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DO NOT REMOVE THE CATHETER: A CASE REPORT ON PEDIATRIC PALLIATIVE PAIN MANAGEMENT WITH AN ERECTOR SPINAE PLANE BLOCK

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Background: Erector spinae plane block (ESB) is a novel fascial plane regional anesthetic technique for pain management. The case report highlights the need for multidisciplinary education on regional nerve blockade in pediatric palliative medicine.

Case Report: The patient was a 5-year-old girl with relapsed metastatic Wilms tumor who presented with recurring malignant pleural effusion, necessitating chest tube insertion. She received a thoracic ESB via catheter to successfully manage uncontrolled pain. Radiation was needed, but radiation providers refused to continue ESB treatment, erroneously citing possible interactions between ESB and radiation therapy. The catheter was removed, and the patient suffered from complications before passing away.

Conclusion: Interdisciplinary education on regional nerve blockade in pediatrics is imperative to prevent premature removal of anesthetic catheters during treatment, thereby causing unnecessary pain after risk of placement is undertaken. Further, we propose that the ESB is feasible for palliative pain management despite patient age and size.

Key words: Acute pain anesthesiology, erector spinae plane block, palliative medicine, pediatric anesthesia, regional anesthesia

BACKGROUND

Erector spinae plane block (ESB) was first described in 2016 by Forero et al (1) for the treatment of acute and chronic thoracic pain. There is little research studying ESB in pediatric palliative care, with one case report discussing its use in a pediatric patient with metastatic osteosarcoma (2). Our case report is one of the first to show successful ESB treatment in pediatric end-of-life care.

There are knowledge gaps amongst providers on the ESB, which occurred in our case and subsequently impacted our patient's care and quality of life. In this case report, we highlight a major failure in the palliative care of a 5-year-old patient who received an ESB despite the odds of successfully receiving a pain-free end of life. The patient was a cachectic girl with metastatic Wilms tumor who received an ESB under general anesthesia for severe pain with chest tube placement secondary to malignant pleural effusion. The patient's anatomy, physiology, and treatment course were obstacles that we overcame to successfully place an ESB catheter (Fig. 1). However, the radiation providers at the adult hospital discontinued the ESB treatment because of concerns of

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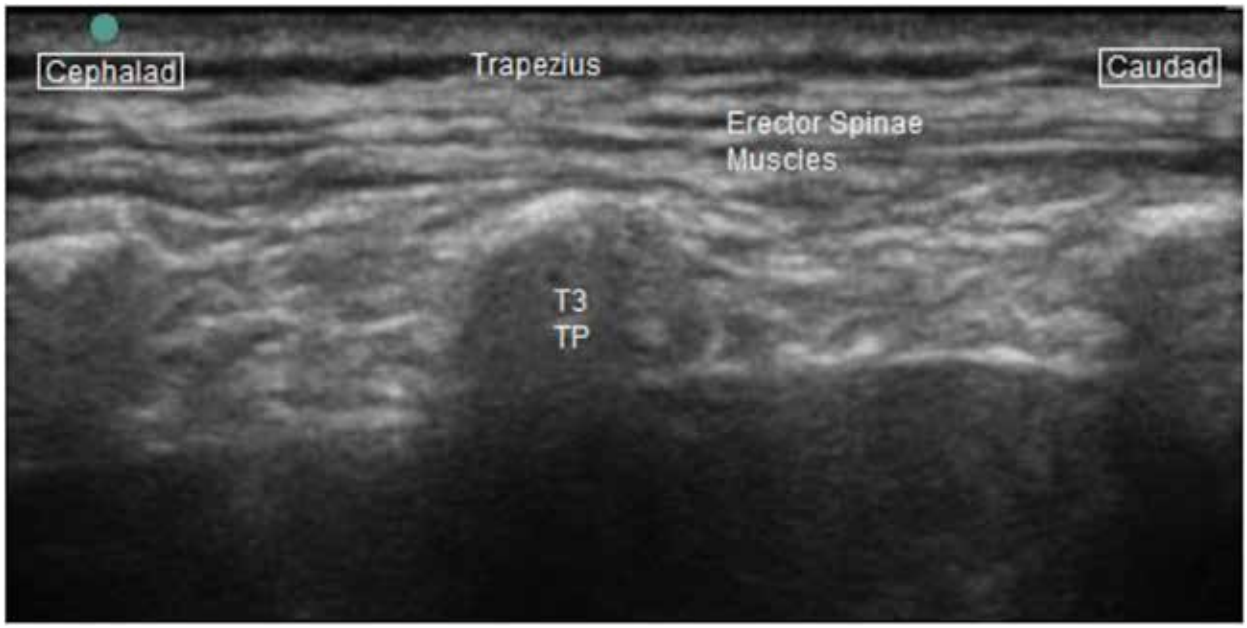

