

intrathecal morphine should be reserved for video-assisted thoracoscopic procedures that are associated with more tissue damage and nociception, for example decortication and lobectomy. Patients are often taking oral analgesics, which seem to be sufficient to bridge the 'analgesic gap' when the effects of intrathecal morphine have dissipated.⁹

In the third point, they note that epidural analgesia is associated with hypotension which may be managed adequately by fluid administration, without the use of vasoconstrictors. Although this may be applicable for general surgical patients, it may be less so for patients who are at risk of lung injury, after thoracotomy.¹⁰ Indeed, patients with limited lung function, particularly those who have had a pneumonectomy, should be given fluids sparingly, and thus we suggest that paravertebral blockade may allow more judicious administration of fluids than epidural analgesia.

The fourth point is concerned with publication bias and intervention studies on pain relief after thoracotomy. From a recent meta-analysis of randomized controlled clinical trials comparing epidural analgesia with paravertebral block, there seems to be reasonable statistical evidence that paravertebral analgesia alone is more optimal for analgesia than a thoracic epidural.⁵ This inference has arisen, not because paravertebral block is better for pain relief than epidural analgesia, but because it is associated with a significantly lower occurrence of several adverse outcomes, for example hypotension, urinary retention, block failure, and nausea. Such limiting effects may impede recovery and rehabilitation in the postoperative period.¹¹ To provide analgesia before insertion of a paravertebral catheter at the end of surgery, we suggested that low-dose intrathecal morphine would be useful as part of a bimodal analgesic plan.

In conclusion, thoracic epidurals are effective for analgesia after thoracotomy and will be the preferred choice of many anaesthetists. However, we have presented evidence to show that this method may not be the most optimal. We hope that we have rekindled the search for the Holy Grail of pain relief after thoracotomy.

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Synthetic oxytocin and latex allergy

Editor—There have been a number of reports of anaphylactic reaction to synthetic oxytocin. In some cases, the authors were strongly in favour of the reaction being due to synthetic oxytocin as it occurred after oxytocin administration,^{1,2} whereas Spears and Liu³ believed it was an allergic reaction to latex. We present a case of anaphylactic reaction to latex after oxytocin administration and advocate the possibility of cross-reaction. To our knowledge, this would be a first report that latex antigen may, in part, comprise of oxytocin.

A 28-yr-old woman underwent her third Caesarean section under spinal anaesthesia with bupivacaine. Just after the infusion of synthetic oxytocin 5 units, the patient complained of dyspnoea and severe pruritis on her upper body. Marked flushing appeared rapidly on her face and upper limbs, and blood pressure abruptly decreased to 59/34 mm Hg. Rapid administration of Lactate-Ringer's solution (total 3000 ml) and ephedrine had no effect, and was followed by i.v. phenylephrine and s.c. epinephrine. Her symptoms disappeared after admission to ICU, and she had an uneventful postoperative course. Later, a patch reaction test was performed. A positive wheal and erythema occurred to latex, but there was no reaction to oxytocin or bupivacaine. A radio-allergosorbent test also detected a latex-specific IgE antibody with a high concentration of 14.7 IU ml⁻¹.

This case involved an obvious anaphylactic reaction and responded to appropriate treatment, but the cause is not clear. Although oxytocin seemed to produce the reaction, she had only latex sensitivity. One explanation would be that oxytocin makes up a part of the epitope of the latex

Query; human oxytocin

(CYIQNCPLG, Accession No; AAA59977)

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                CYIQNCPLG
                :.:.:.:.
Hev b 7.01 PMYQAKDIKDFYLENCPIKIFPKESRDN
           80          90          100

                CYIQNCPLG
                :.:.:.:.
Hev b 7.02 PMYQAKDIKDFYLENCPIKIFPKESRDN
           80          90          100

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Fig 1 Homology in the protein sequence of oxytocin and patatin (Hev b 7.01 and Hev b 7.02) is shown. Two dots indicate an exact match of amino acid, and one dot means a highly conserved amino acid. The numbers indicate the amino acid sequence of patatin.

