Researchers Explore Correlations of Plasminogen Activator Inhibitor-1 and Mortality in Ventilated Patients. Song et al. (page 252)

Studies have found increased concentrations of plasminogen activator inhibitor 1 (PAI-1) in the airspaces of patients with ventilator-associated pneumonia and in plasma of patients with acute respiratory distress syndrome. PAI-1 concentrations have not been evaluated to date as prognostic indicators in mechanically ventilated patients without acute respiratory distress syndrome. Song et al. hypothesized that PAI-1 concentrations might be associated with increased mortality in patients with either Pseudomonas aeruginosa-induced, ventilator-associated pneumonia, or tracheobronchial colonization.

To test this theory, the team studied 33 patients requiring mechanical ventilation and with positive cultures for P. aeruginosa. Blind bronchoalveolar lavage was performed and secretions were processed for biomarker concentrations. Secretion of type III cytotoxins was also analyzed from the P. aeruginosa strains. Ten of the 33 patients died. The research team found that PAI-1 concentrations were significantly increased in patients who died compared with those who survived, even when patients with acute respiratory distress syndrome were excluded from analysis. In addition, 83% of the P. aeruginosa strains isolated from patients with high concentrations of blind bronchoalveolar lavage PAI-1 also had secretions of type III exotoxins. The observations suggest that PAI-1 concentrations may be affected by the virulence factors produced by P. aeruginosa.

Survey of Intraoperative Awareness Incidents in Southeastern U.S. Regional Medical System. Pollard et al. (page 269)

Using data collected by their group’s continuous quality improvement department, Pollard et al. sought to establish the incidence of intraoperative awareness in eight of the locations served by the anesthesiologist physician group. The team excluded cases if patients were under age 18, did not have a general anesthetic, or had a terminal event during the course of their hospitalization.

The researchers identified 211,842 anesthetics that were delivered during the study period from January 2002 through December 2004. Of these, 83.12%, or 177,468, were followed by the continuous quality improvement process. This data tool included 50 quality indicators covering the patient’s entire anesthetic experience. Patients were initially questioned about any possibility of recall during their time in the postanesthesia care unit. The continuous quality improvement team also interviewed patients within 1–2 days after their anesthetic, using a modified Brice interview to ascertain if patients experienced intraoperative awareness.

A total of six patients reported instances of recall. Two of those had undergone cardiopulmonary bypass, and the anesthesiologists had used a dexmedetomidine infusion in lieu of propofol during the rewarming process. The patients had not been given additional narcotics, benzodiazepines, or halogenated compounds to supplement the anesthetic at the conclusion of the procedure. Both of these patients recalled the end of their procedures and the start of their stay in the intensive care unit. Two other patients were also given “light” anesthetics, whereas two others had incidences of possible recall between one procedure and another. The six cases of possible recall brought the incidence of intraoperative awareness in this large sample of patients to 0.0068%, or 1 per 14,500—a number substantially less than that reported in the literature (where incidence ranges between 0.1 and 0.9%).

Effect of Dilution on Particulate Size of Various Steroids Investigated. Benzon et al. (page 331)

To explore the potential effects of particle size on radicular artery embolization during transforaminal epidural steroid injections, Benzon et al. examined seven different steroid preparations. Sample drops from unopened vials were examined under a high-end laser scanning confocal microscope to measure particle size. The team then recorded particle sizes grouped into categories of 0–20, 21–50, 51–1000, and greater than 1000 μ. Both undiluted and diluted samples of steroids were examined, as was type of diluent (either saline or local anesthetic).

Both dexamethasone and betamethasone sodium phosphate were pure liquid. The proportion of larger particles was significantly greater in the methylprednisolone and compounded betamethasone preparations compared with the commercial betamethasone. Increased dilution of the compounded betamethasone with lidocaine decreased the percentage of the larger particles.
particles, whereas increased dilution of 80 mg/ml methylprednisolone with saline increased the proportion of larger particles. For the transforaminal approach, the authors note that the commercial betamethasone is the preferred particulate steroid because of the size of its particles. Dexamethasone, although shown here to be nonparticulate, should be used with caution until further studies clarify its safety and efficacy.

Results from First Human Trial of Neosaxitoxin as Local Anesthetic. Rodriguez-Navarro et al. (page 339)

An analog of saxitoxin, neosaxitoxin is a phycotoxin that reversibly blocks voltage-gated sodium channels in neurons and their processes. Rodriguez-Navarro et al. designed a randomized, double-blind, placebo-controlled trial to evaluate neosaxitoxin as a local anesthetic. During the trial, 10 healthy volunteers received subcutaneous injections of 50 μg neosaxitoxin in one calf and placebo in the contralateral calf. Using TSA II Neurosensory Analyzer (Medoc Ltd, Minneapolis, MN) and von Frey filaments, the team evaluated five sensory parameters: sensory thresholds for warmth and cold, pain thresholds for heat and cold, and threshold for mechanical touch perception. These measurements were made at several times up to 48 h after the injections.

Complete sensory blockade of all parameters was obtained in all study participants. The first sensation to return was the pain threshold for heat, which returned to normal values 3 h after the injection of neosaxitoxin. Blockade of cold pain lasted 24 h. No adverse reactions to neosaxitoxin were detected, and the compound was not detected in participants’ blood or urine samples. The systemic toxicity of outer pore blockers, such as saxitoxin, has been well documented. The dosage used here (50 μg) is below the international safety recommendations of 80 μg, and local administration of the neosaxitoxin did not appear to produce systemic adverse effects. Further study is needed to establish safety.

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