



Does the Use of Lidocaine in Dogs and Cats Reduce Post-Operative Tracheitis?

A Knowledge Summary by

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KNOWLEDGE SUMMARY

Clinical bottom line

Examination of a human systematic review and two veterinary prospective trials suggest topical application on the glottis, and placement of lidocaine on the endotracheal tube both seem to improve sore throat and laryngeal response in animals. Choice of pre-medicants and induction agents appears to have an impact on the extent of lidocaine efficacy. Consideration should be given in allowing enough time for lidocaine placement to have effect (around 60-90 seconds). Limitations in more confident assertions of the efficacy of lidocaine being utilized to prevent tracheitis is that only the human systematic review had enough follow up time to examine the benefits of lidocaine on sore throat in intubation.

Question

In dogs and cats, does the use of lidocaine lubricant on the endotracheal tube or placed on the glottis reduce tracheitis?

Clinical Scenario

At Bel-Rea Institute of Animal Technology, shelter pets are routinely neutered and lidocaine lubricant is applied to the cuff and tip of endotracheal tubes to reduce post-operative sore throat or tracheitis. Incidence of sore throat after surgery has not been evaluated at our institution. Additionally, lidocaine is utilised in feline intubation to reduce laryngospasm.

The Evidence

A systematic review in human medicine and 2 prospective veterinary studies were utilised.

Summary of the evidence

Cassu (2004)	
Population:	10 cats average weight 3kg (8 males, 2 females), healthy.
Sample size:	40 (crossover)
Intervention details:	10 cats underwent induction and intubation four times: Group GTIO was thiopental and intubation, Group GTIO+Lido was thiopental with 10% lidocaine sprayed on the glottis, Group Gprop was propofol and intubation, Group GProp+Lido had propofol and 10% lidocaine sprayed on the glottis. All lidocaine spraying occurred on the glottis and the intubator waited 60-90 seconds before intubating. 15 days elapsed between the four procedures. All animals were previously sedated with acepromazine.
Study design:	Prospective, non-blinded, controlled, crossover study
Outcome studied:	Respiratory, heart rate, pulse oximetry, number of intubation attempts, cough reflex, occurrence of laryngospasm, degree of

	relaxation of glottis, and need for additional induction agent.
Main findings: (relevant to PICO question):	Lidocaine spray groups worked better with thiopental but no real difference was seen between the propofol groups with lidocaine or without.
Limitations:	<ul style="list-style-type: none"> • No critical evaluation and lack of description of who induced and who intubated, which could have made this a blinded study. • Highly subjective criteria of cough reflex without interobserver reliability. • No lidocaine lubricant was placed on tube. • Not enough follow-up time in post-extubation tracheitis.

Dyson (1988)	
Population:	32 healthy cats scheduled for elective surgery. No additional information.
Sample size:	32 cats
Intervention details:	<p>Cats were separated into 4 groups:</p> <p>Group 1 Lidocaine IV. Not specified.</p> <p>Group 2 2% lidocaine applied to larynx, larynx was reviewed after induction. use of tuberculin syringe, with a 20g catheter that had 25g holes and the end sealed by heat.</p> <p>Group 3 10% lidocaine aerosol (one "squirt") to larynx, larynx was reviewed after induction.</p> <p>Group 4 no lidocaine. Not specified</p> <p>Intubation was attempted 90 seconds after groups 1-3 were given lidocaine. One clinician intubated all animals.</p>
Study design:	Prospective, non-blinded, controlled
Outcome studied:	<p>The following were evaluated by the intubating clinician:</p> <p>Induction consideration</p> <ul style="list-style-type: none"> Amount of thiopental used for intubation Amount of thiopental used for a smooth transfer to the inhalant <p>Laryngeal relaxation (only applied to groups 2 and 3)</p> <p>Intubation consideration</p> <ul style="list-style-type: none"> Response (laryngospasm) # of attempts # of coughs Tube size <p>Extubation influence</p> <ul style="list-style-type: none"> Evidence of complications during extubation.
Main findings: (relevant to PICO question):	<p>Less laryngospasm with topical lidocaine than IV or no treatment.</p> <p>Fewer efforts were made with both topical lidocaine administrations.</p> <p>Topical intubation allowed for larger Endotracheal tubes.</p>

