

References

1. Furst SR, Rodarte A: Prophylactic antiemetic treatment with ondansetron in children undergoing tonsillectomy. *ANESTHESIOLOGY* 81:799-803, 1994
2. Eustis S, Lerman J, Smith DR: Effect of droperidol pretreatment on post-anesthetic vomiting in children undergoing strabismus surgery: The minimum effective dose. *J Pediatr Ophthalmol Strabismus* 24:165-169, 1987
3. Ferrari LR, Donlon JV: Metoclopramide reduces the incidence of vomiting after tonsillectomy in children. *Anesth Analg* 75:351-354, 1992
4. Litman RS, Wu CL, Catanzaro FA: Ondansetron decreases emesis after tonsillectomy in children. *Anesth Analg* 78:478-481, 1994
5. Ummenhofer W, Frei EJ, Kern C, Urwiler A, Drewe J: Ondansetron

reduces postoperative nausea and vomiting in children (abstract). *ANESTHESIOLOGY* 79:A1192, 1993

6. Peterson MD, Bishop J, Tanner K: Comparison of droperidol and ondansetron for prevention of vomiting after strabismus surgery in children (abstract). *Anesth Analg* 76:S329, 1993

7. Rose JB, Martin TM, Corddry DH, Zagnoev M, Kettrick RG: Ondansetron reduces poststrabismus repair vomiting in children (abstract). *Anesth Analg* 78:S368, 1994

8. Grunberg SM, Hesketh PJ: Control of chemotherapy-induced emesis. *N Engl J Med* 329:1790-1796, 1993

9. Lin DM, Furst SR, Rodarte A: A double-blinded comparison of metoclopramide and droperidol for the prevention of emesis following strabismus surgery. *ANESTHESIOLOGY* 76:357-361, 1992

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In Reply:—Three of the four citations referred to by Rose and Martin are abstracts,¹⁻³ as is the one we authored.⁴ We did not believe that work published in abstract form qualified as proper studies in that the peer review process associated with their publication is much less thorough and the validity of the conclusions of a very tentative nature. The editorial staff of *ANESTHESIOLOGY* appear to agree, as the Guide for Authors for *ANESTHESIOLOGY* states that "abstracts are acceptable as references only if published within the previous 3 yr in an indexed journal."⁵ The remaining reference was published in March 1994.⁶ Our original manuscript was submitted in 1993, and the final revision was submitted in March 1994. If we had been aware of this article, we would have rephrased that sentence.

With regard to the dose of metoclopramide used, we indeed stated in a previous article that "we were reluctant to increase the dose because of the potential for extrapyramidal effects."⁶ However, that referred to the dose we chose for that study and certainly points out the fact that we care about the well-being of our study patients. The patients had no dystonic reactions at the dose of 0.25 mg/kg, and as stated in the same article, "Although the benefit observed was not statistically significant at the lower dose studied (0.15 mg/kg), it became so at the higher dose (0.25 mg/kg), suggesting a dose-response relationship. Whether *higher doses* will prove more efficacious remains to be determined. . . ."⁶ We believed that, for the best chance for metoclopramide to be effective, it was worth administering a higher dose and monitoring for side effects, which, in the unlikely event that they occurred in a significant number, could have led to a reevaluation of the protocol. No episodes of extrapyramidal effects occurred. We were prepared to use the dose of 1 mg/kg diphenhydramine that the nurses administer routinely for patients who are experiencing extrapyramidal effects. (In our hospital, these events usually are associated with droperidol administration ordered by the surgical house staff.)

Although Grunberg and Hesketh⁷ administered other drugs in combination with metoclopramide in their protocol, at least one other study used doses as high as 5 mg/kg *without* the routine ad-

ministration of diphenhydramine.⁸ In that study of 133 patients, the incidence of extrapyramidal effects was 2.2%, an acceptable number in view of the fact that our dose was an order of magnitude less. In another study,⁹ bolus doses of 2 mg/kg metoclopramide up to a total of 10 mg/kg were given over an 8.5-h period. One of the 41 patients (2.4%) in that trial had extrapyramidal effects requiring treatment.

The parents of our patients were fully informed. The dose and risk of side effects were reviewed thoroughly by our institutional review board, which is chaired by a pediatric pharmacologist.

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References

1. Ummenhofer W, Frei EJ, Kern C, Urwiler A, Drewe J: Ondansetron reduces postoperative nausea and vomiting in children (abstract). *ANESTHESIOLOGY* 79:A1192, 1993
2. Peterson MD, Bishop J, Tanner K: Comparison of droperidol and ondansetron for prevention of vomiting after strabismus surgery in children (abstract). *Anesth Analg* 76:S329, 1993
3. Rose JB, Martin TM, Corddry DH, Zagnoev M, Kettrick RG: Ondansetron reduces poststrabismus repair vomiting in children (abstract). *Anesth Analg* 78:S368, 1994
4. Furst SR, Rodarte A, Demars P: Ondansetron reduces postoperative vomiting in children undergoing tonsillectomy (abstract). *ANESTHESIOLOGY* 79:A1197, 1993
5. Litman RS, Wu CL, Catanzaro FA: Ondansetron decreases emesis after tonsillectomy in children. *Anesth Analg* 78:478-481, 1994

* *ANESTHESIOLOGY* 81:43A-44A, 1994.

