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Research Article

SEDATIVE STUDY OF MIDAZOLAM IN GOATS (CAPRA HIRCUS)

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ABSTRACT

A sedative study was conducted in 5 healthy goats after intravenous administration of midazolam hydrochloride (0.4 mg/kg). The animals went into lateral recumbency by three minutes of midazolam administration. Mild to moderate watery salivation was observed. The palpebral, corneal and swallowing reflexes were diminished after midazolam administration. Relaxation of the jaw, flaccidity of the tongue and relaxation of neck was observed. Limbs, tail and anal sphincters were mildly relaxed. Abdominal muscles relaxation was noticed for about 15 minutes. The head rightening reflex was seen at 18.2±3.28 min after drug administration. The animals stood on their own by 43.4±4.47 min with slight ataxia. Complete recovery occurred after 69.2±5.06 minute.

Key words: Midazolam, goat, premedication

Midazolam, an imidazobenzo-diazepine derivative, has been used as sedative and induction agent in human beings (Berggren and Eriksson, 1981), dogs (Greene *et al.*, 1993) and pigs (Smith *et al.*, 1991). It has an early induction, short duration of action, rapid elimination and total body clearance time (Court and Greenblatt, 1992). Midazolam is compatible with 5 per cent dextrose in water, 0.9 per cent sodium chloride and lactated Ringer's solution (Brown *et al.*, 1993). Hence, the maintenance of anaesthesia becomes easier when injected along with intravenous fluids. There are sporadic reports of work on midazolam in different species but no systematic work has been conducted in goats. The present study describes the evaluation of sedative effects of midazolam in goats.

MATERIALS AND METHODS

The present study was conducted on 5 clinically healthy goats (*Capra hircus*) of either sex. All the goats were kept under similar managemental conditions. The goats were controlled in lateral recumbency and midazolam hydrochloride was administered into the jugular vein at dose rate of 0.4 mg/kg and were immediately let free. Behavioral parameters like spontaneous activity, weak time, down time, relaxation of jaw, abdominal muscles, tongue, neck, tail and limbs, onset of salivation, palpebral/corneal reflex, swallowing reflex, peniculous reflex, sleeping time, time taken to return to sternal recumbency from lateral recumbency and keeping the head upright were recorded. Recovery from the effect of midazolam hydrochloride was judged as time taken by the animal to stand and restoration of co-ordination of limbs.

RESULTS AND DISCUSSION

The effective intravenous dose of midazolam hydrochloride (0.4 mg/kg.) as a sedative agent was standardized by pilot trials as already found effective for restraining cows (Sanchez *et al.*, 1994). Light sedation was observed with 0.3 mg/kg intravenous administration in human (Kanto *et al.*, 1982). Berggren and Erickson (1981) observed smooth and reliable induction of anaesthesia in human with intravenous dose of 0.36 ± 0.01 mg/kg of midazolam.

Within three minutes of intravenous

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administration of midazolam hydrochloride (0.4 mg kg $^{-1}$), animals went into lateral recumbency with legs fully relaxed. Mild to moderate watery salivation was observed within 6.8 ± 1.16 min after the administration of drug. The corneal and palpebral reflexes were diminished. Swallowing reflex was diminished but not abolished. There was relaxation of the jaw, flaccidity of the tongue and relaxation of the neck. The tail was mildly relaxed for 14.2 ± 1.62 min while mild relaxation of limbs and anal sphincter were seen for 15.0 ± 2.78 min and 14.8 ± 2.20 min, respectively. There was no analgesia. Good relaxation of abdominal muscles was observed for 10-15 min. The head rightening reflex (resumption of sternal position from lateral recumbency and keeping the head upright) was seen at 18.2 ± 3.28 min after the administration of midazolam hydrochloride. Animals could stand by 43.4 ± 4.47 min but were still ataxic. The complete recovery (standing without ataxia) was observed at 69.2 ± 5.06 minutes.

The most typical clinical features observed after i/v administration of midazolam hydrochloride in goats were relaxation of muscles, lateral recumbency, mild to moderate degree of salivation, depressed corneal and palpebral reflexes, along with diminished swallowing reflex with no analgesia. Castro *et al.* (1988) found slightly diminished palpebral reflex and centrally positioned eyeballs, pupil in myosis and eyelids closed after 2.0 mg/kg midazolam i/v in dogs. Forster *et al.* (1980) observed drowsiness and loss of eyelashes reflex (0.15 mg/kg) while Bishnoi (2001) used midazolam @ 0.5 mg/kg in calves which produced good sedation without any significant effect on cardio-respiratory, haematological or biochemical parameters.

In the present study, sedation lasted for 18.2 ± 3.28 min after single i/v injection of midazolam hydrochloride (0.4 mg/kg). Smith *et al.* (1991) observed sedation of about 20 minutes after single i/m injection or after incremental i/v doses of midazolam hydrochloride in pigs.

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