Fig. 1. Anatomy for erector spinae plane block.

interactions between ESB and radiation therapy. The patient, unfortunately, suffered from complications and passed away after ESB catheter removal. We highlight a case in which the complexity of human anatomy, misunderstandings, lack of adequate research in uncharted territory, and fear of complications prohibited physicians from providing the highest standard of care, especially to the most vulnerable patients. Written consent to publish this case report was obtained from the family.

CASE

A 5-year-old, 16-kg girl underwent salvage chemotherapy and presented with relapsed anaplastic Wilms tumor and abdominal metastases complicated by a right-sided malignant pleural effusion. Mediastinal shift necessitated a right-sided chest tube placement, which resulted in acute, uncontrollable chest pain. Further pain control was necessary because her treatment plan included intrapleural chemotherapy through the chest tube, a known painful procedure.

The acute pain service (APS) was consulted for recommendations on pain management. The patient had an abnormal coagulation status (PTT-44.7, platelets-46,000) thereby limiting interventional options. The APS recommended right-sided ESB catheter placement under general anesthesia (GA). After multidisciplinary discussions, the patient's parents consented to ESB placement under GA.

The patient was brought to the operating room. Under GA, the patient was positioned in the left lateral decubitus position and all pressure points were padded. The patient's cachectic state caused her trapezius, rhomboid, and erector spinae muscles to atrophy, making it difficult to identify fascial planes between the transverse process and erector spinae muscles. To successfully administer the blockade, the needle was directed until contact was made with the transverse process and then withdrawn while using hydrodissection with normal saline to effectively separate and easily visualize structures, confirming that the needle was in the correct fascial plane. Once the correct fascial plane was identified, 15 mL of 0.2% ropivacaine was injected. Appropriate linear spread was confirmed by 2-dimensional ultrasound imaging (Fig. 2). A continuous infusion of 0.1% ropivacaine was initiated at 6 mL/hr. The patient remained hemodynamically stable, and she was extubated and transported to the critical care unit.

The patient's pain control improved post procedure. Parameters that suggested a successful block were signs of the patient sitting up in bed comfortably, less apprehension when practitioners examined the chest tube site, and pain assessed via FLACC (Face, Legs, Activity, Cry, Consolability) scores. The patient's dermatomal coverage was estimated to be inclusive of T3-T7.

