

## Does the Use of Intratesticular Blocks in Cats Undergoing Orchiectomies Serve as an Effective Adjunctive Analgesic?

A Knowledge Summary by

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**PICO question**

In cats undergoing orchiectomy, does the use of intratesticular lidocaine reduce the pain in patients compared to not using intratesticular lidocaine?

**Clinical bottom line**

With a low grade of evidence, when compared to a pre-medication with pure- $\mu$  agonist opioids, intratesticular lidocaine does not appear to provide significant benefit. However, based on our clinical scenario where pre-medication is with a partial- $\mu$  opioid like buprenorphine, there may be benefit in utilising intratesticular lidocaine.

**Clinical Scenario**

While animals don't appear to show a great deal of pain on our pain scale in post orchiectomies, does the use of intratesticular lidocaine work as a good adjunctive analgesic compared to not using it, and are there many severe complications?

**The evidence**

Two randomised control trials with varying degrees of blindness were examined. All studies included involved cats. All studies had a high degree of variation in premedication and analysis of effect (Moldal et al., 2013; Fernandez-Parra et al., 2017).

**Summary of the evidence**

<b>Fernandez-Parra et al. (2017)</b>	
<b>Population:</b>	Client-owned cats with an average age of 8 mo and 3.8 kg presenting for castration.
<b>Sample size:</b>	49 (out of 54 where 7 were excluded due to fractious behavior – math does not add up) (2 didn't meet inclusion criteria and 5 lacked follow up due to unavailability).
<b>Intervention details:</b>	<p>All received as a premedication and induction agent for neuter – dexmedetomidine (15 <math>\mu</math>g/kg) and alfaxalone (3 mg/kg)</p> <p>Patients were divided into three groups</p> <p>(ITL) Intratesticular lidocaine (N=15) 0.05 ml of lidocaine 2% in both testicles.</p> <p>(SCL) sacrococcygeal epidural lidocaine (N=15) 0.1 ml/kg of lidocaine 2% epidural placed.</p> <p>(IVM) intravenous methadone (n=19), 0.3 mg/kg IV.</p> <p>All patients received atipamezole (dexmedetomidine reversal) at the</p>

	<p>end of surgery.</p> <p>Fentanyl was administered perioperatively (2 µg/kg) - during the procedure if two values were 30% above the baseline for that animal, and patients were also administered propofol when light.</p> <p>Animals failing VAS pain scale and UNESP-Botucatu multidimensional composite pain score post operatively were given rescue analgesics of buprenorphine (20 µg/kg).</p> <p>All cats received 0.02 mg/kg buprenorphine SQ and 0.2 mg/kg meloxicam PO.</p> <p>Study was blinded where all animals had their backs shaved (but did not inject saline in all testicles – or didn't mention it).</p> <p>Patients were evaluated by pulse oximetry, mean blood pressure, respiratory rate, and heart rate during the procedure and the amount of time from injection to sternal recumbency and from recumbency to activity. Patients were also assessed on pain at regular intervals (1 hr, 2 hr, and 3 hr).</p>
<b>Study design:</b>	Randomised Blinded Control Trial
<b>Outcome studied:</b>	<p>Perioperatively:</p> <ul style="list-style-type: none"> <li>• Mean arterial pressure</li> <li>• Breaths/minute</li> <li>• Pulse Oximetry</li> <li>• HR during surgery</li> </ul> <p>Post-operatively:</p> <ul style="list-style-type: none"> <li>• UNESP-Botucatu Composite pain scores</li> <li>• VAS pain score</li> <li>• Recovery times</li> <li>• Surgical time</li> </ul> <p>Post-operative scores measured 4 times, at return of active interaction, and at 1,2, and 3 hours later.</p>
<b>Main findings: (relevant to PICO question):</b>	<p>No significant or readily visible differences between all three groups using the MCPS (UNESP-Botucatu multidimensional composite pain score). Significant differences were found with VAS scores, Methadone group had lower VAS scores. ITL had lowest overall recovery times to active interaction.</p> <p>Rescue analgesia (as fentanyl) was delivered perioperatively to 1/15 cats in the epidural group.</p>

	<p>2/15 for intratesticular lidocaine, 3/15 for the epidural group received propofol, and 0/19 required propofol in the methadone group.</p> <p>Post-operatively rescue analgesia of buprenorphine was delivered to 4/15 in the intratesticular lidocaine group, 3/15 in the epidural group, and 1/19 in the methadone group.</p> <p>Methadone had better reduction in pain scores but longer recovery times compared to lidocaine groups.</p>
<b>Limitations:</b>	<ul style="list-style-type: none"> <li>• Surgery time was longer than average.</li> <li>• A little confused on inclusion/exclusion. 54 cats were examined, 7 excluded due to behavior and 49 cats were included which doesn't make sense as 54-7 = 47.</li> <li>• Not sure if the VAS or UNESP-Botucatu pain scales have been previously validated.</li> </ul>

