CORRESPONDENCE

Intracuff local anesthetic to reduce postoperative sore throat: a randomized clinical trial

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To the Editor,

Postoperative sore throat (POST) following tracheal intubation is reported in 30–70% of patients,¹ and is ranked by patients as the sixth most important postoperative complication.² Instillation of a short-acting local anesthetic, lidocaine, in the endotracheal tube (ETT) cuff reduced postoperative sore throat at one and 24 hr.³ We hypothesized intracuff ropivacaine, a longer acting local anesthetic with a relatively safe cardiovascular toxicity profile, would reduce the severity and incidence of POST on postoperative day one (POD 1).

Following Research Ethics Board approval (Bio18-09 2018, March) and protocol registration (NCT03563963), we conducted a randomized blinded multisite clinical trial comparing POST between three groups: 1) ETT cuff inflated with ropivacaine 0.5%, 2) ETT cuff inflated with lidocaine 2%, and 3) ETT cuff inflated with air (standard care). Informed consent was obtained from those participants aged >18 yr, with American Society of Anesthesiologists status I–III, and requiring an ETT and overnight admission for elective gynecological or general surgery. Exclusion criteria were current sore throat, recent upper respiratory tract infection, or intraoperative transesophageal echocardiography.

Following endotracheal intubation, the anesthesiologist inflated the ETT cuff with lidocaine 2%, ropivacaine 0.5%, or air using the stethoscope-guided inflation technique

described by Kumar and Hirsch⁴ because our institution's cuff manometers (VBM Cuff Pressure Gauge—Sensitive™, Sulz am Neckar, Germany) are not meant to report pressures of a liquid interface. The anesthesiologist documented the volume (mL) instilled into the cuff to create a seal, the ETT cuff pressure after a seal was achieved, any oropharyngeal suctioning, duration of intubation, and incidence and severity of coughing at extubation.

The primary outcome was severity of POST assessed on POD 1 using the numerical rating scale (NRS). Patients without POST rated the severity as “0.” Secondary outcomes included: incidence and severity of POST in the postanesthesia care unit (PACU), incidence of POST on POD 1, patient satisfaction, PACU and POD 1 dysphagia, patient-reported hoarseness/dysphonia, and severity of cough at extubation. Sample calculation was based on studies by Ahmady and Estebe reported in the meta-analysis by Lam *et al.*³ Weighting by sample size, we pooled NRS values on POD 1 from four trials and calculated that lidocaine was associated with a weighted mean reduction in NRS of 17.7 and weighted mean standard deviation of 14.5. Assuming 80% power and a probability of alpha error of 0.05, 14 participants per group were required. We planned to enroll 20 per group to account for patient dropout.

Seventy-three participants were assessed for eligibility and 65 were randomized. Five participants deviated from the protocol, leaving 20 ± 1 participants per group. The median [interquartile range] severity of sore throat on POD1 was similar for intracuff lidocaine (0 [0–1]), ropivacaine (0 [0–2.5]), and air (0 [0–0]) ($P = 0.66$). No harmful effects or complications were reported.

Participant demographic, baseline risk factors, and exposure to measured POST confounders were similar

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Table Participant characteristics and outcomes of a RCT

