



POSTOPERATIVE PAIN MANAGEMENT WITH PARAVERTEBRAL NERVE BLOCK CATHETERS IN A PEDIATRIC PATIENT WITH CAUDAL REGRESSION SYNDROME



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INTRODUCTION

- Caudal regression syndrome (CRS) is a rare congenital malformation, with an incidence of 1-3 in 100,000 births.
- CRS ranges from incomplete sacral and lumbar spine development to congenital fusion of the lower extremities.
- Musculoskeletal deformities and coexistent anomalies can often present a challenge to anesthesiologists.
- Variable anatomy and limited literature on regional anesthesia related to CRS control further poses a challenge for post-operative pain management.
- The role of paravertebral nerve blocks in the context of CRS is unknown. We report a case where bilateral paravertebral catheters were placed pre-operatively for a pediatric patient with CRS.

CLINICAL FINDINGS

- 8-year-old female weighing 13.8kg with extensive PMH including CRS, neurogenic bladder, end-stage renal disease, imperforate anus status post colostomy, cleft palate, solitary left kidney with grade 5 vesicoureteral reflux.
- Scheduled for laparotomy, creation of ileal conduit, cystoscopy and placement of ureteral stent in the transplanted kidney.
- On exam patient had marked scoliosis, underdeveloped lower extremities, and normal sensation along abdominal dermatomes (Figure 1A).
- Prior chest x-ray demonstrated 12 ribs bilaterally with asymmetric attachment to the vertebra, and levocurvature of the spine with the vertebral column ending at L3 (Figure 1B).
- No imaging available of the spinal cord and surrounding structures

MAIN DIAGNOSES/INTERVENTIONS

- Under general anesthesia, the T9 transverse process, pleura, internal intercostal membrane, and spinous process were visualized using a high-frequency, linear transducer placed in a transverse and slightly oblique (Figure 1C)
- Under direct sonographic visualization, a 5 cm, 18-gauge Touhy needle (PAJUNK®) was inserted in-plane, lateral to medial, and advanced directly above the intercostal artery, toward the transverse process.
- Correct access into paravertebral space was confirmed by anterior displacement of pleura after injection of 1 ml of saline, followed by 5 ml of ropivacaine 0.5%.
- A 20-gauge multi-orifice, closed tip catheter (Perifix Epidural Catheter) was inserted 2 cm beyond the needle tip and secured at 5 cm depth (Figure 1D)
- Intraoperatively, 0.2% ropivacaine was infused at 2ml/hour through each catheter and a total of 100mcg of fentanyl was administered.
- Post-operatively, bilateral catheters were infused with 0.1% ropivacaine with clonidine 1mcg/ml at a rate of 3cc/hour and a patient intermittent bolus of 2cc every 4 hours.
- Post operative analgesic regimen included: hydromorphone PCA 100mcg q 8mins (1-hr limit of 700mcg), scheduled acetaminophen, and PRN diazepam.
- Post-operatively, the patient did well with FLACC scale scores of 0.
- POD1- hydromorphone x 5 doses.
- POD 2- no hydromorphone administered and PCA was discontinued. Started on oxycodone PRN.
- No oxycodone or diazepam administered post-operatively.
- Left paravertebral catheter was noted to be leaking on POD 2 and was subsequently removed.
- Right sided paravertebral catheter was removed on POD 3 as scheduled.
- No complications were reported secondary to paravertebral catheter placement.

OUTCOME/SUMMARY

- Our case demonstrates successful post-operative pain management with bilateral paravertebral nerve block catheters after an exploratory laparotomy in a patient with caudal regression syndrome.
- An extensive evaluation of the spinal cord, vertebra, and dural sac should always precede the performance of neuraxial anesthesia in patients with caudal regression syndrome.
- MRI is the modality of choice for evaluation of spinal cord anatomy and surround structures
- Most patients diagnosed with CRS are not candidates for neuraxial analgesia therefore an ultrasound guided paravertebral nerve block with catheter placement can be a feasible technique in the case of caudal regression syndrome.
- An ultrasound guided technique performed by an experienced provider is essential for needle and catheter placement.
- The patient, parents, and the acute pain physicians must carefully consider the potential risks, benefits, and appropriateness of performing paravertebral blocks in a patient with CRS.

