Morphine added to local anaesthetic improves epidural analgesia in minimally invasive Nuss operation for pectus excavatum

Editor—The Nuss operation is a minimally invasive technique for repair of pectus excavatum. However, postoperative pain is the major problem, and meticulous pain management in postoperative period is important to maintain a stable supine position without turning to either side. Thoracic epidural local anaesthetic and morphine are commonly used for postoperative pain management, but patients were randomized without considering the pectus index.

In this report, we aimed to discuss the management of three patients with high pectus index, and thoracic epidural analgesia was insufficient for pain control in two of them who obtained relief by the addition of morphine to local anaesthetic.

General anaesthesia was induced with propofol $2 \text{ mg kg}^{-1}$, fentanyl $0.1 \text{ mg}$, and vecuronium $0.1 \text{ mg kg}^{-1}$ in all patients, before tracheal intubation with a left double-lumen endobronchial tube. The epidural catheter was inserted by a median approach at $T_{8-9}$ space after induction of anaesthesia. After the bar was placed into its position, levo-bupivacaine $0.25\%$ (Chirocaine, Abbott) as a $10 \text{ ml bolus}$ followed by $3 \text{ ml h}^{-1}$ $(2.5 \text{ mg ml}^{-1} \text{ solution})$ infusion was started via epidural catheter. At the end of the operation, if no pneumothorax was seen on a chest X-ray, patients were extubated and sent to the ward.

Sufficient pain control could be achieved in the first case with epidural local anaesthetic administration. However, the second and third cases experienced pain after operation, despite suitable epidural technique (Table 1). The pain was successfully managed with additional morphine $2 \text{ mg}$ to the thoracic epidural local anaesthetic.

Forcing the sternum anteriorly causes significant pain in the chest and back in the skeletally mature patient. The increased pressure on the bar by less flexible chest increases the magnitude of pain which involves dermatomes $T_{1-10}$. Although, thoracic epidural analgesia with local anaesthetic is considered the gold standard for this operation, the high incidence of hypotension related to the complete sympathectomy caused by the large doses of local anaesthetic is the main problem. However, the incidence of side-effects in epidural morphine has limited its routine use.

Morphine can be considered as an adjuvant in patients in whom epidural local anaesthetic is insufficient, and could be considered for routine use in patients with a high pectus index.

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How useful is balanced fluid?

Editor—I was interested to read Dr J. Boldt’s editorial advocating the use of total balanced volume replacement. I agree that intuitively it seems a very sensible approach. I also agree that ‘although the clinical relevance of hyperchloraemic acidosis is not fully elucidated’, it would seem logical to avoid it if possible. However, I feel obliged to question his argument that ‘Avoidance of acid-base alterations by the choice of volume replacement regime is important as base excess may serve as an important marker to identify patients with under-perfused tissues’. I suspect he is aware that this problem can be resolved by calculating the anion gap. A hyperchloraemic acidosis will produce a normal anion gap whereas hypo-perfusion will result in an abnormally large one. The position can be further clarified by simply measuring the serum lactate. A normal serum lactate indicates that a metabolic acidosis is not due to under-perfusion.

Many blood gas analysers already give values for serum chloride and lactate so no additional expense should be incurred if this information is used. However, it will be interesting to note how the cost of balanced colloid compares with the cost of the fluids we use at present.

<p>| Table 1 Patient, operative, and postoperative data |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>W (kg)/H (cm)</th>
<th>ASA</th>
<th>Pectus index</th>
<th>Operation time (min)</th>
<th>Hospital LOS (day)</th>
<th>Thoracic level</th>
<th>Additional morphine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>16</td>
<td>70/178</td>
<td>I</td>
<td>3.75</td>
<td>55</td>
<td>5</td>
<td>$T_{5-10}$</td>
</tr>
<tr>
<td>Case 2</td>
<td>33</td>
<td>73/172</td>
<td>I</td>
<td>3.89</td>
<td>50</td>
<td>5</td>
<td>$T_{4-10}$</td>
</tr>
<tr>
<td>Case 3</td>
<td>16</td>
<td>65/176</td>
<td>I</td>
<td>5.65</td>
<td>75</td>
<td>5</td>
<td>$T_{4-10}$</td>
</tr>
</tbody>
</table>
Concerning costs, it is hard to imagine that balancing fluids will increase costs for a plasma substitute considerably. Thus, cost does not appear to argue against using a balanced, plasma-adapted volume replacement strategy.

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