

Patient controlled analgesia using ketorolac prevented respiratory failure in a child after cardiac surgery

The Editor,

A 12-year-old boy weighing 25 kg underwent a conduit repair of tetralogy of Fallot. The surgical procedure was performed through median sternotomy and lasted for 4 hours. The patient was then shifted to the intensive care unit (ICU) and electively ventilated for 7 hours. During mechanical ventilation, analgesia and sedation was provided with intermittent doses of fentanyl and midazolam. Thereafter, as per institutional protocol, analgesia was provided with intramuscular ketorolac 25 mg every 8 hours. Additionally, fentanyl 12.5–25 µg was administered intravenously in case the child still complained of pain.

On postoperative day 1, the child had tachypnea and complained of pain at the sternotomy site, which increased on coughing and taking deep breaths. Clinically there was reduced air entry in the left lower chest. There was no radiological evidence of lung collapse. The child was unable to actively participate in the physiotherapy sessions. At this point we decided to provide analgesia with a patient controlled analgesia (PCA) pump using ketorolac. We diluted ketorolac to 1 mg/ml concentration. The settings were: A bolus of 2 mg over 30 seconds with a lockout time of 20 minutes. No background infusion was given. The child was given a demonstration of the use of the PCA pump. The initial dose was given by us since the child could not press the button. However, the child soon learned how to use the demand button. He started actively participating in the physiotherapy sessions. Gradually, tachypnea subsided and the child rested. In the next 6 hours, a total of 14 mg ketorolac was used in addition to 2 mg given initially. At night, a background infusion of ketorolac was started at 2 mg/h. After 24 hours, the PCA was discontinued. The total amount of ketorolac consumed was 42 mg. The child remained in the ICU

for 48 hours after surgery and was discharged from the hospital on the sixth postoperative day.

Providing adequate analgesia is a key factor in preventing postoperative respiratory complications in cardiac surgery patients. Opioids, even when administered in novel ways, may contribute to pulmonary complications by causing respiratory depression. Therefore analgesics that do not depress respiration, for example, nonsteroidal antiinflammatory drugs (NSAID) are considered a good option in this setting. In our setup NSAIDs are routinely used for postoperative analgesia with rescue analgesia provided with opioids. Our patient was getting intramuscular ketorolac without much benefit. Intermittent fentanyl was making the patient drowsy and further worsening his condition. Therefore, rather starting a new drug, we started administering ketorolac via PCA. The use of ketorolac via PCA has been shown to reduce opioid requirements in children.^[1] Our objective was to reduce the requirement of fentanyl, which whenever given to the child for breakthrough pain was making him drowsy. By starting ketorolac with PCA, we not only negated the opioid requirement but also reduced the total dose of ketorolac consumed. The total dose of ketorolac was half of what it would have been if it was given as an intravenous infusion at recommended rates of 0.17 mg/kg/h.^[1] A contributing factor could be that it gave the child better control of his pain management, helped him remain alert and diverted his attention from pain. He also became an active participant in the physiotherapy sessions, which led to better postoperative recovery and timely discharge from the ICU. PCA allows the patients to titrate the analgesic dose to the extent of their pain. It reduces the apprehension of older children and adolescents about pain because they can control it. The PCA pumps for the delivery of NSAIDs should be considered a valuable mode of analgesia, especially in the patient population where opioids may contribute to respiratory complications postoperatively.

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