

Pediatric Neuromuscular Scoliosis: Challenges Managing Perioperative Pain When PVB, ESP, or (m)-TLIP Planes Are Inaccessible

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INTRODUCTION

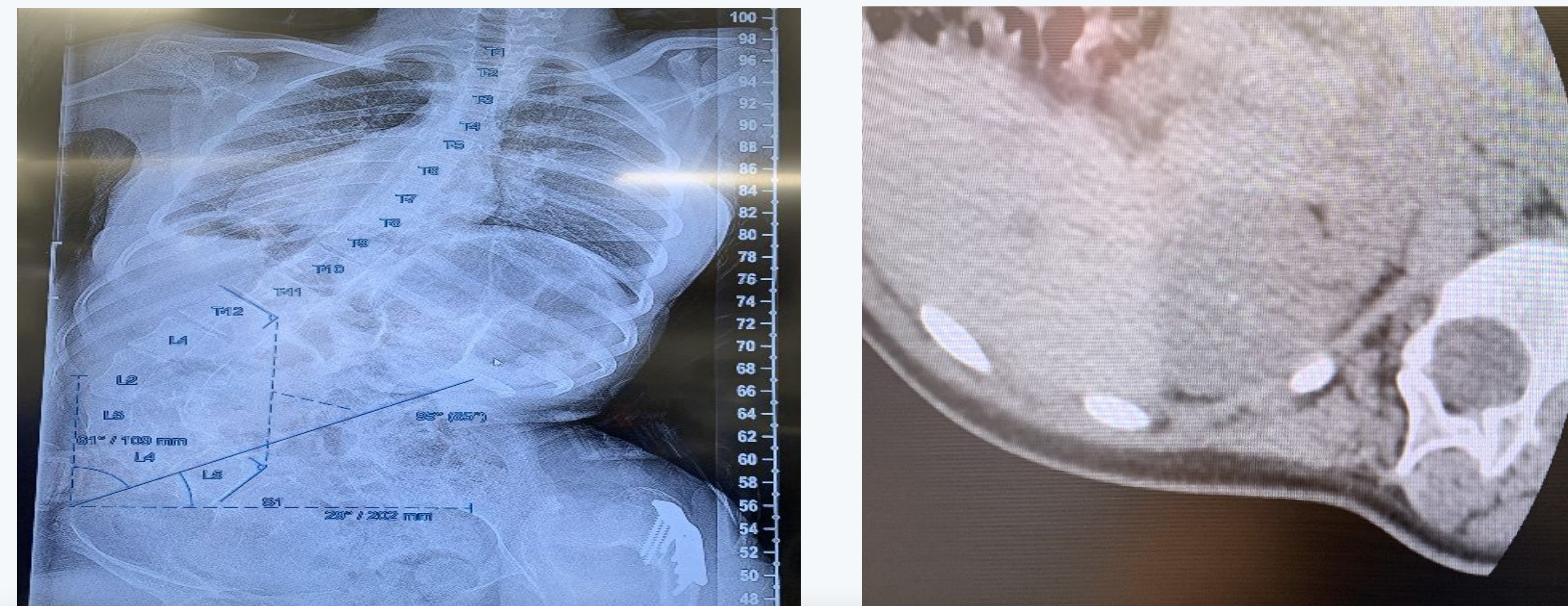
Neuromuscular scoliosis, often associated with cerebral palsy, requires surgery for curves exceeding 50-60 degrees or when functional impairments occur. While techniques such as paravertebral (PVB), erector spinae plane (ESP), and modified-thoracolumbar interfascial plane (m-TLIP) blocks are effective, they can be challenging in severe cases due to anatomical distortions. This case highlights the difficulties encountered when applying these methods to a complex patient.

