Reviewer’s report

Title: Epidural anesthesia and postoperative analgesia with ropivacaine and fentanyl in off-pump coronary artery bypass grafting

Version: 1 Date: 22 June 2011

Reviewer: Tadahiko Ishiyama

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The authors attempt to address the efficacy of thoracic epidural anesthesia on cardiopulmonary function in the perioperative management of off-pump coronary artery bypass grafting (OPCAB).

They found that epidural anesthesia (EA) with ropivacaine and fentanyl stabilized hemodynamics, and postoperative epidural infusion with patient-controlled epidural analgesia (PCEA) improved lung function and reduced time to extubation.

There are several issues that need to be addressed.

Major Compulsory Revisions

General Comments

1. In this study, most of the parameters showed small differences among the three groups, and statistically significant differences, which were shown in Table 2 and 3, may be clinically insignificant. An obvious difference was that patient-controlled epidural anesthesia shortened the time to extubation. Nevertheless, epidural anesthesia required inotropes/vasopressors and colloids during the operation. I suppose this study proved epidural analgesia had little efficacy on OPCAB.

2. Authors described that thoracic EA with repivacaine/fentanyl stabilizes hemodynamics (Abstract), however, epidural anesthesia decreased mean arterial blood pressure (MAP) during OPCAB.

3. Authors described that thoracic EA during OPCAB prevents lung fluid accumulation (Conclusion), however, there were no intergroup differences in extravascular lung water index (EVLWI) among the three groups. The data indicated that lung fluid accumulation could be comparable among Control, EI, and PCEA groups.

4. Authors described that epidural administration of ropivacaine/fentanyl improves myocardial performance (Conclusion). However, cardiac index, cardiac function index, systemic vascular resistance index, global end-diastolic volume index, left ventricle contractility index, and global ejection fraction were comparable among Control, EI, and PCEA groups. Although central venous pressure showed statistically significant differences among the groups, the
differences could be clinically insignificant (Control versus EI; 14 versus 16.8 mmHg, 11.8 versus 14.4 mmHg, 12.7 versus 14.9 mmHg). The data indicate that myocardial performance should be similar in the three groups.

5. Authors described that epidural administration of ropivacaine/fentanyl provides adequate analgesia (Conclusion). However, VAS scores were within 20 mm at rest and 30 mm during coughing in all groups without intergroup differences (Results). Adequate postoperative analgesia was provided not only by epidural analgesia but also by intravenous fentanyl. Epidural anesthesia may have little advantage regarding postoperative pain relief.

6. Authors described that EI combined with PCA is associated with improved oxygenation (Discussion, first paragraph). Table 3 shows that oxygenation was well preserved in all groups. Statistical difference was prominent only one point (18 hours). From those results, I do not think EI combined with PCA is associated with improved oxygenation.

Specific Comments
1. Page 5, Line 19-20; Anesthesia was maintained with propofol 3-5 mg/kg/h and fentanyl 2-4 µg/kg/h. How did authors determine the doses of propofol and fentanyl? Did infusion rate set according to MAP or heart rate? Was bispectral index measured?

2. Page 6, Line 16-18; Fentanyl infusion rate at 3-8 mL/h is an obscure explanation. Was initial intravenous infusion rate different in each patient? Was infusion rate changed according to the severity of postoperative pain?

3. Page 6, Line 20-21; If blood or cerebrospinal fluid had been drawn from the epidural catheter, was operation postponed?

4. Page 6, Line 23-Page 7, Line 3; After induction of anesthesia, the thoracic epidural injection with ropivacaine and fentanyl was made to obtain blockade of pain at Th1-6. How did authors verify the block level of Th1-6 though the patient had already slept by general anesthesia?

5. Page 6, Line 23-Page 7, Line 3; Was initial epidural infusion rate different in each patient? Was infusion rate changed according to the severity of postoperative pain?

6. Page 8, Line 7-9; Who assessed the severity of postoperative pain and the level of sedation?

7. Figure 1; Please clarify the dose of phenylephrine, ephedrine, and nitroglycerin. If MAP higher than 80 mmHg occurred, were infusion rates of propofol and fentanyl changed? Depth of anesthesia should be one of the important factors for maintaining MAP.

8. Discussion; Please rewrite according to the results.
Level of interest: An article of limited interest

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.