study included 92 cases operated in our department from January 2005 to February 2011. There were significant differences in the sex distribution, age, and weight between the study groups, as to be expected due to the index diagnoses (Table 1). Two epidural infusion regimens were given, depending on anaesthetist preference. Regimen 1 was bupivacaine 0.125% and regimen 2 bupivacaine 0.15% with fentanyl 2 μg both to a maximum rate of 0.33 or 0.5 mg kg⁻¹ h⁻¹ of bupivacaine dose.

All children underwent successful epidural placement obtaining effective pain relief. However, almost one in four children complicated their immediate postoperative course with urinary retention. POUR was defined as the absence of spontaneous bladder emptying 12 h after the recorded surgical time.⁵ Once diagnosed, an indwelling catheter was inserted. It was removed the same day that the epidural perfusion was taken down, 48 h after the index procedure. Toilet-trained children had an increased incidence of POUR compared with those who did not control their bladder (43.18% vs 6.25%). Age and weight differences were also statistically significant regarding the development of POUR, but this is most likely related to the inherent characteristics of the groups studied. Conversely, gender, side, or drug used in the epidural regimen made no difference (Table 1). Importantly, none of these children developed urinary, epidural, or surgical site infection as a complication.

Other authors have reported an increased incidence of POUR in toilet-trained children albeit not offering an explanation for their findings.⁶ Although epidural opioids have been associated with a higher rate of urinary retention, this study did not find such difference. Pelvic orthopaedic surgery is particularly affected by this complication due to nerve sharing levels of pain, epidural, and bladder function. Infants have a primitive excitatory somato-bladder reflex that becomes progressively weaker in the post-natal period. It is eventually replaced by an inhibitory perineal-to-bladder reflex and the adult form of reflex voiding. This somato-bladder reflex mechanism may be spared by the epidural analgesia⁷ justifying our findings. Consequently, toilet-trained children who have much larger bladders and mature urinary reflexes⁸ are more susceptible to POUR, although psychological reasons may play an important part as well.

The initial reluctance to routinely catheterize patients due to increased risk of bacteraemia has to be balanced against the ultimate need for a catheter, associated with increased patient discomfort and less than aseptic conditions during catheterization in the ward. Additionally, this study found no infectious complications after the use of indwelling urinary catheters in those children who required it. POUR is highly likely in the toilet-trained population after pelvic orthopaedic surgery and continuous epidural analgesia.

Declaration of interest
None declared.

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Table 1 Patient and study data. Values are mean (range) for age, and mean (so) for weight

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1</th>
<th>Group 2</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of surgery</td>
<td>Open reduction + acetabuloplasty</td>
<td>Shelf osteotomy</td>
<td></td>
</tr>
<tr>
<td>Bladder control</td>
<td>No</td>
<td>Yes</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Sex (M/F)</td>
<td>6/42</td>
<td>25/19</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Age (months)</td>
<td>18.71 (4.6–61.2)</td>
<td>56.34 (10.2–108.4)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>10.72 (2.24)</td>
<td>29.1 (11.15)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Side (R/L)</td>
<td>21/27</td>
<td>21/23</td>
<td>0.43</td>
</tr>
<tr>
<td>Epidural drugs (I/II)</td>
<td>31/17</td>
<td>28/16</td>
<td>0.54</td>
</tr>
<tr>
<td>POUR (N/Y)</td>
<td>45/3</td>
<td>25/19</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Harlequin syndrome after extrapleural bupivacaine infusion

Editor—We present a case of harlequin syndrome after the use of an extrapleural bupivacaine infusion post-thoracotomy. A 76-yr-old man presented for thoracotomy and open resection of adenocarcinoma of the right upper lobe. Anaesthesia was induced with fentanyl 1.5 μg kg⁻¹, propofol 2 mg kg⁻¹, and rocuronium 600 μg kg⁻¹. A 37 Fr left-sided Broncho-Cath® endobronchial tube (Covidien-Nellcor, Boulder, CO, USA) was sited and checked before isolation of...
the right lung. Anaesthesia was maintained with isoflurane in an air/oxygen mix. The patient was turned into the left lateral position and surgery proceeded uneventfully.

After removal of the specimen and before chest closure, an extrapleural catheter was sited in the right T3/4 inter-space using an 18 G Portex® Touhy needle (Smiths Medical, St Paul, MN, USA). After chest closure, this was loaded with 20 ml of 0.25% racemic bupivacaine. After extubation of the trachea, the patient was transferred to the recovery room where a 10 ml h⁻¹ infusion of 0.125% bupivacaine was commenced.

Approximately 1 h later, the patient was noted to have a marked vasodilatation of the left (contralateral) side of his face, with a well-defined midline demarcation. The erythema appeared localized to the upper part of the face. There were no other neurological abnormalities. The patient was transferred to his postoperative ward after 2 h in the recovery room, by which point the flushing had subsided. He went on to make a good recovery and was discharged home on day 5.

Harlequin syndrome is variously described as a unilateral flushing and sweating affecting the face. It was first described in 1988¹ and has been reported several times since, with a variety of aetiologies including following thoracic paravertebral local anaesthesia.²

The pathophysiology of the condition is thought to be an autonomic response to unilateral block of the upper thoracic segments of the sympathetic chain, which carry sympathetic vasodilator fibres to the face. Block of, or damage to, these fibres reduces ipsilateral skin blood flow. Flushing triggers of any cause, in the context of ipsilateral vasoconstriction, appear as the harlequin sign with contralateral flushing and a marked midline demarcation. It is unclear whether this flushing is abnormally pronounced, or merely appears so.

In our case, it had resolved by the time of transfer from the recovery area to the ward, despite continuing infusion. This suggests that the initial bolus was of sufficient volume to reach the upper thoracic sympathetic outflow, whereas the infusion only maintained the block either locally or around T3/4. The patient’s position at the time of the bolus (left lateral) may have contributed, as suggested by Burlacu and Buggy.³

Anatomically, the extrapleural space is in continuity with the paravertebral space postero-medially. Indeed, this is the basis for our use of surgically placed extrapleural catheters for thoracic surgery, as they provide reliable and safe postoperative analgesia without some of the associated complications of thoracic paravertebral injections, such as damage to lung parenchyma and accidental intrathecal injection. They are easily placed under direct vision, while the lung is deflated.

Harlequin syndrome has been described in the perioperative setting on only a few occasions and only four times in relation to regional anaesthesia.² ⁴–⁶ This is the first description of harlequin syndrome after extrapleural injection of local anaesthetic.

Declaration of interest
None declared. Permission for this report was given by the patient.

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