DOES REMIFENTANIL-BASED ANESTHESIA CAUSE ACUTE OPIOID TOLERANCE?

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INTRODUCTION: The development of acute opioid tolerance with potent short-acting opioids such as remifentanyl is described in animal studies,¹ but the results of clinical studies are controversial.^{2,3} Remifentanyl-based anesthesia is commonly used at our hospital to facilitate neurophysiologic monitoring during scoliosis surgery. We compared postoperative morphine consumption and visual analogue pain scores in children receiving remifentanyl/propofol or morphine/propofol anesthesia for scoliosis surgery.

METHODS: With Research Ethics approval, 30 children aged 7 to 18 years scheduled to undergo posterior instrumentation for correction of idiopathic scoliosis were studied. Anesthesia was induced with propofol 4 mg/kg, glycopyrrolate 10 g/kg, morphine 100 g/kg, and rocuronium 600 g/kg. The children were assigned randomly to one of two maintenance regimens: (1) in the remifentanyl group, anesthesia was maintained with propofol infusion 50-80 g/kg/min, N₂O, and remifentanyl starting at 0.25 g/kg/min and titrating in increments of 0.05 g/kg/min according to hemodynamic response, (2) in the control group, anesthesia was maintained with N₂O, intermittent morphine, and propofol starting at 200 g/kg/min and titrating in 25 g/kg/min increments according to hemodynamic response. Criteria for inadequate anesthesia included a heart rate or mean arterial pressure that exceeded 20% of the baseline value. In the remifentanyl group, patients were given morphine 100 g/kg approximately 30 min before the end of surgery. After extubation, morphine 50 g/kg was administered by a blinded investigator as required for analgesia, followed by patient-controlled analgesia (PCA) with morphine. Initial 12- and 24-hour postoperative PCA morphine consumption and visual analogue pain scores were recorded.

RESULTS: Mean 12- and 24-hour PCA morphine consumption did not differ significantly between groups (figure). The 24-hour PCA morphine consumption in the remifentanyl group was 1.47 ± 0.39 mg/kg and that in the control group was 1.23 ± 0.32 mg/kg. Visual analogue pain scores did not differ between groups. There were no significant differences in the duration of anesthesia or intraoperative morphine administration.

DISCUSSION: Remifentanyl-based anesthesia did not cause a clinically significant increase in initial 12- and 24-hour PCA morphine consumption or visual analogue pain scores. These data do not support the development of acute opioid tolerance following remifentanyl-based anesthesia in surgical patients.

REFERENCES: (1) Anesth Anal 83: 600-5 (2) Anesth 93:409-17 (3) Anesth Anal 89:753-7