

Update on Selective Regional Analgesia for Hip Surgery Patients

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KEYWORDS

- Total hip replacement • Hip fracture • Femoral nerve block • Fascia iliaca block
- Lumbar plexus block • Local infiltration analgesia • Surgical outcome
- Postoperative analgesia

KEY POINTS

- A wide range of selective nerve blocks are available for hip surgery analgesia, reflecting the complex innervation of the hip.
- The ideal block technique or combination for hip surgery is not yet defined; there is supportive evidence for posterior lumbar plexus, femoral nerve, and fascia iliaca blocks.
- Alternative nerve and interfascial plane blocks may have a role in analgesia for patients undergoing hip surgery but rigorous studies are lacking.
- Despite the type of block used, a strategy of multimodal analgesia in the perioperative period is mandatory.

INTRODUCTION

The hip surgery patient population worldwide is quite diverse, from children with congenital hip dysplasia, to younger athletic adults who undergo hip arthroscopy, to frail elderly patients with multiple medical problems who suffer a mechanical fall. This review focuses on adult hip surgery patients with a special emphasis on the applications of regional anesthesia and analgesia following hip fracture repair and total hip arthroplasty (THA).

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Hip fracture due to mechanical falls continues to occur at a significant rate despite focused efforts on prevention.¹ Most of these patients are elderly and frail with multiple comorbidities. In this vulnerable population, early and appropriate analgesic treatment can have a strong positive influence on the trajectory of postoperative recovery.² Total joint replacement, including THA, is projected to become among the most common elective surgical procedures in the United States in the coming decade.³ Effective pain management is an essential element of successful rehabilitation and enhanced recovery.^{4,5} In this context, appropriate application of regional anesthesia and analgesia continues to play an important role in perioperative pain management but must be carefully balanced with the expected occurrence of lower limb motor block.⁶

Beyond the immediate postoperative period, regional anesthesia and analgesia can have potentially beneficial effects on long-term outcomes, especially on persistent postsurgical pain⁷ and functional rehabilitation.⁸ Continuous regional analgesia, in particular, has been extensively studied in patients who undergo total joint replacement surgery and may positively influence patient outcomes in other surgical settings.⁹

New appraisals on hip anatomy and innervation, as well as the emergence of new equipment and techniques, have increased the spectrum of possible regional anesthesia and analgesia options for anesthesiologists and pain physicians who care for hip surgery patients. This review presents the latest information on this topic, with special attention on anatomy, selective unilateral regional analgesic techniques, and outcome data.

REVIEW OF HIP INNERVATION

Hip innervation is complex with contributions from many nerve components. Birnbaum and colleagues¹⁰ reported that the femoral nerve (FN) innervates the anterolateral capsule, and the obturator nerve (ON) innervates the anteromedial capsule. Combined innervation of the anterior capsule was often observed. The posterior and inferior parts of the hip joint capsule are innervated by the sacral plexus, consisting of branches directly from the sciatic or superior gluteal nerves, or via the sciatic nerve branch to the quadratus femoris muscle.

A histologic study of the hip joint capsule found nociceptive fibers to be predominantly present in the anterior and superolateral parts of the hip joint capsule. Neural fibers found in the posterior and inferior parts were identified as mechanoreceptors.¹¹ These findings support the assumption that the FNs and ONs may be the primary mediators of nociceptive pain from the hip joint, thus narrowing the focus of regional analgesic techniques.¹² However, blockade of the sacral plexus is necessary to provide surgical anesthesia, and the lateral femoral cutaneous nerve (LFCN) is also important for postoperative analgesia because it innervates the skin in the lateral part of the thigh, which is frequently involved in the surgical incision (**Fig. 1**). Although neuraxial blocks, epidurals, and spinal techniques are known to provide effective anesthesia and analgesia for hip surgery patients, they are nonselective for unilateral surgery and may be associated with undesirable side effects.¹³

SELECTIVE REGIONAL ANALGESIC TECHNIQUES FOR HIP JOINT SURGERY

Lumbar Plexus Block

Lumbar plexus block (LPB) targets the FN, LFCN, and ON as they run within the psoas major muscle. It is also known as the psoas compartment block. There are various

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