Correspondence

Dobutamine, not dopamine, improves gastric intramucosal pH during resuscitation from hemorrhagic shock in dogs

To the Editor:

Preservation of splanchnic perfusion is considered an important goal of resuscitation because the derangement of gastrointestinal mucosal perfusion is the main cause of the progression of hemorrhagic shock into an irreversible state.¹ When measuring systemic oxygenation only, the possibility of overlooking serious gastrointestinal mucosal ischemia is high, hence the need to monitor mucosal oxygenation selectively.² We examined the effects of dopamine or dobutamine on the recovery of mucosal perfusion in a canine model of hemorrhagic shock. Thirty dogs were bled to a mean

arterial pressure of 40 mmHg and maintained in this state for 90 min. After volume resuscitation, dogs were randomized to receive dopamine (DP, 4 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, $n=10$), dobutamine (DB, 7 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, $n=10$), or no drug (C, $n=10$) and followed up for 180 min. The gastric intramucosal PCO_2 and pH (pHi) were measured with a Trip® NGS catheter (Datex, Engstrom, Finland). The cardiac index was maintained higher with DP than with DB or C after resuscitation. However, the pHi was maintained higher with DB than with DP or C, while DP was not significantly different from C (Figure). We conclude that low-dose dopamine has little effect on the restoration of gastrointestinal mucosal oxygenation despite a significant improvement of cardiac index, and that dobutamine is effective to improve gastrointestinal mucosal oxygenation after volume resuscitation from hemorrhagic shock. This result may be explained by the dopamine-induced redistribution of perfusion away from the mucosal area³ and an increase in oxygen requirements greater than supply.⁴ Dobutamine may selectively dilate the intramucosal vessels to direct perfusion towards the mucosal and/or increase oxygen delivery more than oxygen requirements.⁵

Sung Jin Hong MD PhD
Jong Bun Kim MD PhD
Jin Young Chun MD PhD
Hae Jin Lee MD PhD
Choon Ho Sung MD PhD
Se Ho Moon MD PhD
Seoul, Korea

FIGURE The effects of dopamine or dobutamine on the changes of systemic oxygen delivery and gastric intramucosal pH. Systemic oxygen delivery is recovered above baseline in the dopamine group at 60 and 120 min after resuscitation while it is recovered to baseline in the dobutamine group at 60 min after resuscitation. Systemic oxygen delivery of dopamine group was higher than in the dobutamine group after resuscitation. However, gastric intramucosal pH (pHi) of dobutamine group is maintained higher than the dopamine group after resuscitation. S30: 30 min of hemorrhagic shock, S90: 90 min of hemorrhagic shock, R60: 60 min after resuscitation, R120: 120 min after resuscitation, and R180: 180 min after resuscitation. * $P < 0.05$ comparing to control group, and † $P < 0.05$ comparing to dopamine group.

References

- 1 Fiddian-Green RG, Haglund U, Gutierrez G, Shoemaker WC. Goals for the resuscitation of shock. *Crit Care Med* 1993; 21(2 Suppl): S25–31.
- 2 Ivatury RR, Simon RJ, Islam S, Fueg A, Rohman M, Stahl WM. A prospective randomized study of end-points of resuscitation after major trauma: global oxygen transport indices versus organ-specific gastric mucosal pH. *J Am Coll Surg* 1996; 183: 145–54.
- 3 Segal JM, Phang PT, Walley KR. Low-dose dopamine hastens onset of gut ischemia in a porcine model of hemorrhagic shock. *J Appl Physiol* 1992; 73: 1159–64.
- 4 Pawlik W, Shephard AD, Jacobson ED. Effect of vasoac-

tive agents on intestinal oxygen consumption and blood flow in dogs. *J Clin Invest* 1975; 56: 484–90.

5 Secchi A, Wellmann R, Martin E, Schmidt H.

Dobutamine maintains intestinal villus blood flow during normotensive endotoxemia: an intravital microscopic study in the rat. *J Crit Care* 1997; 12: 137–41.