FIGURES/IMAGES

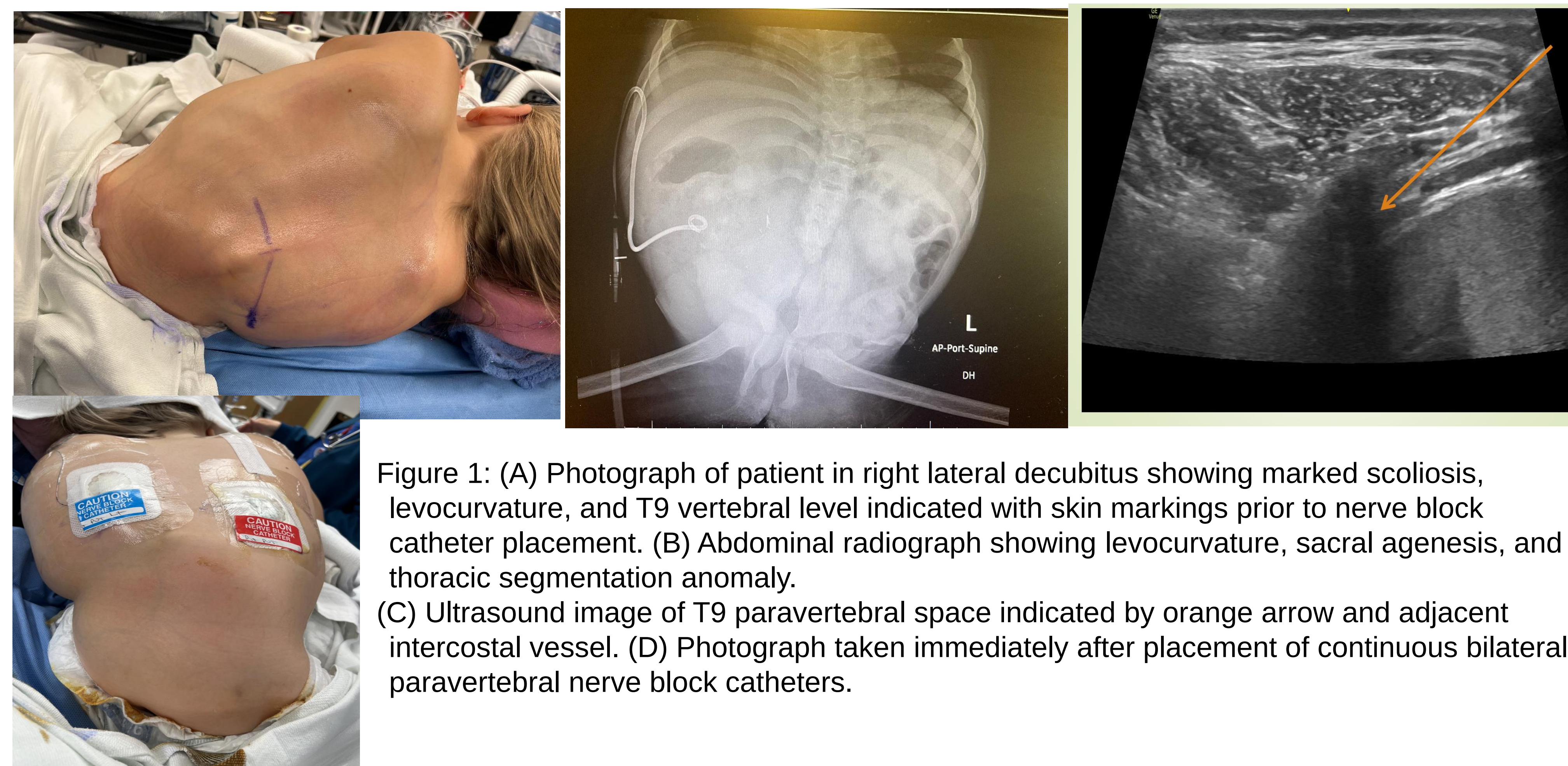


Figure 1: (A) Photograph of patient in right lateral decubitus showing marked scoliosis, levocurvature, and T9 vertebral level indicated with skin markings prior to nerve block catheter placement. (B) Abdominal radiograph showing levocurvature, sacral agenesis, and thoracic segmentation anomaly. (C) Ultrasound image of T9 paravertebral space indicated by orange arrow and adjacent intercostal vessel. (D) Photograph taken immediately after placement of continuous bilateral paravertebral nerve block catheters.

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