Study suggests dexmedetomidine before surgery reduced remifentanil-induced hyperalgesia

April 12 2013

Surgical patients who demonstrated heightened pain sensitivity, or hyperalgesia, induced by high doses of a synthetic opioid had their symptoms alleviated by co-treatment with dexmedetomidine, according to new research. Study investigators, who presented their results today at the 29th Annual Meeting of the American Academy of Pain Medicine, concluded that dexmedetomidine may be a new and effective treatment option for opioid-induced hyperalgesia (OIH).

OIH refers to increased pain sensitivity due to high-dose or prolonged opioid exposure. Dexmedetomidine is an alpha-2 adrenergic agonist that is believed, based on prior research, to reduce pain and opioid requirements after surgery (Blaudszun et al, Anesthesiology 2012;116(6):1312-22). In the current study, OIH was induced by high doses of remifentanil, which is an ultra short-acting synthetic opioid used during surgery as an adjunct to anesthesia and to relieve pain.

"High-dose remifentanil can induce hyperalgesia, which is marked by a decreased mechanical hyperalgesia threshold, enhanced pain intensity, shorter time to first postoperative analgesic requirement and greater morphine consumption," said Kim Yeon-Dong, MD, lead study author and a clinical professor of anesthesiology and pain medicine at Wonkwang University Hospital in Iksan City, South Korea. "Dexmedetomidine infusion efficiently alleviated these symptoms."

Patients treated with dexmedetomidine reported less pain, used less post-surgical morphine, and went longer before requesting medication for pain relief than patients treated with placebo. They also reported fewer adverse opioid-related effects, including nausea.

The research was conducted on 90 patients who underwent laparoscopically-assisted vaginal hysterectomy. Patients were randomly assigned to 1 of 3 research groups, each of which received either dexmedetomidine or placebo saline 15 minutes before surgery. During surgery, all patients received a remifentanil infusion.

Group C received placebo and a comparatively low dose (0.05 μg/kg/min) of remifentanil. The next 2 groups received higher doses of remifentanil: group RH received placebo and 0.3 μg/kg/min remifentanil; and group DRH received dexmedetomidine and 0.3 μg/kg/min remifentanil.

Patients in the RH group, who were treated with placebo and high-dose remifentanil, had a lower threshold for mechanical hyperalgesia in the 24 hours after surgery than the other 2 groups and were the first to require analgesia for pain. The same placebo group also had more pain intensity and greater use of patient-controlled morphine for pain than group DRH, which received dexmedetomidine and high-dose remifentanil. Additionally, group DRH reported less shivering and postoperative nausea and vomiting than the other 2 groups. All findings were statistically significant.

Dr. Kim said those who might benefit from treatment with alpha-2 agonists include patients who are hospitalized for painful conditions or procedures and who have not responded to traditional opioid medication.