blood transfusion was determined by the consultant anesthetist looking after the patient based on the standard transfusion policy in our hospital. We agree that future studies on coagulopathy after cardiac surgery are warranted. Our study suggests that the PAI-1 4G/5G genotype should be taken into consideration for any future transfusion algorithms in cardiac surgical patients. Novel approaches incorporating preoperative genetic testing may have the potential to expand our understanding of bleeding after cardiac surgery.

With regard to antifibrinolytics, the study was underpowered to detect an association with blood loss or requirement for coagulation products. Indeed, it would be interesting to see if the same pattern pertained in general surgical patients without the use of antifibrinolytics or anticoagulants. However, accounting for all the factors influencing fibrinolysis and coagulation in any study would be difficult.

One focus of our article was to emphasize the utility of mRNA measurement for proteins, which are difficult to measure by enzyme-linked immunosorbent assay. As PAI-1 is a labile protein with an *in vivo* half-life of 30 min, accurate measurement can be difficult (5). Our study describes a novel method of assessing PAI-1. The decrease in PAI-1 mRNA levels post CPB may contribute to the increased propensity to bleed after cardiac surgery. However, we agree with Jimenez Rivera and Iribarren that it would have been beneficial to measure both PAI-1 protein and mRNA levels. A better comprehension of the multifactorial mechanisms of activation of the inflammatory and fibrinolytic pathways may direct a more effective and individual use of the therapeutic options that are currently available.

Edel Duggan, MB, FFARCSI
Thomas Ryan, MB, FFARCSI
Department of Anaesthesia
St. James's Hospital
Dublin, Ireland
edelduggan@yahoo.com

REFERENCES

1. Jimenez Rivera JJ, Iribarren JL, Raya JM, Nassar I, Lorente L, Perez R, Brouard M, Lorenzo JM, Garrido P, Barrios Y, Diaz M, Alarco B, Martinez R, Mora ML. Factors associated with excessive bleeding in cardiopulmonary bypass patients: a nested case-control study. J Cardiothorac Surg 2007;2:17
2. Welsby IJ, Podgoreanu MV, Philips-Bute B, Mathew JP, Smith PK, Newman MF, Schwinn DA, Stafford-Smith M, Perioperative Genetics and Safety Outcome Study (PEGASUS) Investigative Team. Genetic factors contribute to bleeding after cardiac surgery. J Thromb Haemost 2005;3: 1206–12
3. Murray D, Pennell B, Olson J. Variability of prothrombin time and activated partial thromboplastin time in the diagnosis of increased surgical bleeding. Transfusion 1999;39:56–62
4. Jimenez Rivera JJ, Iribarren JL. Coagulopathy after cardiac surgery. Anesth Analg 2007;105:1514
5. Kooistra T, Sprengers ED, van Hinsbergh VW. Rapid inactivation of the plasminogen-activator inhibitor upon secretion from cultured human endothelial cells. Biochem J 1986;239:497–503

DOI: 10.1213/01.ane.0000282776.61879.fc

Spinal Block with 1.5 mg Hyperbaric Bupivacaine: Not Successful for Everyone

To the Editor:

A recent report by Wassef et al. (1) described successful spinal block with 1.5 mg bupivacaine for short perianal surgery. Our department has been conducting investigational protocols on spinal anesthesia (2,3) including a dose-finding study with hyperbaric bupivacaine for perianal surgery. Fifty-four of 160 planned patients with perianal pathologies (hemorrhoids, fistulas, anal lesions) have been recruited and randomly assigned to receive 2, 3, 4, or 5 mg of hyperbaric 0.5% bupivacaine intrathecally. Protocol stipulations include switching failed spinal to general anesthesia and termination of a dose-group for failure rates greater than 20% at interim analyses.

From the available data, block efficacy by bupivacaine seems dose-dependent: low at 2 mg (20%), near maximal (90%) at 3 mg, and maximal (100%) at the highest doses. At 2 mg, specifically, bupivacaine provides a block (i.e., pin-prick anesthesia of S_4 dermatome [86 ± 37 min], inability of walking [129 ± 18 min] and of voiding [184 ± 36 min]) that is effective for surgery only in one of five patients. For this reason, 2 mg bupivacaine will not be tested further under this protocol.

