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What is This?
Spinal anaesthesia in the rabbit

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Summary
Spinal anaesthesia, until now used in the guineapig, was adapted to the rabbit for examining rabbit foetuses during labour. This form of anaesthesia is easy, quick and safe, and it makes it possible to examine the physiology of rabbit foetuses without their being affected by anaesthesia.

Rabbit foetuses are in many respects the experimental animals of choice for studying the first breath and lung maturity of foetuses (Pulkkinen & Kero, 1977; Thomasson & Ravitch, 1969). It is, however, difficult to anaesthetize the mother safely and especially without affecting the foetuses (Becker, Flannagan & King, 1958; Thomasson & Ravitch, 1969). Anaesthesia for prolonged operations in the rabbit is difficult, mainly because of the narrow margin between surgical anaesthesia and respiratory arrest as well as the great individual variations in the response to the anaesthetic (Thomasson & Ravitch, 1969). Since spinal anaesthesia has been used for foetal surgery in guineapigs with satisfactory results (Thomasson, Ruuskanen & Merikanto, 1974), we adapted the same method to the rabbit.

Materials and methods
6 New Zealand White rabbits were anaesthetized in a pilot study. All the rabbits were anaesthetized 3 times at a few days' interval. Afterwards, in a study of the first breath of rabbit foetuses, the same method was used in 50 hysterotomies (Pulkkinen & Kero, 1977). Thus spinal anaesthesia was applied 68 times in all.

After shaving and antiseptic preparation of the skin in the lumbar region, 20 mg mepivacaine chloride (0·5 ml ‘Carbocain tung’; Ab Bofors, Mölndal, Sweden) was injected through the lumbar spinal interspaces at a level 1 or 2 interspaces higher than the iliac crest (level I). The injection was administered 3 times 2-3 interspaces higher (level II) during the pilot study to evaluate the effect of using this higher level. During injection the assistant held the rabbit tightly with its back curved (Fig. 1). The injection was carried out using sterile 1 ml disposable syringes with 0·60 x 25 mm needles. The needle was pointed at a 30° angle to the longitudinal axis of the spine in a caudoventral direction.

Results
After the injection of the anaesthetic (level I) the rabbit immediately lost motor function and the response to painful stimuli below the level of the epigastrium (Figs 2 and 3). During the introduction of the anaesthetic some of the rabbits cried out, but usually they were quite peaceful. Motor function was restored after 55 ± 10 min and the response to painful stimuli of the epigastric skin after 65 ± 10 min in all 6 rabbits (level I). When using the higher spinal interspaces (level II), all 3 rabbits were permanently paralyzed.

Spinal anaesthesia (level I) was then employed in 50 hysterotomies in order to obtain live rabbit foetuses for...
Discussion

In this study spinal anaesthesia proved very useful in hysterotomies performed on rabbits. It is an ideal form of anaesthesia when studying rabbit foetuses during or just before labour because it does not influence the foetuses. Motor and sensory functions recover in about 1 h (after the anaesthesia) when the anaesthetic is injected 1-2 interspaces higher than the iliac crest (Fig. 1). If the anaesthetic is disposed 2-3 interspaces higher still, total paralysis of the hindlimbs follows (Fig. 2).

General anaesthesia is difficult but useful in prolonged operations on the rabbit. However, in foetal surgery 30% mortality rate has been reported with general anaesthesia using pentobarbitone (Thomasson & Ravitch, 1969). Any general anaesthetic crosses the placenta to depress the foetuses and valid physiological studies are then impossible (Thomasson & Ravitch, 1969).

The technique of spinal anaesthesia, as used previously in the guinea-pig, is also useful in pregnant rabbits as it leaves the foetuses unaffected. It is easy to administer and especially safe for examining the physiology of the foetuses.

References


Lumbalanästhesie beim Kaninchen

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Zusammenfassung