

## Medetomidine-Tiletamine-Zolazepam Anaesthesia with Brachial Plexus Blockade: An Alternative Protocol for Canine Forelimb Surgeries

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**Abstract:** The use of medetomidine-tiletamine-zolazepam anaesthesia with brachial plexus blockade is reported as an alternative anaesthetic technique for repair of radius and ulna fractures in dogs. A 3 years old male Japanese spitz was presented with a history of leg carrying lameness following a car accident 2 weeks earlier. Clinical examination revealed non-weight bearing lameness of the right forelimb and normal physiological parameters. Radiography confirmed a complete oblique fracture of the proximal right radio-ulna bones which required open reduction and internal fixation. Two anaesthetic protocols were attempted but resulted into severe apnea and bradycardia. The first regime involved the use of xylazine-thiopentone-isoflurane while the second one was xylazine-ketamine combination. An alternative anaesthesia protocol involving medetomidine-tiletamine-zolazepam combination with brachial plexus block using lidocaine was employed with great success. Analgesia of the desensitized limb extended 7 h post-operatively. Temperature and cardio-pulmonary parameters remained stable intra-operatively as indicated by an average temperature of 37.2°C, heart rate of 68 beats min<sup>-1</sup> and respiratory rate of 18 breaths min<sup>-1</sup>. This study reports successful use of medetomidine-tiletamine-zolazepam anaesthesia with lignocaine brachial plexus blockade in orthopedic procedures involving the forelimbs in dogs.

**Key words:** Anaesthesia regime, apnea, bradycardia, hyperalgesia, forelimb fracture

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### INTRODUCTION

Local regional blocks have been used to supplement general anaesthetic protocols and post-operative analgesia with good success rates (Dumas *et al.*, 2008). Studies have demonstrated that lidocaine, bupivacaine and ropivacaine local anaesthetic agents can supplement general anaesthetic protocols in dogs (Dumas *et al.*, 2008; Futema *et al.*, 2002; Wenger *et al.*, 2002). Brachial plexus block is used as an adjunct to general anaesthesia with the aim of supplementing analgesia and reducing the dose requirement for general anaesthetic agents, especially inhalant anaesthetics that cause a dose-dependent cardiopulmonary depression in dogs (Novello, 2010). This advantage (reduction in dose) can be of value particularly in general anaesthesia of high risk patients (Jones, 2001).

Depressed, overly apprehensive or fractious patients that are often unstable and difficult to safely induce and maintain can therefore greatly benefit from the use of brachial plexus blockade while undergoing surgeries of the forelimbs (Brodbeck, 2009). However, despite the enormous benefit of brachial plexus block in dogs, the uptake of the technique in small animal practice remains

low (Novello, 2010). This study reports the use of lignocaine hydrochloride for brachial plexus blockade supplementing medetomidine-tiletamine-zolazepam combination for general anaesthesia in the repair of a radius and ulna fracture in a dog.

### CASE HISTORY, FINDINGS AND MANAGEMENT

A 3 years old male Japanese Spitz was presented to the Small Animal Clinic, University of Nairobi with a history of leg carrying lameness following a car accident 2 weeks earlier. Clinical examination revealed non-weight bearing lameness of the right forelimb and normal physiological parameters. Manipulation of radius and ulna elicited pain and crepitation. Radiography confirmed a complete oblique fracture of the proximal right radius and ulna which required open reduction and internal fixation.

Two anaesthetic protocols were attempted but resulted into severe apnea and bradycardia. The first protocol involved the use of xylazine-thiopentone-isoflurane while the second one was xylazine-ketamine combination at recommended dosage rates. An alternative regime involving medetomidine-tiletamine-zolazepam

combination with regional brachial plexus block using 2% lignocaine hydrochloride was employed. medetomidine hydrochloride (Domitor®-Roche Manufacturers, France) at 0.02 mg kg<sup>-1</sup> was administered intramuscularly; 10 min later tiletamine-zolazepam (Zolatel®-Carros-Codex Manufacturers, France) at 8 mg kg<sup>-1</sup> was administered intramuscularly. After 2 min, 10 mL of 2% lidocaine hydrochloride (Lidocaine injection B.P 2%, Macs Pharmaceuticals Ltd. Nairobi, Kenya) was infiltrated into the axillary area medial to the shoulder joint by blind needle placement technique using 16 G needle as described by Skarda and Tranquilli (2007).

Onset of analgesia was achieved within 10 min and was ascertained by loss of pedal reflex. The patient was prepared for aseptic surgery and fracture repaired using a compression bone plate and screws. The surgery took 1 h and the patient recovered from anaesthesia 35 min later with no untoward effects. Analgesia of the desensitized limb extended 7 h post-operatively. Temperature and cardiopulmonary parameters remained stable as indicated by an average temperature of 37.2°C, heart rate of 68 beats min<sup>-1</sup> and respiratory rate of 18 breaths min<sup>-1</sup>.

## DISCUSSION

To the researchers knowledge this is the first reported case on the use of medetomidine-tiletamine-zolazepam anaesthesia and lidocaine brachial plexus blockade in a dog that reacted unexpectedly to routinely used anaesthesia protocols. General anaesthesia with brachial plexuses blockade is a technique that is gaining popularity in small animal practice (Novello, 2010). This might be attributed to effective and superior analgesia that is achieved with potentially low morbidity and mortality (Campoy, 2008). However, despite these enormous advantages, the uptake of the technique remains significantly low (Novello, 2010).

The researchers strongly believe that the severe apnea and bradycardia observed in the xylazine-thiopentone-isoflurane and xylazine-ketamine anaesthesia may have been due to prolonged untreated pain with results into hyperalgesia and hence difficult in anaesthesia induction (Harsoor, 2011), idiosyncrasy and cardiopulmonary depressant effects of xylazine (Lemke, 2007), thiopentone (Branson, 2007) and isoflurane (Steffey and Mama, 2007).

On the other hand, the success of the later technique may be attributed to the fact that although medetomidine has a dose dependant cardiopulmonary depression in dogs, its effects are not far-reaching as those of xylazine (Pypendop and Verstegen, 1998). In

addition, tiletamine-zolazepam may have neutralized the cardio-pulmonary depressant effects of medetomidine when used together. Similar observations have been reported by Caulkett and Cattet (1997). Although, medetomidine-tiletamine-zolazepam combination has been reported to have a wider margin of safety, its analgesia is apparently poor (Caulkett *et al.*, 1999; Lin, 2007) and it is for this reason that brachial plexus block was employed to supplement analgesia perioperatively in this case. Previous studies have reported the use of lignocaine-bupivacaine combination (Futema *et al.*, 2002; Wenger *et al.*, 2002, 2005) and ropivacaine (Dumas *et al.*, 2008) for brachial plexus blockade in dogs but lidocaine was shown to be equally effective in the current case.

## CONCLUSION

This study recommends the use of medetomidine-tiletamine-zolazepam anaesthesia with lignocaine brachial plexus blockade in orthopedic procedures involving the forelimbs in dogs. The use of this protocol confers the benefits of stable cardiopulmonary parameters, excellent peri-operative analgesia and good muscle relaxation.

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