antigen, and produced the antigenicity. To identify a putative cross-reaction between the latex antigen and oxytocin, we compared the protein sequences of human oxytocin (Cys, Tyr, Ile, Gln, Asn, Cys, Pro, Leu, Gly; CYIQNCPLG, accession no: AAA59977) and vasopressin (CYFQNCPRG, accession no: AAA61291) with sequences of allergenic proteins registered on the web database, SwissProt/TrEMBL Protein Knowledgebase (<http://ca.expasy.org/>), and World Health Organization/International Union of Immunological Societies (WHO/IUIS) Allergen Nomenclature Sub-Committee (<http://www.allergen.org/>), via the Allermatch™ database (<http://www.allermatch.org/>) by FASTA protein search. As a result, neither oxytocin nor vasopressin had an exact match in six (or more) contiguous amino acids to antigens, suggesting no antigenicity. However, of the *Hevea brasiliensis* (Para rubber tree) latex antigens registered on the database of the WHO/IUIS Allergen Nomenclature Sub-Committee, two patatin latex antigens (Hev b 7.01 and Hev b 7.02) were identified to have homology in six (oxytocin) and seven (vasopressin) contiguous amino acids (Fig. 1) with above 50% identity. Compared with vasopressin, oxytocin has a relatively high homology to patatin (z -score 81.6, identity 67%) in the sequence, suggesting a possible cross-reaction. It could be hypothesized that oxytocin might comprise a part of the epitope of latex antigen, and complement the antigenicity, although oxytocin does not have any inherent antigenicity. Our patient could have been sensitized to patatin as there had been recent latex contact (gloves and catheter). Subsequent administration of oxytocin could facilitate the antigen recognition, resulting in an anaphylactic response to latex. Although it should be noted that further immunological study is necessary to evaluate whether oxytocin actually has a cross-reaction to latex antigen, this is a novel concept worth taking into account.

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Phasic voltage ECG variation during laparoscopy

Editor—We would like to report a case in which atypical intraoperative ECG changes during laparoscopy alerted us to the recurrence of a pneumothorax, despite the presence of an *in situ* chest drain. In a 22-yr-old male, after a 2 cm stab wound in the left ninth intercostal space in the mid-axillary line, a small left-sided apical pneumothorax was seen on the CT scan, with free air in the abdomen. A left-sided intercostal chest drain was inserted under local anaesthesia, which drained 30 ml of serous fluid and a little air. Laparoscopy was planned to exclude bowel perforation.

After induction of general anaesthesia that included 5 cm of PEEP, peak airway pressure was 19 cm H₂O, but rose to 25 cm H₂O after carbon dioxide (CO₂) pneumoperitoneum was produced. Abdominal insufflation pressure was limited to 12 mm Hg. Laparoscopy revealed a 2 cm tear in the tendinous part of the left hemidiaphragm and a small serosal tear on the anterior wall of the stomach. When the laparoscope was passed through the diaphragmatic tear into the chest, the intercostal drainage tube was seen to be wedged between the chest wall and the left lung. At the same time, phasic voltage variation was noted in lead II of the ECG tracing (Fig. 1). There was, however, no change in palpable pulse, blood pressure, or plethysmograph waveform. It was also noticed that the water meniscus in the intercostal drainage tube was neither swinging nor bubbling in time with ventilation. After laparoscopic repair of the diaphragmatic tear, the ECG reverted to normal and the water meniscus in the intercostal drainage tube started swinging again.

Pneumothorax, though a rare complication of laparoscopic abdominal surgery, can be difficult to diagnose in an anaesthetized patient. Botz and Brock-Utne¹ reported that reduction in ECG amplitude had alerted them to the diagnosis of intraoperative pneumothorax during an open left nephrectomy. Phasic ECG voltage variation has previously been reported in non-anaesthetized patients, the majority with left-sided spontaneous pneumothorax,