CASE PRESENTATION

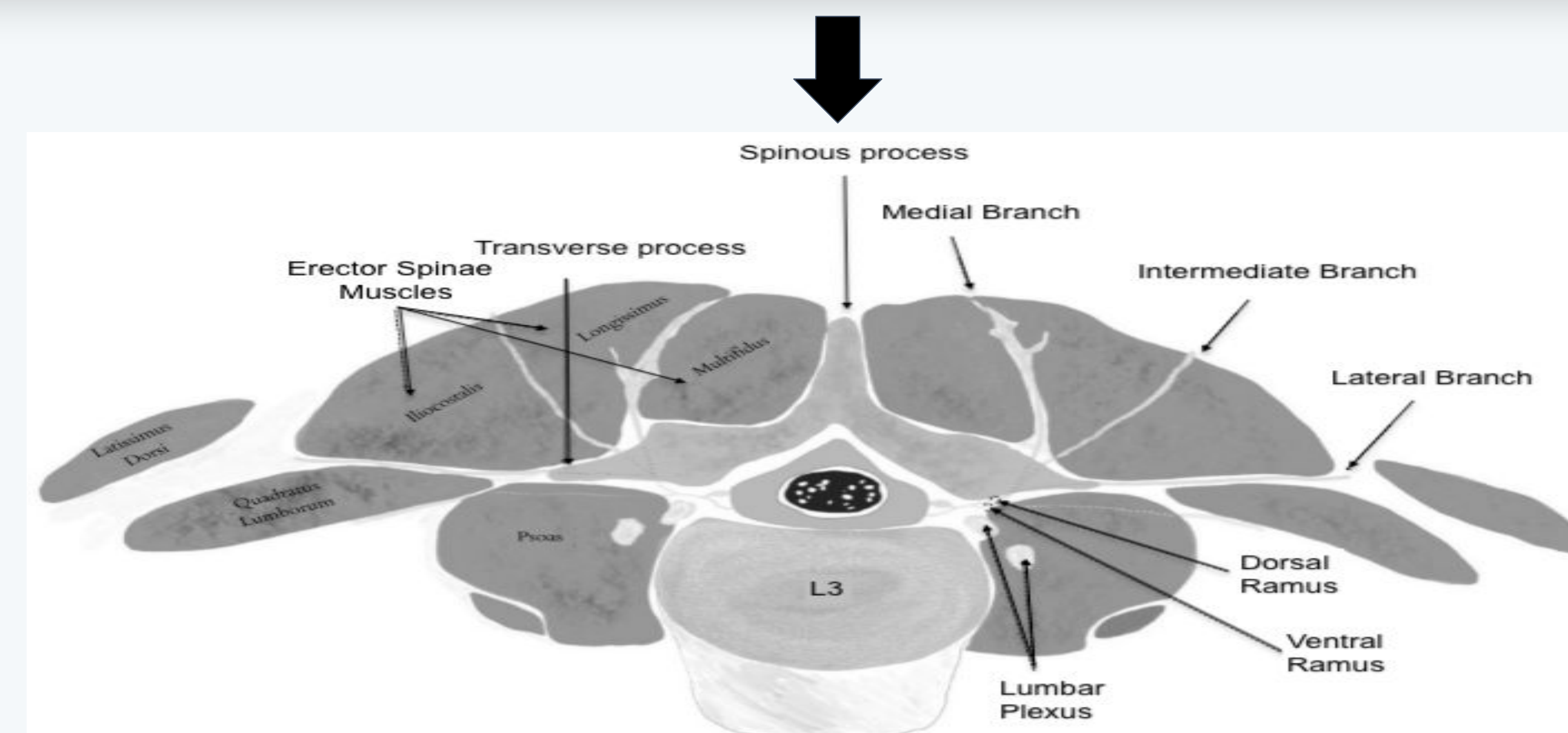
A 15-year-old, 28 kg female with severe neuromuscular scoliosis (Cobb angle of 95 degrees, 45 degrees of spinous process rotation) and pelvic obliquity secondary to cerebral palsy presented for corrective surgery. The patient's symptoms included progressive pain with sitting and the anticipation of further disease deterioration, despite overall good health, making her a candidate for T2-to-pelvis posterior spinal fusion. Intraoperative management included two large-bore peripheral IVs, an arterial line, general endotracheal intubation, and comprehensive intraoperative monitoring with somatosensory evoked potentials (SSEP), electromyography (EMG), and electroencephalography (EEG). Anesthesia was maintained with propofol, and remifentanyl. Intraoperative methadone dosing was administered, and postoperative pain control was provided via a patient-controlled analgesia (PCA) pump with hydromorphone. The intraoperative course, anesthetic dosing, postoperative pain management, and side effect management will be discussed in detail.

APPROACH

GETA→Prone



Applied anatomy with a (45 degrees spinous process) twist



What are the risks with each approach?

- PVB
- ESP
- (m)-TLIP

What is my backup plan in a pediatric population?

LESSONS LEARNED

Neuromuscular scoliosis presents unique challenges, often arising from extreme musculoskeletal deformities, muscle atrophy, and plane distortion.

A triaged approach to regional techniques is key, although no single technique has proven superiority over another, as long as the chosen one is performed with anatomical accuracy.

Pediatric patients in the prone position for peripheral nerve blocks (PNB) are at high risk for inadvertent neuraxial administration of local anesthetic, even in the absence of significant scoliosis or spinal rotation.

IV methadone (0.05-0.1 mg/kg), though not widely used for orthopedic surgeries in the pediatric population, serves as a valid backup plan for regional techniques.

Opting for a non-regional technique does not equate to failure in the eyes of patients, as long as we achieve pain relief without side effects, regardless of the modality.

DISCUSSION

Perioperative pain management in patients with severe spinal deformities undergoing corrective surgery is challenging due to limitations in regional anesthesia options. The degree of deformity, including spinal rotation, further complicates effective block placement and pain control. Optimal management requires a multimodal analgesia approach with careful monitoring for side effects.

References →