Recovery times reported by Wassef et al. in their 1.5 mg bupivacaine group are similar to those found in our 2 mg group. Only two patients in the 1.5 mg group by Wassef et al. (1) (5%) required intraoperative sedation and analgesics to alleviate "discomfort," whereas we had an 80% failure rate in our 2 mg group. After the publication by Wassef et al., we asked the drug manufacturer (Recordati Chemical Pharmaceutical Industry, Milan, Italy) to check the actual concentration of bupivacaine. An HPLC analysis on three unopened vials (batch number 018, expiration date June 2009) yielded a 97%–103% of the labeled amount (mean bupivacaine concentration 4.94 mg/mL). Our patient population seems to be similar to the Wassef et al. groups as far as clinical features and had no significant pain symptoms before surgery. All spinal anesthetics were performed by staff anesthesiologists experienced with the technique. "Clusters" of failed spinals even with higher doses of bupivacaine (9–12 mg) can be found in the literature (4–6). In those cases, authors were not able to find a clear reason for the failure and their hypothetical explanations dealt with the "heat intolerance" of bupivacaine or patient related factors such as diabetes or other anatomical or biochemical abnormalities (6,7) that may cause resistance to local anesthetics. We reviewed charts and blood tests of our patients and none of them has diabetes. We did not test sensitivity to local anesthetics in individual patients.

Failure of spinal anesthesia occurred only at a 2 mg dose of bupivacaine suggesting that, at least in our patients, this dose may be not sufficient to ensure intraoperative analgesia for perianal surgery

in all patient populations, a finding worth of note.

Michele Carron
Ulderico Freo
Stefano Veronese
Federico Innocente
Carlo Ori
Department of Pharmacology and Anesthesiology
University of Padova, Italy
micarron@libero.it

REFERENCES

1. Wassef MR, Michaels EI, Rangel JM, Tsyrlin AT. Spinal perianal block: a prospective, randomized, double-blind comparison with spinal saddle block. Anesth Analg 2007;104:1594–6
2. Carron M, Innocente F, Veronese S, Miotto D, Pilati P, Rossi CR, Ori C. Subarachnoid anesthesia for loco-regional antiblastic perfusion with circulatory block (stop-flow perfusion). Minerva Anestesiol 2006;72:37–45
3. Carron M, Freo U, Innocente F, Veronese S, Pilati P, Jevtovic-Todorovic V, Ori C. Recovery profiles of general anesthesia and spinal anesthesia for chemotherapeutic perfusion with circulatory block (stop-flow perfusion). Anesth Analg. In press
4. Calthorpe N. Inadequate spinal anaesthesia with 0.5% Marcain Heavy (Batch 2016). Int J Obstet Anesth 2004;13:131
5. Wood M, Ismail F. Inadequate spinal anaesthesia with 0.5% Marcain Heavy (Batch 1961). Int J Obstet Anesth 2003; 12:310–1
6. Smiley RM, Redai I. More failed spinal anesthetics with hyperbaric bupivacaine. Int J Obstet Anesth 2004;13:131–4
7. Hoppe J, Popham P. Complete failure of spinal anaesthesia in obstetrics. Int J Obstet Anesth 2007;16:250–5

DOI: 10.1213/01.ane.0000286079.45616.8c

In Response:

There are several differences between Carron et al.'s (1) study of small-dose bupivacaine and ours that might account, at least in part, for the different results. First, Carron et al. (1) used isobaric 0.5% bupivacaine, whereas we used hyperbaric 0.75% bupivacaine. Second, there is no mention of patient position, rate of injection, and duration of patient position before final positioning for surgery.

The essence of the spinal perianal technique (2) is to direct a small bolus of bupivacaine, towards its target, S4-5 and coccygeal nerve roots, by lodging at the lower end of the dural sac. Success of the spinal perianal anesthesia technique depends on subtle use of many factors such as bupivacaine concentration, higher gradient, baricity, sitting position, gravity effect, direction of needle orifice, slow rate of injection, no barbatage to preserve the integrity of the bupivacaine bolus, and time-dependency integral to the technique before final patient positioning.

