of vagal component of the baroreceptor reflex (McGrath *et al.,* 1975) or selective positive inotropic influence in heart muscle (Adams *et al.,* 1977) or increase in epinephrine level (Craft *et al.,* 1983).

The less pregnancies in diazepam premedicated does could be due to the increased dose of ketamine (15 mg/kg BW) which could increase uterine vascular resistance and reduce the blood flow (Craft *et al.,* 1983).

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