Effect of skin infiltration with ropivacaine on postoperative pain in patients undergoing craniotomy under general anesthesia

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Background: Local anesthetic infiltration has been used to manage postoperative pain in various surgeries. The present study was aimed to investigate the effect of skin infiltration with 0.5% ropivacaine on postoperative pain in patients undergoing craniotomy.

Methods: One hundred and six patients with ASA I-II scheduled to undergo elective craniotomy were enrolled during March to November in 2015 in this prospective, randomized, placebo-controlled, double-blind study. After the anesthesia induction, skin around the incision was infiltrated with 0.5% ropivacaine (group R, n=53) and 0.9% saline solution (group C, n=53), respectively. Morphine was used as rescue analgesic postoperatively. Morphine consumption during the first 24 postoperative hours was recorded as the primary outcome, and the time to first rescue requirement was also recorded. Pain was assessed at 2, 4, 8, 24 hours, 7 days, 3 months after surgery by visual analog scale (VAS). Heart rate (HR) and mean arterial pressure (MAP) were recorded before anesthesia induction (T1), after anesthesia induction (T2), after scalp infiltration (T3), during skull drilling (T4), mater cutting (T5) and skin closure (T6).

Results: Results are reported on 50 patients in group C, 51 in group R because of 5 patients were excluded from the study. Morphine consumption during the first 24 postoperative hours was significantly higher in group C than in group R (13.36[6.5, 20]mg vs. 6.3[0, 10]mg, $P<0.05$). The first time of patients needed rescue analgesic was prolonged in group R as compared with group C (6.16[3.4, 8.0]h vs. 3.87[2.3, 4]h, $P<0.05$). Postoperative VAS and hemodynamic signs during the first 24 hours showed no significant difference in two groups. The incidence of persistent pain in 7 days and 3 months postoperatively had no significant differences between two groups. Besides one patient (2%) enduring moderate pain (VAS: 4~7) in group C, the number of patients suffering from mild pain (VAS: 1~3) was 17(33.3%) in group R and 17(34%) in group C 3 months after surgery. The opioid consumption intraoperatively was not significantly different between two groups. HR and MAP in group C were higher than that in group R at the time points of T3 and T4.

Conclusion: The results suggest 0.5% ropivacaine scalp infiltration before skin incision has favorable analgesic effect in reducing morphine consumption and prolong the time of first rescue analgesic requirement after surgery.

Key Words: craniotomy, scalp infiltration, postoperative pain, ropivacaine

Acknowledgement for AstraZeneca's support