

RABBIT GENERAL ANESTHESIA FOR CATARACT SURGERY USING CISATRACURIUM AS NEUROMUSCULAR BLOCKING DRUG. CASE STUDY

Alexandru Cosmin TUTUNARU¹, Alexandru ŞONEA², Charlotte SANDERSEN³

¹University of Agronomic Sciences and Veterinary Medicine Bucharest, 59, Mărăşti, 011464, Bucharest, Romania, 0040726282714, tutunarualexandru@yahoo.com.

²University of Agronomic Sciences and Veterinary Medicine Bucharest, 59, Mărăşti, 011464, Bucharest, Romania, sonealexandru@yahoo.com.

³Université de Liège, Place du 20-Août, 7 4000, Liège, Belgique, charlotte.sandersen@ulg.ac.be

Corresponding author email: alexveterinaria@yahoo.com

Abstract

Surgeries on rabbits are more and more frequently as they are used as pet animals and the owner is interested in their welfare. Cataract surgery is already a routine intervention in small animals as dogs and cats. This is why the aim of this study is to present a case study of a rabbit anesthesia for cataract surgery. Our subject was a three year old female laboratory rabbit which weight 2.07 kg. We premedicated him using butorphanol 0.4 mg/kg and midazolam 1 mg/kg subcutaneous 30 minutes before induction. To prevent sever bradycardia, we administered glycopyrrolate 0.01 mg/kg. Induction was realized using ketamine 10% and midazolam 0.5% mixed in the same volume and administered at a dose of 2 ml/kg. After induction the rabbit was intubated using blind technique and isoflurane was administered by the endotracheal tube. The rabbit was perfused at a rate of 20 ml/kg/h with Hartman solution, colloids and glucose all along anesthesia. To minimize the risk of cataract surgery we administered cisatracurium at a dose of 0,05 mg/kg as multiple boluses. Neuromuscular blockade was assessed using a standard peripheral nerve stimulator. Postoperative we administered enrofloxacin 5 mg/kg, meloxicam 0.2 mg/kg for postoperative analgesia and metoclopramide 0.5 mg/kg for digestive stimulation. Even if there is no dose given in literature for cisatracurium in rabbits, we concluded that it can be used with great success and with no incidence at a dose used for dogs and cats.

Key words: rabbit, cisatracurium, cataract, neuromuscular block.

INTRODUCTION

Rabbit's anesthesia have evolved much in the past years. The number of rabbit's owners increased as much as the demands of more specialized surgeries. Cataract surgery is a routine procedure in small pet animals like dogs and cats. The first steps in developing new cataract surgery techniques for rabbits starts with enrichment of particular anesthetic techniques, regarding a good myorelaxation. Our case study on rabbit research the use of cisantracurium to obtain a good myorelaxation. Cisantracurium is a 1R⁺-cis isomer of antracurium, four times more potent and has much less potential for histamine release. It is regular used as myorelaxant for dogs and cats surgeries [2].

The aim of this case study is to adapt cisantracurium use for a cataract surgery in rabbit.



Photo 1. Peripheral nerve stimulator (original)

MATERIAL AND METHOD

The subject was a two years male rabbit who was brought by the owner at CVU-ULG Liege for a cataract surgery (Photo 3. Our case study).

The rabbit was premedicated with glycopyrrolatev 0.01 mg/kg, butorphanol 0.4 mg/kg and midazolam 1 mg/kg, all administrated subcutaneous.

40 minutes from premedication, the rabbit was induced using ketamine 10% and midazolam 0.5% mixed equally and administrated intravenous as needed for intubation. The rabbit was then intubated with a 3 mm endotracheal tube using a 1.9 mm rigid endoscope.

Anesthesia was maintained with isoflurane and respiration was assisted using a closed circuit. During anesthesia the patient received intravenous a mixture of Heartmann 20 mL, colloid 20 mL and glucose 5% 5 mL solution at a rate of 20 mL/kg/hour using a syringe pump.