<b>Moldal et al. (2013)</b>	
<b>Population:</b>	Client owned cats 34 Domestic Short Hair and Domestic Long Hair cats, 5 pedigree. Inclusion criteria included clinically healthy cats not on medications 6 months to 5 years old. No abnormalities of testicular anatomy.
<b>Sample size:</b>	39 cats
<b>Intervention details:</b>	<p>All animals were premedicated with:</p> <p>0.25 mg/kg midazolam IV</p> <p>2.5 mg/kg ketamine IV</p> <p>1-4 mg/kg propofol IV</p> <p>0.5 ml lidocaine for glottal application (for intubation)</p> <p>Groups were randomised by lot.</p> <p>Control group (GA) n=19</p> <p>No saline was given in the testicles.</p> <p>Lidocaine testicular group (LA) n=20</p> <p>0.1 ml/kg lidocaine -1/3 lidocaine in each testicle and 1/3 subcutaneous. Surgeon but not anesthetist was blinded to placement. Lidocaine was introduced craniodorsal in each testicle but approached caudoventral 25 g x 1" needle (This did not make a great deal of sense to the author).</p> <p>Post operatively all animals received 2µg/kg medetomidine IV, 15 µg/kg buprenorphine IM, 2 mg/kg ketoprofen SQ and sent home with 1mg/kg ketoprofen oral for three days.</p>

<b>Study design:</b>	Randomised Control Trial.
<b>Outcome studied:</b>	Heart rate, Mean Arterial Pressure, heart rate variability (HRV).
<b>Main findings: (relevant to PICO question):</b>	Lidocaine group (LA) on average had less significant heart rate increase in HRV. Pulse rate in general was less pronounced in the lidocaine group. Cats in the lidocaine group also had lower mean arterial pressure (statistically significant).
<b>Limitations:</b>	<ul style="list-style-type: none"> <li>Besides ketamine, there was no analgesic in the premed, probably not consistent with most practices.</li> <li>Description of intratesticular injection was extremely confusing.</li> <li>Blinding was done for the surgeon, who was not recording the values for the study, and there was no attempt to blind control from experimental in terms of a saline placebo in each testicle. Likewise, the testicles may have become swollen from injection and surgeons may have noticed. They also don't mention who actually recorded these values (most likely the anesthetist) who knew which patient was given lidocaine or not.</li> </ul>

## Appraisal, application and reflection

Examination of the whole body of studies made the effect of intratesticular blocks extremely inconsistent. However, when taking into account the type of premedication used in the studies, a clearer picture presented itself. The most significant contribution to post-operative analgesia in routine castration of the cat seems to be the analgesic used in premedication or perioperatively. In the study that used a pure  $\mu$  opioid agonists, there was marked improvement of the pure  $\mu$  group over intratesticular groups and epidural groups in pain scores (Fernandez-Parra *et al.*, 2017).

All studies only used lidocaine as an intratesticular block. None of the studies used had adequate blinding measures which could create a bias in interpretation of the results.

A further limitation of these results is in our PICO, we were focusing on pain and the use of intratesticular lidocaine. If this PICO were modified to isoflurane, propofol, and rescue analgesic sparing effect, our conclusion may be different.

Overall, lidocaine led to no significantly aversive events in any of the studies, it is relatively inexpensive, and fairly easy to administer. In light of the low cost and minimal risk with inconsistent results, an argument could be made that it is still worthwhile to administer in most clinical scenarios.

## Methodology Section

Search Strategy	
Databases searched and dates covered:	PubMed (1963 – 07/2017) VetMed Resource (CAB) (1973 – Week 1 2017) CAB Abstracts on OVID Platform (1973 – Week 1 2017)
Search terms:	Orchiectomy AND intratesticular AND veterinary (pubmed 22 results and 9 relevant) , (dog OR cat) AND intratesticular (Pubmed 46 results/5 relevant), lidocaine AND castration AND (dogs OR cats) (Pubmed 21/3 relevant), orchiectomy and intratesticular (vetmed resource and Cab Abstracts) 11 results/3 relevant
Dates searches performed:	07/17/2017

Exclusion / Inclusion Criteria	
Exclusion:	Anaesthetic injections versus local blocks
Inclusion:	English, French, Spanish, and Thai articles on intratesticular injection of local anaesthetic to testicles.

Search Outcome					
Database	Number of results	Excluded – not involving lidocaine or bupivacaine intratesticular injection on cats	Excluded – duplicate	Excluded – not local anesthetic – lidocaine or bupivacaine	Total relevant papers
Pubmed	89	80	0	7	2
VetMed Resource	11	3	3	0	0
CAB Abstracts	11	0	11	0	0
Total relevant papers when duplicates removed					2

## CONFLICT OF INTEREST

Erik Fausak is a member of the editorial board of Veterinary Evidence.

This paper underwent a rigorous peer-review process as per our normal reviewing guidelines of inviting a minimum of two external reviewers. The identity of the Associate Editor handling the paper has not been disclosed to the author. The final decision to accept this paper rested with the Editor-in-chief.

All other authors declare no conflict of interest.

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