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Case report

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Thoracic surgery with erector spinae plane block in a patient with Duchenne muscular dystrophy

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Informed Consent
The authors stated that the written consent was obtained from the patient presented with images in the study.

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Abstract

The management of general anesthesia is very difficult in patients with Duchenne muscular dystrophy (DMD) due to the potential for difficult airway problems, malignant hyperthermia, and cardiorespiratory complications. Therefore, peripheral nerve and plane blocks may be a good choice in DMD patients. In this case, we aimed to show the anesthetic efficiency of erector spinae plane (ESP) block in an 18-year-old male patient with DMD scheduled for video-assisted thoracoscopy surgery (VATS) exploration due to prolonged air leak. On surgery day, ultrasound (US)-guided one-sided ESP block (ESPB) was performed under sedation. Decortication surgery was performed in 3 hours. The patient's intraoperative hemodynamic parameters were stable, and no pain or complications were recorded. The patients' visual analog scale (VAS) scores were recorded at postoperative hour 0, 2, 6, and 12 as 0, 0, 2, and 2, respectively. In conclusion, safe and effective anesthesia can be provided by ESPB with US guidance in thoracic surgery.

Keywords: Erector spinae plane block, Duchenne muscular dystrophy, Regional anesthesia, Ultrasound, Dexmedetomidine, Postoperative analgesia

Introduction

Duchenne muscular dystrophy (DMD) is an X-linked recessive disease characterized by progressive muscular degeneration and muscle weakness. Cardiomyopathy and respiratory failure may develop as the disease progresses. Because of the potential for difficult airway problems, malignant hyperthermia, and cardiorespiratory complications, general anesthesia management is highly challenging. To minimize these risks, regional anesthetic techniques may be attractive options [1, 2]. In our patient's case, we evaluated the anesthetic efficacy of a single-sided erector spinae plane (ESP) block (ESPB) under ultrasound (US) guidance in a patient with DMD who was scheduled for decortication with video-assisted thoracoscopy surgery (VATS).

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Case presentation

An 18-year-old male patient with DMD for 16 years was scheduled to undergo VATS exploration due to prolonged air leakage in his past tracheostomy. Thorax computerized tomography and chest X-ray images of the patient are shown in Figures 1 and 2.

Figure 1: Thorax computerized tomography of the patient.

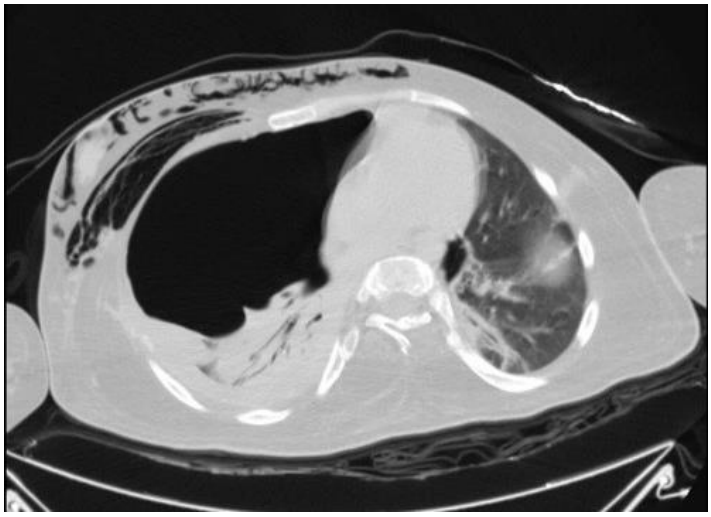
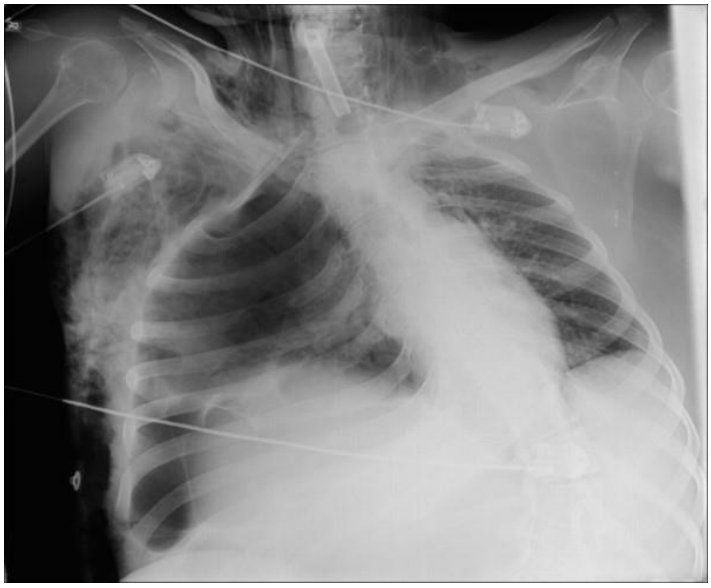