Other drugs administrated during anesthesia were: meloxicam 0.2 mg/kg intravenous and enrofloxacin 5 mg/kg. postoperative we administered metoclopramide 0.5 mg/kg to stimulate digestion and to reduce postoperative anorexic period.

Cisatracurium was administered at a dose of 50 µg/kg intravenous before surgery. Neuromuscular blockade was monitored using a peripheral nerve stimulator applied over the proximal lateral aspect of tibia, to stimulate superficial peroneal nerve (Photo 1. Peripheral nerve stimulator, original). We used cisatracurium 0.2% (Photo 2. Cisatracurium used in the study, original). Dose was repeated each time the neuromuscular blockade diminishes.

During anesthesia cardiorespiratory functions were assessed using a capnograph, pulse-oximeter and EKG. Respiratory rate was artificially kept at 57 breaths/minute. End-tidal CO₂ varied between 35-45 mmHg and hemoglobin saturation in oxygen between 96-100%. Heart rate varied between 200-240 beats/hour.

Anesthesia lasted 3 hours, from intubation to extubation.

RESULTS AND DISCUSSIONS

There are also other studies regarding cataract surgery in rabbits [3]. Our study wants to encourage cataract surgeries in rabbits and to transform it into a routine procedure. General anesthesia with cisatracurium in our case study allowed a very good cataract procedure for the surgeon and for the technique. Lens problems solved well after this bilateral surgery.



Photo 2. Cisatracurium used in the study (original)

Cisatracurium is frequently administered in dogs and cats in cataract surgery at a dose of 150 µg/kg initially, and 50 µg/kg the next boluses [4, 2]. Cisatracurium rate doses for rabbits are not recorded in literature. One study reported using a dose of 400 µg/kg cisatracurium in rabbits [1]. In this study we used the dose protocol recorded in dogs and cats, 50 µg/kg with very good results. Even if cisatracurium may produce severe tachycardia when administered fast intravenous, it did not appear to be a problem in this study. All cardio-respiratory parameters were kept between physiological limits suggesting that cisatracurium do not interfere when is administered slowly intravenous.

Cataract surgeries without the use of neuromuscular blockade leads to hazard results because of the risk of eye movement during surgery. This is why we need to study the pharmacology of neuroblocking agents in different species were we will need to perform a cataract surgery.

CONCLUSIONS

Even if there are no studies regarding the use of cisatracurium in rabbits, our study used this neuromuscular blocking agent with great success at a normal dog and cat dose rate. Following pharmacological researches are necessary to establish the exact dose of cisatracurium needed for a good neuromuscular blockade in rabbits.



Photo 3. Our case study

ACKNOWLEDGEMENTS

This study is part of the POSDRU project 88/1.5/S/52614 “Doctoral scholarships for high quality training for young researchers in the field of agronomy and veterinary medicine”.

REFERENCES

- [1] Scheufler K.M., Thees C., Nadstawek J., Zentner J., 2003, *S(+)-ketamine attenuates myogenic motor-evoked potentials at or distal to the spinal alpha-motoneuron*, *Anesth Analg*, 2003 Jan, 96(1):238-244
- [2] Sparr H.J., Beaufort T.M., Fuchs-Buder T., 2001, *Newer neuromuscular blocking agents: How do they compare with established agents?*, *Drogs*, 2001, 61:919-942
- [3] Stiles J., Didier E., Ritchie B. et al., 1997. *Encephalitozoon cuniculi in the lens of a rabbit with phacoclastic uveitis: conformation and treatment*, *Veterinary and Comparative Ophthalmology*, 1997, 7:233-238
- [4] Wastila W.B., Maehr R.B., Turner G.L., Hill D.A., Savarese J.J., 1996. *Comparative pharmacology of cisatracurium (51W89), atracurium, and five isomers in cats*, *Anesthesiology*, 1996, 85:169-177.