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Continuous i.v. infusion of remifentanil and intraosseous lidocaine provide better analgesia than intraosseous lidocaine alone in percutaneous vertebroplasty of osteoporotic fractures

Editor—Several methods have been reported for providing anaesthesia for percutaneous vertebroplasty (PV). These include local anaesthesia alone,[1] local anaesthesia and sedation,[2 3] and general anaesthesia.[4] Sesay and colleagues[5] reported that intraosseous lidocaine provides effective analgesia in 84% of patients undergoing PV and the addition of i.v. boluses of propofol was required in about 10% of patients. Target-controlled infusions (TCI) of remifentanil in conscious sedation regimes is reported in other settings,[6] but conscious sedation with remifentanil infusion during the PV with local anaesthesia has not been evaluated. Our objectives were to evaluate the safety and efficacy of analgesia with intraosseous lidocaine associated with TCI remifentanil i.v. (ILR), compared with intraosseous lidocaine (IL) alone during PV for osteoporotic fractures.

After Institutional Ethical Board approval and obtaining written informed consent, 60 ASA physical status I–III adult patients undergoing PV for osteoporotic vertebral fractures were included in this double-blind placebo-controlled randomized clinical trial.

Patients were randomized into the IL or ILR group, and the neuroradiologist, anaesthetist, and physician who collected the data and the patients were blinded to the group assignment. The ILR group was treated by local injection of lidocaine 10 mg ml^{-1} then TCI remifentanil with an initial effect-site concentration of 1.5 ng ml^{-1}. Incremental changes of 0.5 ng ml^{-1} in the target effect-site concentration (a maximum of 2.5 ng ml^{-1}) were used to maintain a visual analogue scale (VAS) score <4. If severe respiratory depression (Sp_{O_2} $<90\%$ for >20 s) occurred, opioid infusion was decreased or stopped. The IL group was treated with the local injection of lidocaine and the continuous infusion of NaCl 0.9% solution. If a VAS >4 was registered, anaesthesia was considered 'insufficient' and sedation with propofol was given. Pain intensity was registered on a VAS 10.0 cm long and by a five-point verbal rating scale (VRS). A total of 60 patients (30 per group) were calculated to be necessary to find 15 mm of difference on mean VAS (α error=0.05, power=80%). The Mann–Whitney *U*-test was used to check differences between numeric variables and Fisher's exact test for categorical differences.

Groups were similar with regard to characteristics, haemodynamics, and surgery. Analgesic efficacy was superior in the ILR group during all PV procedures [VAS: trocar insertion: ILR 0.8 (1.0) *vs* IL 2.8 (1.6); trocar positioning: ILR 1.1 (1.6) *vs* IL 2.7 (1.8); cement injection: ILR 0.5 (1.2) *vs* IL 2.5 (2.0); all $P<0.01$]. Anaesthesia was 'insufficient' (VAS>4) in six (20%) cases in IL patients compared with one (3.3%) case in ILR patients ($P=0.1$). Adverse effects were more frequent in the ILR group (five cases) than the IL group (one case), $P=0.2$.

Table 1. VRS monitoring on groups. *Thirty patients in each group at baseline. One patient from the ILR group and six patients from the IL group were excluded from the further analysis because they were deeply sedated during the procedure for severe pain

Verbal rating scale*	No pain, *n* (%)	Mild pain, *n* (%)	Moderate pain, *n* (%)	Severe pain, *n* (%)	Very severe pain, *n* (%)	*P*-value
Baseline						
ILR (*n*=30)	11 (36.7)	5 (16.7)	10 (33.3)	3 (10.0)	1 (3.3)	0.6
IL (*n*=30)	9 (30.0)	9 (30.0)	6 (20.0)	5 (16.7)	1 (3.3)	
Trocar insertion						
ILR (*n*=29)	17 (58.6)	7 (24.1)	5 (17.3)	—	—	0.003
IL (*n*=24)	4 (20.0)	7 (26.7)	13 (50.0)	—	—	
Trocar positioning						
ILR (*n*=29)	17 (58.6)	8 (27.6)	4 (13.8)	—	—	0.002
IL (*n*=24)	4 (16.7)	8 (33.3)	12 (50.0)	—	—	
Cement injection						
ILR (*n*=29)	24 (82.8)	4 (13.8)	1 (3.4)	—	—	<0.001
IL (*n*=24)	9 (37.5)	6 (25.0)	9 (37.5)	—	—	
End of surgery						
ILR (*n*=29)	28 (95.6)	1 (3.4)	—	—	—	0.1
IL (*n*=24)	19 (79.1)	4 (16.7)	1 (4.2)	—	—	

Analgesia was significantly more efficacious in ILR patients as checked by using VRS (Table 1).