Cytology for the malignant effusion returned and

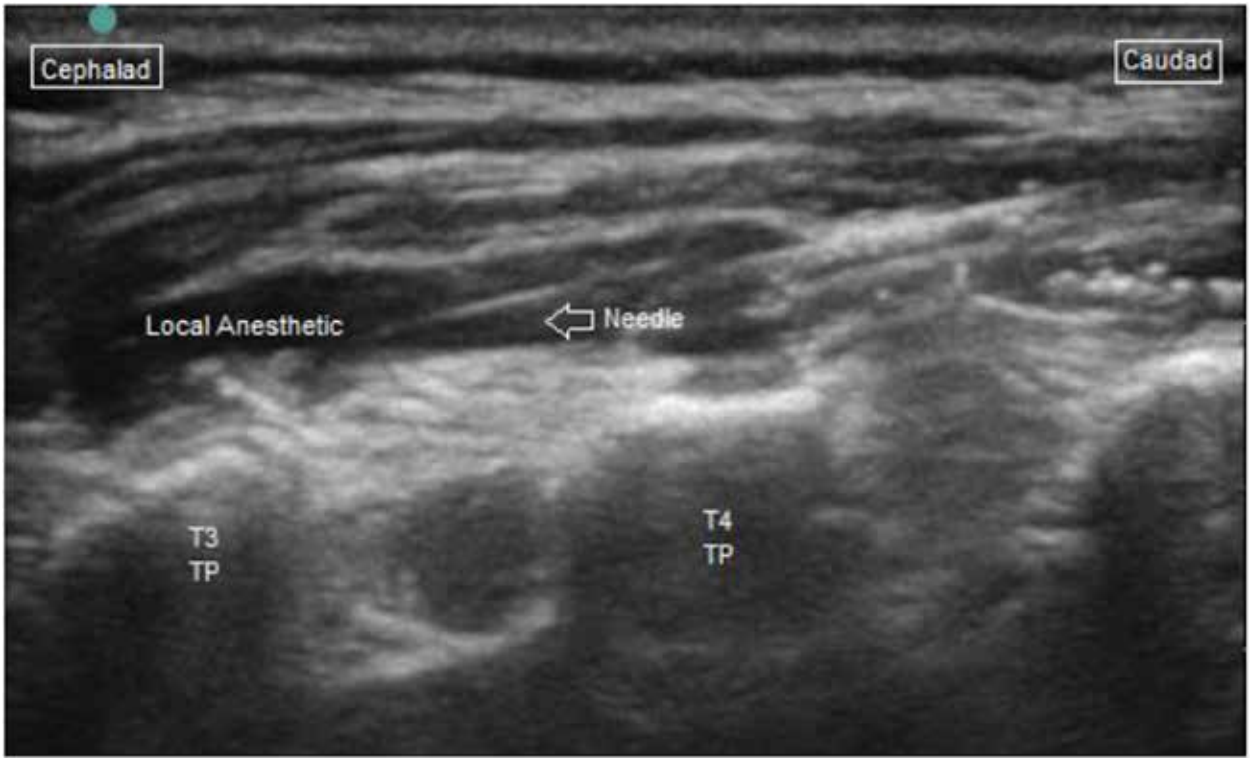

Fig. 2. Erector spinae plane block with confirmation of fascial plane via linear spread of local anesthetic.

intrapleural chemotherapy was aborted. Radiation therapy was the next course of action. Radiation providers at the adult hospital requested the removal of the ESB catheter for the patient's impending radiation treatment. The APS advocated for the patient's welfare and discussed appropriate indications of ESB in radiation patients. ESB is a relatively safe procedure to provide concurrently with radiation. However, due to the radiation team's discomfort, they refused to keep the ESB catheter during treatment. They inaccurately cited possible interactions between ESB and radiation therapy. On postoperative day 4, the catheter was removed for radiation. This poor, misinformed clinical decision severely impacted the patient's care, worsening her quality of life and causing physical and psychological complications. The following week the patient developed significant pain, worsening respiratory distress, and expired.

DISCUSSION

Aggressive pediatric malignancies often require multiple invasive surgeries and intensive chemotherapy or radiation. Wilms tumor has an overall survival rate of greater than 90% following treatment (3). Metastatic anaplastic tumors, our patient's diagnosis, represent the worst prognosis with a 5-year survival of 38% (4). Malignant effusion is indicative of advanced disease.

Due to recurrent malignant pleural effusions, our patient received radiation therapy to prolong life and alleviate symptoms. Radiation is one of the mainstay treatments of thoracic malignancies, including advanced disease (5). With the advent of proton beams and multidirectional beam techniques, radiation can be focally delivered, avoiding toxicity to surrounding tissues (5).

The severity of aggressive malignancies and intensity of treatment can cause intolerable pain. Pain is prevalent in palliative care, and without proper management, it can increase morbidity and mortality. Adequate pain control is crucial so oncologic treatment can be continued while maintaining quality of life.

The gold standard for thoracic pain management is a thoracic epidural, and more recently, paravertebral nerve blockade (6,7). However, both include risks of bleeding and infection in the neuraxiom. In anticoagulated patients, these risks are increased. As a result, patients are frequently overlooked for acute pain in-

terventions. An ESB with catheter placement is a better alternative for uniquely challenging patients. Although complications can occur in any regional technique, ESB is a relatively superficial block that is easy to administer because it lacks obvious vessels in the path of entry. Our patient had coagulation abnormalities posing procedural risks. Administering an ESB in a thrombocytopenic pediatric patient has not been previously documented.

