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Anesthesia for Spinal Stabilization Using Neuromuscular Blocking Agents in Dog: Case Report

Authors : Agata Migdalska, Joanna Berczynska, Ewa Bieniek, Jacek Sterna

Abstract : Muscle relaxation is considered important during general anesthesia for spine stabilization. In a presented case peripherally acting muscle relaxant was applied during general anesthesia for spine stabilization surgery. The patient was a dog, 11-years old, 26 kg, male, mix breed. Spine fracture was situated between Th13-L1-L2, probably due to the car accident. Preanesthetic physical examination revealed no sign underlying health issues. The dog was premedicated with midazolam 0.2 mg IM and butorphanol 2.4 mg IM. General anesthesia was induced with propofol IV. After the induction, the dog was intubated with an endotracheal tube and connected to an open-ended rebreathing system and maintained with the use of inhalation anesthesia with isoflurane in oxygen. 0,5 mg/ kg of rocuronium was given IV. Use of muscle relaxant was accompanied by an assessment of the degree of neuromuscular blockade by peripheral nerve stimulator. Electrodes were attached to the skin overlying at the peroneal nerve at the lateral cranial tibia. Four electrical pulses were applied to the nerve over a 2 second period. When satisfying nerve block was detected dog was prepared for the surgery. No further monitoring of the effectiveness of blockade was performed during surgery. Mechanical ventilation was kept during anesthesia. During surgery dog maintain stable, and no anesthesiological complication occur. Intraoperatively surgeon claimed that neuromuscular blockade results in a better approach to the spine and easier muscle manipulation which was helpful in order to see the fracture and replace bone fragments. Finally, euthanasia was performed intraoperatively as a result of vast myelomalacia process of the spinal cord. This prevented examination of the recovering process. Neuromuscular blocking agents act at the neuromuscular junction to provide profound muscle relaxation throughout the body. Muscle blocking agents are neither anesthetic nor analgesic; therefore inappropriately used may cause paralysis in fully conscious and feeling pain patient. They cause paralysis of all skeletal muscles, also diaphragm and intercostal muscles when given in higher doses. Intraoperative management includes maintaining stable physiological conditions, which involves adjusting hemodynamic parameters, ensuring proper ventilation, avoiding variations in temperature, maintain normal blood flow to promote proper oxygen exchange. Neuromuscular blocking agent can cause many side effects like residual paralysis, anaphylactic or anaphylactoid reactions, delayed recovery from anesthesia, histamine release, recurarization. Therefore reverse drug like neostigmine (with glikopyrolat) or edrofonium (with atropine) should be used in case of a life-threatening situation. Another useful drug is sugammadex, although the cost of this drug strongly limits its use. Muscle relaxant improves surgical conditions during spinal surgery, especially in heavily muscled individuals. They are also used to facilitate the replacement of dislocated joints as they improve conditions during fracture reduction. It is important to emphasize that in a patient with muscle weakness neuromuscular blocking agents may result in intraoperative and early postoperative cardiovascular and respiratory complications, as well as prolonged recovery from anesthesia. This should not appear in patients with recent spine fracture or luxation. Therefore it is believed that neuromuscular blockers could be useful during spine stabilization procedures.

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