Sensitization of neural elements by direct pressure[7] or by heat generated during cement polymerization[8] produces nociception during the PV procedure. This type of pain is well controlled by general anaesthesia, but local anaesthesia alone may be insufficient in some patients. We found only one study which evaluated the efficacy of the local anaesthesia by intraosseous injection of lidocaine and compared it with i.v. administration of propacetamol and nalbuphine.[5] The authors concluded that good analgesia was obtained only in 84% and 85% of patients, respectively, in accordance with our findings in the IL group (80%).

Our results suggest that IL alone or IL and i.v. association of remifentanil in TCI regimen produces good analgesia and therefore could be considered as valid alternatives to general anaesthesia for PV procedures.

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One-lung ventilation using Proseal™ laryngeal mask airway and Arndt endobronchial blocker in paediatric scoliosis surgery

Editor—Recently, the use of one-lung ventilation (OLV) is strongly indicated in video-assisted thoracoscopic surgery for exposure of surgical fields. We report a case of OLV using a size 3 Proseal™ laryngeal mask airway (LMA) and a 7 Fr Arndt endobronchial blocker in a paediatric patient to achieve OLV.

An 11-yr-old patient, who weighed 32 kg, was undergoing thoracoscopic anterior spinal release operation of thoracic vertebrae for idiopathic scoliosis. General anaesthesia was induced with target-controlled infusion of propofol 4 $\mu g\ ml^{-1}$, fentanyl 150 μg, and rocuronium 30 mg, a size 3 Proseal™ LMA (LMA North America, Inc., San Diego, CA, USA) was placed and the lungs were ventilated with pressure-controlled mode. A 7 Fr Arndt endobronchial blocker (Arndt Endobronchial Blocker Set by Cook Critical Care) was connected with the multiport adaptor and a 3.4 mm fibroscope. The fibroscope (modal BF, Type3 C40, Olympus, Tokyo, Japan) was inserted into the right bronchus, the blocker was passed coupled with the guide-loop. After a proper cuff position was confirmed by fibroscope, which was then withdrawn, leaving the endobronchial blocker between the vocal cords and enough space for ventilation (Fig. 1).

After lateral positioning of the patient, a fibroscope examination revealed movement of the blocker cuff, adjustment was completed under vision. Before the insertion of the thoracoscopic port, the breathing circuit was disconnected and halted for 2 min to facilitate lung collapse, and the cuff was

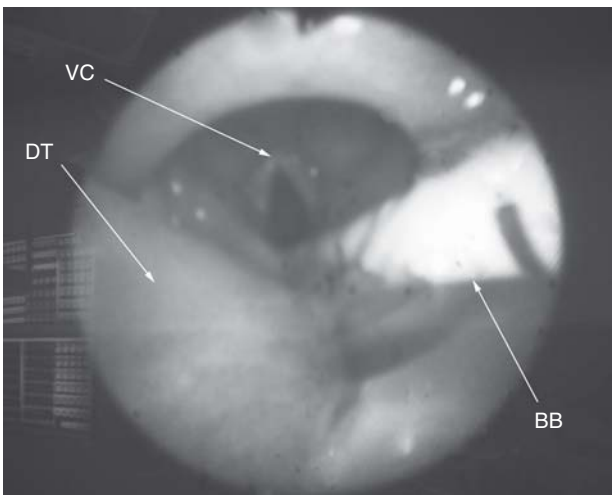

Fig 1 Fibreoptic scope view of the Arndt endobronchial blocker going through the vocal cords. DT, drainage tube of Proseal™ LMA; VC, vocal cords; BB, endobronchial blocker.