Limitations:	<ul style="list-style-type: none"> • Same intubator, less interobserver reliability with subjective evaluations. • Not blinded. • Lidocaine 2% administration was complicated with a modified catheter. • No ET Tubes are lubricated • Not enough follow up time for sore throat evaluation
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Tanaka (2015)	
Population:	Adult humans undergoing intubation.
Sample size:	1940 Adult Humans undergoing endotracheal intubation.
Intervention details:	<p>Systematic review, study inclusion criteria: Randomised control trials involving adult humans with varying degree of lidocaine use in endotracheal intubation (IV, spray, on the tube, in the cuff).</p> <p>Databases searched were: Cochrane Central Register of Controlled Trials (CENTRAL) Medline, and Embase</p> <p>Measurements used: Visual Analogue Scale (VAS) of sore throat. Follow up duration was 12-30 hours post-operative Two authors independently evaluated studies, but were not blinded to authors and institutions.</p> <p>Intervention types: -endotracheal cuff was inflated with lidocaine -lubrication of distal end of endotracheal tube with lidocaine -spraying the glottis with lidocaine -IV lidocaine administration</p>
Study design:	Systematic review with meta-analysis including 19 Randomised Control Trials.
Outcome studied:	<ul style="list-style-type: none"> • Risk of sore throat 12-30 hours after intubation/surgery. • Severity of sore throat 12-30 hours after intubation/surgery. • Amount of negative results from lidocaine administration.
Main findings: (relevant to PICO question):	All approaches with lidocaine appear to have been beneficial to prevent sore throat. No toxicities were reported in the use of lidocaine.
Limitations:	Didn't mention what portion of lidocaine lube administration included besides, "distal". Relevant information would include if "distal" endotracheal tube includes application on the cuff. All studies had unclear risk of bias and received a lower GRADE (Trial evaluation criteria) score.

Appraisal, application and reflection

Veterinary appreciation of lidocaine's effect on post-operative sore throats is limited due to communication barriers between humans and other animals. Human research in some way provides greater advantage because patients could communicate the existence of sore throat after intubation, which occurs 30-70% of the time in Tanaka et al.'s (2015) study.

Veterinary study limitations for sore throat did not have a significant follow up time, to evaluate post-extubation sore throat. Future research should have better follow up periods following lidocaine application. No veterinary study examines placement of lidocaine on the endotracheal tube.

Measurement of sore throat is another veterinary challenge because Visual Analogue Scales will not reliably work in determining severity of animal sore throats.

Despite the limitations in the quality of human research and surrogate outcomes measured in veterinary research, lidocaine by any route does seem to improve sore throat or laryngeal response with minimal toxicity concerns.

Methodology Section

Search Strategy	
Databases searched and dates covered:	Pubmed, VetMed Resource, and CAB Abstracts
Search terms:	Pubmed Sore Throat AND lidocaine AND intubation CABI and Vet Med Resource: <i>lidocaine AND intubation</i>
Dates searches performed:	12 April 2016

Exclusion / Inclusion Criteria	
Exclusion:	Only systematic reviews and metanalysis were included from human medicine.
Inclusion:	Any relevant research with dogs, cats and systematic human reviews.

Search Outcome					
Database	Number of results	Excluded – human systematic reviews only	Excluded – relevance and species specific	Excluded – duplicates	Total relevant papers
NCBI PubMed	158	157	0	0	1
Thomson Reuters Web of Science	36	0	31	0	5
CAB Direct	40	0	4	36	0
Total relevant papers when duplicates removed					3

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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