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Two Routes of Administration Outperform Systemic Steroid Alone, Extend Pain Control of Intercostal Nerve Blocks: Controlled Trial

Feb. 18, 2016, PALM SPRINGS, Calif. – Researchers interested in prolonging the effect of an intercostal nerve block (INB) to ease post operative pain were able to do so through administering dexamethasone by two separate routes. The resulting superior pain control suggests that perineural and systemic steroids provide analgesia by two separate mechanisms of action, according to results reported in a scientific poster today at the 32nd Annual Meeting of the American Academy of Pain Medicine.

Previous studies cited by the lead study author had shown that dose escalation of dexamethasone by the same route fails to prolong the effect of local anesthetics. He called the current results encouraging.

"Following lung surgery, it is vitally important for patients to continue to take deep and forceful breaths to prevent the development of post operative pneumonias, atelectasis and other complications," said Dermot P. Maher MD, MS, a clinical fellow in Pain Medicine at Massachusetts General Hospital, Harvard School of Medicine in Boston, Mass. "This study gives surgeons and anesthesiologists another simple tool that can be used to treat post operative pain in thoracic surgery patients."

INBs are one method used to delay the restrictive breathing patterns that occur due to pain, and steroids are often added to prolong the local anesthetic action. Though not approved by the U.S. Food and Drug Administration for this purpose, steroids "have a very long and proven record in this role and their use is commonplace," Dr. Maher said. Regardless, questions linger over whether systemic or perineural steroids are superior, due to conflicting evidence regarding the potential for neurotoxicity seen in animal models with perineural steroids.

"Many of the anesthesiologists that I've spoken with suggest that given the unclear benefits and potential risks of perineural dexamethasone, only giving intravenous may be reasonable," Dr. Maher said. "However, no one had looked to see if giving both systemic and perineural dexamethasone in combination will add any analgesic prolongation of local anesthetics over intravenous alone."

The double-blind, placebo-controlled, prospective trial contained 40 patients, all of whom were undergoing their first unilateral video-assisted thoracoscopic surgery with the same surgeon. To

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create a more homogenous cohort, patients who received additional surgical interventions, such as a rib or chest wall resection, were excluded from analysis.

Patients received an INB containing either bupivacaine and dexamethasone (Group 1) or bupivacaine and saline (Group 2). All patients received 8 mg of intravenous dexamethasone. All injections were done at the conclusion of the thoracic procedure but prior to dermal closure, under direct thoracoscopic visualization of the chest wall, ensuring the block solution entered the appropriate tissue plane. The scientific investigators evaluated pulmonary function tests every four hours following surgery and measured pain and opioid consumption for the first 48 hours after surgery.

Mixed effect analysis found that Group 1, which received the combination, had lower pain scores at 20 hours (2.23 vs. 4.3) and 24 hours (2.06 vs. 4.52) and lower morphine consumption at 32 hours (1.67 mg vs. 5.87 mg). The patients in the combination group also demonstrated a less restrictive breathing pattern with better sustained Forced Vital Capacity and Forced Expiratory Volume. Dr. Maher said the most significant differences between the groups were observed starting at 20-24 hours, which could reflect the analgesic half-life of local anesthetics.

The most common side effects with INBs include flushing, fluid retention and hyperglycemia (especially in diabetic patients). In the current study, no adverse events attributable to either steroids or local anesthetics occurred.

Dr. Maher suggested that the results should be studied in other peripheral nerve blocks and chronic pain interventions and that the mechanisms underlying the two different administration methods should be evaluated.

Poster 135 – The Combination of Perineural and Systemic Dexamethasone Enhances the Duration of Operatively Placed Intercostal Nerve Blocks Compared to Systemic Dexamethasone Alone as Measured by Objective Pulmonary Function Testing

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