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Editorial comment

Optimal thoracic epidural analgesia—Again

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In this issue of the *Scandinavian Journal of Pain*, Gísli Vigfússon and Gísli H. Sigurðsson from the University Hospital of Reykjavik, Iceland publish an interesting, very well done study on thoracic epidural analgesia for pain after open postero-lateral thoracotomy in 253 elderly patients [1]. They compared the effects of thoracic epidural infusion of a standardized low concentrations epidural mixture in two homogeneous groups of women and men 50–70 years of age. They documented that even after painful open postero-lateral thoracotomies it is possible to obtain excellent analgesia during rest as well as during deep inspiration and forceful coughing when the patients receive an optimally placed, triple component epidural infusion, starting before surgery and continuing during the postoperative days as long as needed [1]. They were able to clearly document that female patients need less epidural infusion volumes and less rescue analgesics than male patients [1].

They studied two fairly large and homogeneous groups of patients having similar types of indications for open postero-lateral thoracotomies. They used low concentrations, triple component mixture for background epidural infusion already from before surgery started. This mixture, which contains only 1 mg/ml (0.1%) of bupivacaine, 2 μg/ml of fentanyl, and 2 μg/ml of adrenaline, prevents severe pain on coughing, and patients have only mild pain at rest [1–4]. Therefore they were able to document the clinically important finding that female patients need less of the epidural infusion than male patients [1]. Without adrenaline, a more concentrated local anaesthetic infusion with a higher amount of opioid would have been needed [5,6], and this important difference between elderly females and male patients may not have been documented. With higher concentrations of drugs and no adrenaline in an epidural infusion, too much local anaesthetic drug would easily cause orthostatic hypotension, motor blockade and weak legs, and too much fentanyl would cause higher systemic absorption of the opioid resulting in more nausea, pruritus, and urinary retention [2–6].

Their findings are in agreement with those of Niemi and coworkers a decade ago, clearly documenting that the triple epidural mixture, containing only bupivacaine (or ropivacaine) 0.1 mg/ml, fentanyl 2 μg/ml, and adrenaline 2 μg/ml, has optimal concentrations of these three drugs for postoperative epidural analgesia after major thoracic and (upper) abdominal surgery [2–6]. We have used this clinically optimal mixture for epidural analgesia since 1992 [7]. The bupivacaine (or ropivacaine), fentanyl, and adrenaline have at least three different mechanisms of spinal cord analgesia in addition to dorsal ganglion and spinal nerve root local anaesthetic effects [6]. The specific analgesic effects of adrenaline on the dorsal horn of the spinal cord are well-documented [8]. They are additive to the pre- and postsynaptic analgesic effects of fentanyl and to the pre- and postsynaptic effects of subanaesthetic concentrations of a local anaesthetic drug in the dorsal horn. For a comprehensive review of the effects of these drugs and their interactions on spinal analgesia, see [6].

In addition, when adrenaline is infused into the epidural space, delaying the systemic vascular absorption of bupivacaine and fentanyl [2,6], it increases their possibilities for entering the subaracnoid space and the dorsal horn of the spinal cord. Moreover, adrenaline increases the stickiness of platelets, contributing to a reduced risk of bleeding into the spinal canal if the epidural needle or catheter accidentally injures epidural veins [10].

One reason this triple mixture for optimal thoracic epidural analgesia is not more widely used, may be the problems of preventing oxidation and inactivation of adrenaline, thereby reducing shelf-life of such a mixture [9,11]. While an antioxidant metabisulphite is often used in local anaesthetic vials containing adrenaline [11], a small amount of EDTA added to the bupivacaine, fentanyl, and adrenaline mixture prevents oxidation and prolongs shelf-life to at least 12 months without significant reduction of the three active drugs ([11] and Brustugun et al., personal communication).

Philip Bromage, the "father" of modern epidural analgesia, often stated that epidural analgesia is the superb method for preventing severe pain after thoracotomies and major upper abdominal surgery, however he emphasized that "epidural analgesia is labour-intensive and not without risks" [12,13].

The century old technique of paravertebral blockade is having a renaissance because some surgeons (and unfortunately also some anaesthetists) erroneously think that this procedure is safer than epidural analgesia, which it definitely is not [14]. Gísli Vigfússon and Gísli H. Sigurðsson have long experience using paravertebral block for various indications, but they do not use paravertebral blocks for post-thoracotomy pain. They have observed complications from the paravertebral block method and stick with thoracic epidural analgesia as the most effective and less risky method [15].

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Even 30-days mortality after major non-cardiac surgery is reduced by epidural techniques [16].

The study by Gísli Vigfússon and Gísli H. Sigurðsson published in this issue of the *Scandinavian Journal of Pain* again documents that thoracic epidural analgesia, when optimally performed and monitored, using the low concentration triple epidural infusion, gives effective dynamic pain relief after one of the most painful types of thoracic surgery [1]. We want to congratulate them for picking up and sticking with this successful optimal thoracic epidural analgesia praxis for more than a decade.

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