

Technical note:

A simple technique for intubating rats

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Since anaesthetic agents are CNS depressants which can result in inadequate spontaneous respiration, intermittent positive pressure ventilation (IPPV) may be necessary to maintain physiology close to normal during general anaesthesia. Artificial ventilation is essential during thoracic surgery or when muscle relaxants are being used, and when anaesthesia is maintained for long periods (Green 1979).

For IPPV it is necessary to intubate the trachea of the animal. This has been described by several authors, all using methods involving fixation of the anaesthetised animal by the incisors. Medd *et al.* (1970) used a self-made laryngoscope and polythene tubing. Peña *et al.* (1980) used a stereo microscope and a 16 G intravenous cannula and Alpert *et al.* (1982) also used the 16 G intravenous catheter, but used a self-made laryngoscope. Thet (1983) described a method of endotracheal intubation with a 16 G intravenous cannula under direct vision.

Materials and methods

Twenty rats (mol:SPRD), weighing 473 ± 45 grams and 17–21 weeks old, were intubated as part of a study of long-term, non-recovery anaesthesia. Anaesthesia was induced with 0.31 ± 0.02 ml/kg i.m. fentanyl-fluanisone (Hypnorm, Janssen Pharmaceutica, Belgium) at and 4.1 ± 0.3 mg/kg s.c. midazolam (Dornicum, Hofmann-La Roche, Switzerland). After 26 ± 13 minutes, the trachea was intubated.

A Venflon 2[®] intravenous cannula of 16 G (1.7 mm) and a length of 4.5 cm was used as an endotracheal tube. The stylet was shortened to slightly shorter than the cannula, and was blunted. It was bent 2 cm from the tip at an angle of 10°, so that it could still

easily be inserted or withdrawn from the cannula. The wings of the cannula were cut off at the fold.

The anaesthetised rat was placed in dorsal recumbency without any fixation. The tongue was extended through the left diastema and an otoscope (Welch Allyn, USA) was inserted as far as possible, while keeping tension on the tongue. After tilting the end of the otoscope upwards, the pharynx could be observed with the epiglottis just caudal to the palatum molle. The endotracheal tube, with the stylet inserted, was introduced into the oral cavity via the right diastema as far as the end of the palatum molle. Depression of the palate revealed the opening of the larynx, and the tip of the tube was placed in the larynx. Then the otoscope was removed and the tube inserted. After feeling a slight resistance, the stylet was withdrawn while the tube was further inserted into the trachea.

Successful intubation was audible: a clear airflow could be heard at the end of the endotracheal tube, especially after a brief compression of the thorax. Proper airflow could also be detected by holding a tuft of fur at the end of the tube. Unsuccessful intubation was characterised by grunting noises and dyspnoea.

After intubating the animal and replacing the tongue in the oral cavity as far as possible, the end of the Venflon 2[®] cannula was taped to the mouth to keep it in place.

Discussion

Although pedal and tail reflexes were not present 10 minutes after administering anaesthesia, many animals still showed coughing reflexes when intubation was attempted at that time. Midazolam, in combination with fentanyl-fluanisone has been reported to

give good skeletal muscle relaxation from 5–15 minutes after administration (Flecknell *et al.* 1984), but no report of the abolition of pharyngeal reflexes has been made. After 26 ± 13 minutes the animals were relaxed enough to intubate the trachea without resistance. The intubation was atraumatic, but occasional broncho-secretion occurred.

All methods of endotracheal intubation reported included fixation of the anaesthetised animal by the incisors, while in horizontal dorsal recumbency (Peña *et al.* 1980, Alpert *et al.* 1982, Thet 1983), whereas Medd *et al.* (1970) positioned the animals vertically while in dorsal recumbency. When using an otoscope, fixation was found to be unnecessary. Since no fixation is used, the time necessary for intubation, including checking the airflow and connecting the animal to a ventilator, can be less than five minutes.

Abstract

Rats were anaesthetised with fentanyl-fluanisone and midazolam. After 26 ± 13 minutes the animals were relaxed enough for endotracheal intubation. A modified Venflon 2[®] intravenous cannula of 16 G was used for in-

tubating the trachea, which was monitored with an otoscope. The technique described is a successful, atraumatic method of endotracheal intubation of the rat.

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