Further work may be needed to assess the advantages and limitations of this technique.

Medhat R. Wassef, MB, BCH, DA, FRCA
Assistant Professor of Anesthesiology
Mount Sinai School of Medicine
Elmhurst Hospital Center
New York

REFERENCES

1. Carron M, Freo U, Veronese S, Innocente F, Ori C. Spinal block with 1.5 mg hyperbaric bupivacaine: not successful for everyone. Anesth Analg 2007;105:1515–6
2. Wassef MR, Michaels EI, Rangel JM, Tsyrlin AT. Spinal perianal block: a prospective, randomized, double-blind comparison with spinal saddle block. Anesth Analg 2007;104:1594–6

DOI: 10.1213/01.ane.0000286080.39367.dd

Laryngeal Tube S-II to Facilitate Fiberoptic Endotracheal Intubation in an Infant with Boring-Opitz Syndrome

To the Editor:

A 6-mo-old infant (body weight 5 kg) with Boring-Opitz syndrome, a rare complex of malformations that includes malformed skull and facial bones (1), presented for removal of an infected port system. There was a history of two previous difficult tracheal intubations.

Anesthesia was induced with increments of propofol until loss of consciousness. The ability to manually ventilate the lungs was confirmed before more propofol was administered. A Size 1 laryngeal tube S-II (LT-S) (VBM Medizintechnik, Sulz a.N., Germany) was inserted and proper position confirmed using capnography and chest auscultation (Fig. 1). Thereafter, nasal fiberoptic tracheal intubation was performed with a flexible pediatric fiberscope (2.8 mm diameter) armed with a 4.0 mm ID endotracheal tube. When the proximal cuff of the LT-S was seen in the pharynx, it was briefly deflated allowing the bronchoscope to pass. Once tracheal rings were identified,

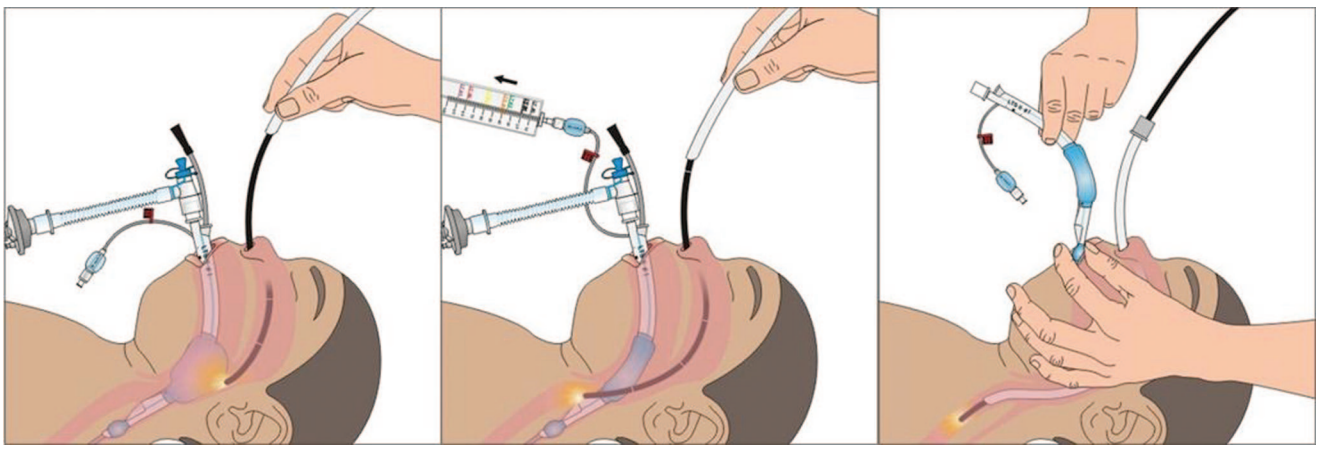

Figure 1. A flexible, pediatric bronchoscope is inserted through the patient's nose until the pharyngeal cuff of the laryngeal tube is seen (left) and briefly deflated allowing the bronchoscope to pass (middle). Finally, the endotracheal tube is advanced over the bronchoscope into the trachea, the pharyngeal cuff deflated again, and the laryngeal tube removed from the airway (right).