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CORR Insights

CORR Insights®: Hypotensive Epidural Anesthesia Reduces Blood Loss in Pelvic and Sacral Bone Tumor Resections

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Where Are We Now?

Intraoperative hypotensive epidural anesthesia, when administered by those very familiar with the technique, is thought to be safe for hip surgery and may reduce bleeding and transfusion, improve the quality of the operative field, and shorten operative times [3]. However, intraoperative hypotension has also been associated with adverse events. A practice advisory regarding neuraxial anesthesia (from the American Society of Regional Anesthesia) recommends maintaining the blood pressure within 20% to 30% of baseline [2]. Recent observational studies suggest that brief exposure to intraoperative hypotension may double or triple 30-day mortality [1], acute kidney injury [4], and myocardial injury [5]. This information is hard to reconcile with intentional intraoperative hypotension, since the blood pressures associated with injury are commonly experienced by patients during hypotensive epidural anesthesia, without apparent harm.

Freeman and colleagues found that hypotensive epidural anesthesia for pelvic tumor surgery reduced both calculated blood loss and the number of transfusions, without an increased risk of end-organ injury. This important study extends the benefits of hypotensive epidural analgesia to a new and challenging patient population. Minimization of transfusion in cancer patients is particularly important, due to the immunosuppressive effects of transfusion.

Where Do We Need To Go?

Some institutions routinely practice hypotensive epidural anesthesia with excellent outcomes. Surgeons accustomed to this practice perceive safety with many benefits, but several questions remain about hypotensive epidural analgesia. Should vigorous efforts be made to avoid all hypotension? Or do risks of blood loss and transfusion outweigh potential risks of hypotensive epidural anesthesia? One view holds that decreased blood pressure endangers patients (the kidneys do not care whether the hypotension is intended or not), but perhaps not all hypotension is the same. An opposing view maintains that adverse physiologic

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processes cause both adverse events and hypotension. If so, then hypotension is correlated with adverse events, but hypotension does not cause adverse events. This school of thought maintains that hypotensive epidural anesthesia is a high-flow, low-pressure state with associated positive outcomes.

How Do We Get There?

Two complementary research approaches will help us answer these questions: randomized trials and database studies. Ideally, large multicenter prospective randomized trials would compare the risk of severe anemia, transfusion (driven by protocol), operative time, and incidence of adverse events associated with perfusion (including myocardial ischemia, kidney injury, stroke, and death) after procedures conducted under normotension or with hypotensive epidural anesthesia. Anesthetic techniques should be standardized. Blood pressure for the normotensive group should be kept within 20% to 30% of baseline. Assessors of outcomes should be blinded to group assignment. To mitigate against changes in anesthetic and surgical practices during the period of study that could result in confounding variables, the study would need to be a multi-center trial completed over a relatively brief period of time. However, the expense of conducting a study large enough to address rare outcomes may be prohibitive. Competition for scarce clinical research funding of the magnitude required is fierce, and it seems unlikely that an adequately powered randomized trial will be conducted. Given the rarity of adverse events and the difficulties of using composite outcomes or surrogate measures, it is important to conduct large-scale database studies. There is a coding term for controlled hypotension, so administrative databases could be queried to link intentional hypotension with patient outcomes. Alternatively, adoption of electronic medical records allows more granular, but institution-specific, research into outcomes and hypotensive epidural anesthesia. Clearly, adverse events can occur under hypotensive epidural anesthesia, and database studies may be the most practical way to define the risks and benefits. Large-scale studies are needed to prove whether hypotensive epidural anesthesia is safer or more dangerous than the normotensive alternative.

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