

Critical Review Form

Meta-analysis

Prophylactic Lidocaine Use Preintubation: A Review, *J EM* 1994; 12:
499-506

Objective: To review the clinical use of prophylactic lidocaine as a preintubation medication (p. 499).

Methods: This is a review article without any stated methods^{1,2} and as such, it is a narrative review, albeit one on a topic not previously reviewed. The authors attempt to review the myriad potential benefits of lidocaine in attenuating the noxious stimuli produced by laryngoscopic intubation including cough, tachycardia, hypertension, dysrhythmias, and elevation of intraocular pressure and intracranial pressure (ICP).

Guide	Question	Comments
I	<i>Are the results valid?</i>	
1.	Did the review explicitly address a sensible question?	Sensible question, yes—but not very specific. The article is written as an overall review of the use of prophylactic lidocaine as a preintubation medication. A specific question for our purposes would have been “In patients suffering a major head injury who undergo RSI, does pretreatment with intravenous lidocaine compared with no pretreatment lead to an improved neurological outcome?”
2.	Was the search for relevant studies details and exhaustive?	No details of the search strategy or article selection methods are provided. What search engines did they employ? Did they hand-search relevant journals? Did they review the bibliographies of selected articles? Who did the searches? If more than one author performed the searches, how were discrepancies resolved between the authors?
3.	Were the primary studies of high methodological quality?	The primary study methods were not graded and the evidence was not weighted. All evidence is not created equal, so it is important to objectively assess the quality of the papers referenced using a validated tool (Jadad, Cochrane).
4.	Were the assessments of the included studies reproducible?	The methods of assessing the studies and inclusion/exclusion criteria was not provided, so the reader is unable to reproduce the search strategy.



II.	<i>What are the results?</i>	
1.	What are the overall results of the study?	<p>1) <u>Cough</u> – five studies evaluated the effect of lidocaine on cough reflex. Yukioka finds that a dose “of 2 mg/kg IV 1-5 minutes prior to intubation decreases the incidence of visible coughing” (p 500).</p> <p>2) <u>Cardiovascular</u> (blood pressure and heart rate) – 25 studies (summarized on Table 2 p. 501) had addressed this issue with eight demonstrating effective attenuation of both BP and HR, seven showing benefit to BP but not HR, and ten documenting no benefit of lidocaine to either BP or HR. Lack of uniformity in study design, patient populations, and dosing prohibit meaningful meta-analysis (p 500-501).</p> <p>3) <u>Dysrhythmia</u> – four studies were referenced demonstrating diminished post-intubation dysrhythmias in patients premedicated with intravenous or aerosol lidocaine before intubation.</p> <p>4) <u>IOP</u> – one study referenced to support the use of lidocaine (2 mg/kg IV) two minutes pre-intubation to prevent a rise in IOP in those at risk (p. 503).</p> <p>5) <u>ICP</u> – five human studies (summarized in Table 3 p. 502) referenced in regards to the effect of lidocaine on ICP. Only one (Hamil, reviewed this month by 3rd Years), looked at this effect during intubation. Three were assessed during suctioning and one during scalp incision. Four out of five studies document a benefit with lidocaine with an effect size ranging from 3.9 mm Hg to 15.6 mm Hg. The effective dose appears to be 1.5 mg/kg IV administered 3 minutes prior to laryngoscopic intubation.</p> <p>Reviewing Table 3, several important points should not be missed:</p> <ul style="list-style-type: none"> a) only Hamil involved intubations. b) small numbers (9-23) in all studies. c) IV Lidocaine appears superior to aerosolized. d) discrepancy noted over sustained decrease in ICP after dosing. e) Evan’s data suggest current dosing recommendation (1.5 mg/kg) might be too low. Doses of up to 20 mg/kg have completely blunted the increase in ICP.

2.	How precise are the results?	No CI provided to assess precision.
3.	Were the results similar from study to study?	Focusing on lidocaine for ICP attenuation—NO! Although the majority show benefit of lidocaine in attenuating ICP rise, different interventions on different patient populations were performed analyzing a surrogate outcome of little practical importance to patients.
III.	<i>Will the results help me in caring for my patients?</i>	
1.	How can I best interpret the results to apply them to the care of my patients?	Recognize that this is a narrative review (as opposed to a Systematic Review or Meta-analysis) and therefore is subject to bias with invalid conclusions. Though this article is highly referenced (see Rosen and Tintinelli), it draws conclusions on limited data and highly understudied questions. <u>Each clinician must therefore assess the risk/benefit ratio for each patient in deciding whether or not to use lidocaine to blunt a rise in ICP during laryngoscopy.</u>
2.	Were all patient important outcomes considered?	No, the most important outcome is neurological recovery and mortality, of which ICP is only a loose surrogate.
3.	Are the benefits worth the costs and potential risks?	See answer to III 1 above.

Limitations

- 1. Sources and search strategy not specified and therefore not reproducible.**
- 2. Levels of evidence not appraised.**
- 3. No focused clinical question asked, rather a general appraisal of lidocaine efficacy pre-intubation for any potential indication.**
- 4. Results drawn and conclusions made from very few studies of heterogeneous design on a variety of populations undergoing different stimuli (scalp incision versus suctioning versus intubation—all lumped into effect on ICP rise). Assuming the search strategy was exhaustive and inclusive, this should make the consumer of the medical literature wary of drawing firm conclusions one-way or the other for the use of lidocaine pre-intubation.**

Bottom Line

This dated narrative review found no significant adverse drug effects to lidocaine in any study reviewed. On the basis of five studies, only one of which assessed patients during intubation, the authors recommend intravenous lidocaine (not aerosolized) in head injured patients administered at a dose of 1.5 mg/kg three minutes prior to intubation to attenuate the anticipated rise in ICP which accompanies laryngoscopic manipulation.

¹ Zed PG, Rowe BH, Loewen PS, Abu-Laban RB; Systematic reviews in emergency medicine: Part I. Background and general principles for locating and critically appraising reviews. CJEM 2003; 5: 331-335.

² Zed PG, Rowe BH, Loewen PS, Abu-Laban RB; Systematic reviews in emergency medicine: Part II. Critical appraisal of review quality, data synthesis and result interpretation. CJEM 2003; 5: 406-411.