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COMMENTARY & PERSPECTIVE

Total Hip Arthroplasty: What Is the Best Perioperative Analgesic Modality?

Commentary on an article by Rebecca L. Johnson, MD, et al.: "Continuous Posterior Lumbar Plexus Nerve Block Versus Periarticular Injection with Ropivacaine or Liposomal Bupivacaine for Total Hip Arthroplasty. A Three-Arm Randomized Clinical Trial"

Xinning Li, MD

Total joint replacement is projected to become the most common elective surgical procedure in the United States in the coming decade. The prevalence of total hip arthroplasty in the U.S. in 2010 was 0.8% of the entire population, which equates to 2.5 million individuals¹. Recent innovations in joint replacement surgery include minimally invasive techniques, computer-assisted surgery, advanced rehabilitation protocols, patient-specific implantation, and perioperative pain management. It is well documented that a substantial number of patients experience severe pain and receive suboptimal pain control in the early perioperative period after elective joint replacement². Poorly controlled management of postoperative pain results in increased consumption of opioid medication along with associated opioid side effects, including respiratory depression, nausea, vomiting, ileus, cognitive changes, and hospital readmission².

Recent advances in multimodal analgesia as a multidisciplinary approach to target different pathways of pain management maximize pain control while minimizing the side effects of medication. The elements include oral anti-inflammatory medications, epidural analgesia, posterior lumbar plexus block, single nerve block, intrathecal opioid administration, and periarticular intraoperative infiltration. However, there is no consensus on the ideal perioperative analgesic modality for total hip arthroplasty.

In the current study, Johnson et al. compared 3 postoperative analgesia interventions in combination with a comprehensive multimodal analgesic pathway after total hip arthroplasty: (1) continuous posterior lumbar plexus nerve block (PNB); (2) periarticular infiltration with ropivacaine, ketorolac, and epinephrine (PAI-R); or (3) periarticular infiltration with liposomal bupivacaine, ketorolac, and epinephrine (PAI-L). This prospective, randomized, Level-I study evaluated the efficacy of the 3 interventions according to the postoperative pain control, opioid consumption, length of stay, adverse hospital events, and complications within 3 months postoperatively. A total of 159 patients were randomly allocated by computer into 1 of the 3 study arms. The authors found no significant difference in outcome in terms of pain control or amount of opioid consumption between the PNB and PAI-L groups. However, the patients in the group with the PAI-R reported more pain during the postoperative time period compared with the other 2 groups. A total of 4 patients fell, requiring medical attention after hospital discharge: 2 in the PAI-R group, and 1 each in the other 2 groups (PAI-L and PNB). There was no difference in the fall rate across the 3 groups.

Marino et al.³ compared the efficacy of postoperative pain control after total hip arthroplasty in patients who had continuous lumbar plexus block, continuous femoral block, or patient-controlled analgesia alone. They reported similar findings to the current study in that the continuous lumbar plexus block significantly reduced pain scores during physiotherapy on postoperative days 1 and 2 compared with the other 2 groups. Additionally, both the opioid consumption and drug-related side effects were decreased in the PNB group. Multiple studies have evaluated local periarticular injection and pain control after total hip arthroplasty. In a randomized study, Parvataneni et al.⁴ reported significantly lower average pain scores and higher overall satisfaction in patients who had periarticular intraoperative injection (bupivacaine, morphine, epinephrine, methylprednisolone, and cefuroxime) compared with the control group who received patient-controlled analgesia. In another systematic review and meta-analysis of short and long-term effectiveness of local anesthetic infiltration for perioperative pain control, the authors evaluated 13 studies including 909 patients undergoing total hip arthroplasty and reported that patients receiving the PAI experienced a greater reduction in pain at 24 hours and 48 hours postoperatively during activities, with reduced opioid consumption, fewer days in the hospital, earlier mobilization, and a lower incidence of vomiting⁵.

The current study by Johnson et al. is the first prospective randomized controlled trial comparing the efficacy of periarticular injection (PAI-R and PAI-L) with continuous lumbar plexus nerve block (PNB). The authors found a modest improvement in pain control on postoperative day 2 in patients who had PNB and PAI-L compared with those who had PAI-R; however, there was no significant difference between patients in the PNB and PAI-L groups in terms of postoperative opioid use, length of stay, and hospital adverse events. Additionally, readers should be cautious when interpreting the results as one of the major limitations of PNB and PAI is that both procedures are highly technique-dependent modalities, and deviations from the authors' reported results

may occur because of the technical ability of the anesthesiologist or surgeon. Furthermore, there is not a standardized medication delivery for the PAI injection, which may also affect the results. Nevertheless, the addition of a PNB or PAI with the liposomal bupivacaine mixture (PAI-L) in combination with a multimodal analgesic regimen for primary total hip arthroplasty will provide excellent analgesia while decreasing opioid consumption and other adverse side effects related to opioids.

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