Negative pressure pulmonary edema following thyroidectomy

To the Editor:

A 60-yr-old female presented with a two and a half year long history of neck swelling. Initially she was diagnosed as having Grave's disease and treated with antithyroid drugs. Examination of the neck revealed a small diffuse thyroid swelling with no obvious retrosternal extension. Otorhinolaryngology (ENT) examination, electrocardiography, thoracic inlet and chest *x-rays* were normal. Flow volume loop showed variable extrathoracic obstruction. Computed tomography scan of the neck and fiberoptic bronchoscopy revealed slight tracheal narrowing. She underwent thyroidectomy and her intraoperative course was uneventful. Approximately ten minutes after extubation, the airway became obstructed. She had marked tracheal tug and intercostal indrawing. The airway obstruction was unrelieved by positive pressure ventilation using a Guedel's airway and facemask ventilation with an anesthetic breathing system. The trachea was reintubated and there was no evidence of laryngeal edema. Following intubation pink froth was noted coming out of the endotracheal tube (ETT). The patient was treated with furosemide, aminophylline, morphine and positive pressure ventilation in the intensive therapy unit (ITU). She received *iv* dexamethasone in ITU for 48 hr. After three days of ventilation in the ITU her pulmonary edema resolved. Direct laryngoscopy and rigid bronchoscopy by an ENT surgeon revealed right vocal cord palsy and moderate tracheomalacia. As there was no evidence of airway obstruction while breathing spontaneously following rigid bronchoscopy, it was decided to extubate the trachea. She again became increasingly dyspneic with marked tracheal tug and intercostal indrawing. The trachea was reintubated and mechanical ventilation resumed. Finally, the trachea could be extubated after four days. The rest of her post-operative course was uneventful.

Tracheomalacia is an important clinical problem complicating long standing goitre.^{1,2} Tumour, strabulation, interrupted hanging, laryngospasm, ETT suctioning, bilateral vocal cord paralysis, aspirated for-

eign body and pseudomembranous cast³ are just a few causes of pulmonary edema reported to date. To our knowledge, pulmonary edema secondary to postthyroidectomy tracheomalacia has not been described before. The mechanism involves an alteration in pulmonary microvascular pressure together with an increase in pulmonary capillary permeability. These are due to changes in Starling forces of pulmonary circulation, hemodynamic changes secondary to negative intrathoracic pressure, as well as hypoxia and a hyperadrenergic state.⁴ Tracheostomy or leaving the tube *in situ* for a few days are well recognized methods for managing tracheomalacia.⁵ Had extubation been unsuccessful we would have proceeded to carry out a tracheostomy as distal as possible to enable location below the involved tracheal segment.¹

Manohar Lal Sharma FRCA

Neal Beckett FFARCSI

Paul Gormley MD FFARCSI

Belfast, Northern Ireland

References

- 1 Geelhoed GW. Tracheomalacia from compressing goiter: management after thyroidectomy. *Surgery* 1988; 104: 1100–8.
- 2 Abdel Rahim AA, Ahmed ME, Hassan MA. Respiratory complications after thyroidectomy and the need for tracheostomy in patients with a large goitre. *Br J Surg* 1999; 86: 88–90.
- 3 DeSio JM, Bacon DR. Complete airway obstruction caused by a pseudomembranous cast with subsequent negative pressure pulmonary edema. *Anesth Analg* 1993; 76: 1142–3.
- 4 Lang SA, Duncan PG, Shephard DA, Ha HC. Pulmonary oedema associated with airway obstruction. *Can J Anaesth* 1990; 37: 210–8.
- 5 Shaha A, Alfonso A, Jaffe BM. Acute airway distress due to thyroid pathology. *Surgery* 1987; 102: 1068–74.

Myasthénie et anesthésie pour chirurgie abdominale en urgence. Anesthesia for urgent abdominal surgery and myasthenia gravis

Monsieur le rédacteur,

Nous décrivons la prise en charge d'un patient myasthénique grade IIA (diplopie et faiblesse généralisée modérée) opéré en urgence d'une laparotomie.