CORRESPONDENCE

6. Lin DM, Furst SR, Rodarte A: A double-blinded comparison of metoclopramide and droperidol for the prevention of emesis following strabismus surgery. *ANESTHESIOLOGY* 76:357-361, 1992

7. Grunberg SM, Hesketh PJ: Control of chemotherapy-induced emesis. *N Engl J Med* 329:1790-1796, 1993

8. Allan SG, Cornbleet MA, Warrington PS, Golland IM, Leonard RCF, Smyth JF: Dexamethasone and high dose metoclopramide: Efficacy in controlling cisplatin induced nausea and vomiting. *BMJ* 289: 878-879, 1984

9. Gralla RJ, Itri LM, Pisko SE, Squillante AE, Kelsen DP, Braun DW Jr, Bordin LA, Braun TJ, Young CW: Antiemetic efficacy of high dose metoclopramide: Randomized trials with placebo and prochlorperazine in patients with chemotherapy-induced nausea and vomiting. *N Engl J Med* 305:905-909, 1981

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Endotracheal Tube Replacement in Patients with Cervical Spine Injury

To the Editor:—Several devices have been described for use when an endotracheal tube is exchanged in a patient with a compromised airway. These include the jet stylet and the fiberoptic bronchoscope. However, each of these methods is not always reliable when used alone. We describe a case in which the two techniques were combined for the exchange of an endotracheal tube in a patient with cervical spine instability.

A 73-yr-old man with metastatic prostate carcinoma presented with acute quadraparesis secondary to fracture of the odontoid process and C1-C2 instability. The endotracheal tube developed a cuff leak and required replacement. A medium-size tracheal tube exchanger (Sheridan, Argyle, NY) was placed through the original endotracheal tube. The exchanger was connected to a jet ventilation source *via* a 14-G intravenous catheter, and positive pressure ventilation was stopped briefly. Jet ventilation was tested to evaluate that it would provide adequate gas exchange. A fiberoptic bronchoscope (Olympus FL Tracheal Intubation Fiberscope-4 mm deflectable insertion tube, Lake Success, NY) was guided orally into the trachea around the deflated cuff of the original 8.0 endotracheal tube. When the carina was visualized with the fiberscope, the original endotracheal tube was removed. A new 7.5 endotracheal tube was threaded into the trachea over the fiberscope.

Many techniques of airway management have been used in cervical spine instability. Mask ventilation has been shown to move the C-spine more than any other technique.¹ Direct laryngoscopy remains the fastest and most reliable method of tracheal intubation, but this is known to cause movement of the C-spine.² Axial traction for the purpose of stabilizing the C-spine during laryngoscopy has not been proved to be protective. Cricothyroidotomy may be accomplished without C-spine movement, but no studies prove this. Benumof described the ideal method of extubation for endotracheal tube exchange as "one that permits withdrawal from the airway that is controlled, gradual, step-by-step, and reversible at any time."³ The advantages of the jet stylets include guidance into the laryngeal inlet in the presence of distorted anatomy as well as attachment to jet ventilation. The adequacy of minute ventilation with jet stylets has

been documented over a full range of sizes of the endotracheal tube exchanger and values for lung compliance.⁴ Direct visualization is the most significant benefit of fiberoptic bronchoscopy, and provides the best success with the difficult airway. Many models allow application of topical anesthesia, suction of secretions, and insufflation of oxygen during exchange. Use of the fiberscope as a jet stylet has been described but not widely studied in humans.⁵ Watson recommended that endotracheal tube exchange with the fiberscope "should be attempted with the backup of proven alternatives. . . ." ⁶ Combining the two techniques would provide backup in case of difficulty. We found three major advantages to using the fiberscope in conjunction with a jet stylet. First, it allows for examination of the laryngeal inlet for edema, which may predict further difficulties with instrumentation. Second, it is important to locate the tip of the endotracheal tube exchanger to be inside the original endotracheal tube to minimize the chances of developing barotrauma to the trachea from the jet ventilation source. Most important, however, is the security afforded by two instruments in the trachea for endotracheal tube placement guidance, because this allows for greater airway control.

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References

1. Hauswald M, Sklar DP, Tandberg D, Garcia JF: Cervical spine movement during airway management: Cine fluoroscopic appraisal in human cadavers. *Am J Emerg Med* 9:535-536, 1991