The ESB is achieved by local injection into an erector spinae fascial plane deep to the erector spinae muscles but superficial to the transverse process. Cadaveric studies have shown the spread to be within the erector spinae plane and into the paravertebral space (1,8). The analgesic effect of the ESB focuses on the dorsal and ventral rami of the thoracic spinal nerves, allowing the anterior, lateral, and posterior thoracic walls to be anesthetized (1). The erector spinae fascial plane runs throughout the thoracolumbar region, resulting in extensive craniocaudal spread.

Even though ESB is a relatively simple procedure, administration in pediatric populations can be challenging, especially in children with disease processes that render their inherently smaller anatomy difficult to identify. Our patient's cachectic state made it tough to visualize and identify fascial planes. However, with anatomical knowledge and experience, we administered the ESB using hydrodissection to effectively identify the correct fascial plane and provide analgesia without the risks of a more neuraxial regional technique. Nerve hydrodissection is a relatively new approach using high-resolution ultrasound-guided fluid injection to separate nerves from surrounding structures (9). Our case supports previous conclusions that ultrasound-guided hydrodissection facilitates intraoperative identification of correct fascial planes (9,10). This is one of the first pediatric cases showing that nerve hydrodissection can beneficially guide perioperative identification of correct fascial planes in atrophied patients, effectively administering the ESB.

We believe that we achieved our goal of pain management, providing our 5-year-old patient with invaluable days without pain. The ESB provided pain relief without adverse side effects and sedation, which accompany traditional narcotic analgesia. Because our patient had a reoccurring malignant pleural effusion, radiation was necessary to prolong her life and manage symptoms. When consulting the radiation team, we stressed the importance of continuing her pain treatment using the ESB catheter. The radiation providers were unaware of peripheral nerve block indications, especially with radiation. They erroneously believed there was a risk of interaction between ESB and radiation therapy. It has been confirmed the ESB catheter can be provided concurrently with radiation (11). Anesthesia administration during pediatric radiation therapy is relatively safe, with a low incidence of complications in delivering anesthetics via peripherally inserted central catheters and port catheters (12). Despite no contraindications, the ESB catheter was removed, and the patient could not receive proper pain management. She suffered from respiratory distress and tremendous pain, and ultimately passed away. Insufficient knowledge amongst providers prevented the patient from receiving appropriate care, exacerbating her quality of life. Had her catheter been left and her ESB maintained, she could have enjoyed her last few days without pain, perhaps even for a longer time. We stress that patient advocacy and beneficence are paramount clinical and ethical obligations. If the radiation providers had prioritized the patient's well-being, knowing her prognosis, her quality of life would have been preserved.

Palliative medicine is multidisciplinary. Since ESB is novel, providers may not know its indications. Multidisciplinary education on ESB treatment is important to dispel misinformation, helping providers have accurate knowledge.

In the current literature, ESB procedures are not documented in pediatric palliative care. To the knowledge of the authors, this is one of the first case reports demonstrating the successful use of ESB for pain management in terminally ill, cachectic pediatric patients. Erector spinae catheters should be widely used in vulnerable patients secondary to their safety, efficacy, and ease of placement. The ESB should also remain in terminal patients despite further treatment provided unless documented contraindications exist.

CONCLUSION

ESB is a novel procedure indicated for pain management, but there is limited literature describing its use in pediatric end-of-life care. This case report emphasizes the ethical and clinical importance of multidisciplinary medical education on novel anesthetic procedures in pediatric palliative medicine.

Author Contributions

C.J., A.R.E., N.P., A.H., E.B.L: These authors helped acquire data, conceptualize, draft, and revise the manu-

script, approve the version submitted, and agree to be accountable for all aspects of the work.

C.L., A.D.N., P.T: These authors helped conceptualize, draft, and revise the manuscript critically, approve the version submitted, and agree to be accountable for all aspects of the work.

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