Characteristic/outcome	Lidocaine <i>n</i> =19	Ropivacaine <i>n</i> =21	Air <i>n</i> =20	Effect size	<i>P</i> value
Age (yr), mean (SD)	58 (13)	56 (16)	57 (17)		
Female, <i>n</i> (%)	14 (74)	14 (67)	12 (60)		
Smoker, <i>n</i> (%)	7 (37)	5 (24)	7 (35)		
Asthma, <i>n</i> (%)	1 (5)	3 (14)	1 (5)		
COPD, <i>n</i> (%)	2 (11)	0 (0)	2 (10)		
ASA					
Normal, <i>n</i> (%)	3 (16)	0 (0)	3 (15)		
Mild disease, <i>n</i> (%)	5 (26)	11 (52)	10 (50)		
Severe disease, <i>n</i> (%)	11 (58)	10 (48)	7 (35)		
Type of surgery					
General surgery, <i>n</i> (%)	7 (37)	14 (67)	13 (65)		
Gynecologic surgery, <i>n</i> (%)	12 (63)	7 (33)	7 (35)		
Primary outcome— <i>POD 1</i>					
POST pain score, median [IQR]	0 [0–1]	0 [0–2.5]	0 [0–0]	0.02 ^a	0.66 ^b
Secondary outcomes— <i>PACU</i>					
POST pain score, median [IQR]	0 [0–0]	0 [0–0.5]	0 [0–0]	0.01 ^a	0.26 ^b
Incidence of sore throat, <i>n</i> (%)	6/19 (32)	5/21 (24)	2/20 (20)	0.22 ^c	0.28 ^d
Surgery pain score, median [IQR]	3 [0–6.74]	5 [3–8]	2 [0–4]	0.08 ^a	0.04 ^b
Dysphagia, <i>n</i> /total <i>N</i> (%)	1/19 (5)	3/21 (14)	1/20 (5)	0.16 ^c	0.61 ^d
Hoarseness, <i>n</i> /total <i>N</i> (%)	15/19 (79)	11/21 (52)	12/20 (60)	0.23 ^c	0.22 ^e
Minutes in PACU, median [IQR]	90 [73–128]	118 [74.5–118]	89 [71.8–121.5]	0.02 ^a	0.19 ^b
Secondary outcomes— <i>POD1</i>					
Incidence of POST, <i>n</i> (%)	6 / 19 (32)	6 / 21 (29)	4/20 (20)	0.11 ^c	0.76 ^e
Surgery pain score, median [IQR]	3.5 [1–6]	3 [1–5]	3.5 [1–6.75]	0.03 ^a	0.88 ^b
Dysphagia, <i>n</i> /total <i>N</i> (%)	1/19 (5)	1/21 (5)	2/20 (10)	0.10 ^c	0.84 ^d
Hoarseness, <i>n</i> /total <i>N</i> (%)	13/19 (68)	8/21 (38)	9/20 (45)	0.26 ^c	0.14 ^e
Participant very satisfied, <i>n</i> /total <i>N</i> (%)	15/19 (79)	19/21 (95)	16/20 (80)	0.88 ^c	0.92 ^d

Note: All the percentages are rounded off to nearest integer.

^a Eta squared (η^2); ^b Kruskal–Wallis test; ^c Cramer's V; ^d Fisher's Exact test; ^e Pearson Chi square test.

ASA = American Society of Anesthesiologists; COPD = chronic obstructive pulmonary disease; IQR = interquartile range; PACU = postanesthesia care unit; POD = postoperative day; POST = postoperative sore throat; RCT = randomized-controlled trial; SD = standard deviation

between groups (Table). The mean cuff pressure measured in the air, ropivacaine, and lidocaine group were 26.4, 10.2, and 14.6 cm H₂O, respectively.

Our results did not support the use of 0.5% ropivacaine to reduce severity or incidence of POST. The rate of POST in our study was lower than previously reported.^{1,3} The explanation for this discrepancy is not clear, but suggests a systematic cause. Although our cuff insufflation manometry has limitations, it should be accurate in the air group. These measured levels are lower than previously reported, suggesting that the cuff inflation method used in this study may have influenced POST.

Our participants demonstrated more hoarseness in PACU than previously reported rates of 14.4–50%,⁵ but rates were similar between groups. Future research should

investigate the methods used for air inflation as our results indicate a lower POST rate can be achieved with a protocolized cuff inflation method. If POST severity can be reduced to near zero with air in the ETT cuff, the study of pharmacological methods to reduce it seems unwarranted.

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Competing interest None.

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Reproducible science Full protocol available at megan.mclachlan@usask.ca.

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