Figure 2: Chest X-ray of the patient.



The patient's anesthesia management was planned in the form of a one-sided ESPB with US guidance accompanied by sedation. After sedation with 0.03–0.05 mg/kg intravenous midazolam (Dormicum®, Roche), proper skin sterilization was performed while the patient was sitting, and a linear 10–18 MHz US probe (Esaote MyLab 30®, Geneva, Italy) was placed between two transverse processes in the right paramedian plane. Transverse processes and erector spinae muscle were determined at the T5 level. After the skin and subcutaneous tissue were anesthetized with 2% lidocaine, the 18-gauge, 50-mm needle (Pajunk®, Geisingen, Germany) hit the transverse processes in an in-plane position, the needle was withdrawn by 1–2 mm, and the fascia under the erector spinae muscle was reached (Figures 3, 4). Following needle-tip aspiration to control the presence of blood and/or air, 20 mL of 0.5% bupivacaine hydrochloride (Marcaine®, AstraZeneca) was administered intravenously. Pain and sensory block were evaluated at 20 minutes post-block, after which surgery was allowed. After beginning surgery, 1 µg/kg of dexmedetomidine IV bolus was followed by an infusion of 0.2 µg/kg/h and continued during the surgery. Decortication surgery was performed in 3 hours. In the intraoperative period, the patient's hemodynamic parameters were stable, and he had no pain or any complications. The patient's visual analog score (VAS, pain score: 0–10) recorded at postoperative hours 0, 2, 6, and 12 were 0, 0, 2, and 2, respectively. Informed consent for publication was obtained from the patient's guardian.

Figure 3: Patient position before injection.

Figure 4: Patient and probe position during injection.

Discussion

DMD is a progressive muscle degeneration that characteristically holds proximal muscles. Respiratory failure and cardiomyopathy are common, because DMD affects the cardiac and respiratory muscles. Since the complications parallel the severity of the disease, this should be kept in mind in the management of anesthesia. The most undesirable complication associated with general anesthesia is malignant hyperthermia and anesthesia-induced rhabdomyolysis, which has a mortality rate of 30%. While critical risks are involved, such as prolonged effect and residual block in the use of neuromuscular blockers, hemodynamic instability and hypotension due to overdose in total intravenous anesthesia (TIVA) can complicate the management of anesthesia. Because of all these risks, peripheral nerve blocks may be a preferred choice [3, 4].

One of the widely used plane block is ESPB. It is a safe, effective technique that ensures adequate analgesia for acute or chronic pain and can be performed as a single injection or via catheter inserted into the ESP [5]. The target of injection is the musculofascial plane between the erector spinae muscle groups and the transverse process of vertebrae. The injection can be made sagittally or transversely. After the spinal nerves pass through the intervertebral foramen, these nerves travel through the erector spinae musculofascial plane. The purpose of the ESPB is to provide visceral and parietal analgesia by affecting the ventral and dorsal rami of the spinal nerves [6]. Although it is a relatively novel technique, its beneficial properties are shown in various operations; in parallel, the number of publications about ESPB is growing [5].

It has been assumed that ESPB has lower complication rates than central neuraxial blocks, as the target of blockage is located more distally from important structures like pleura or main vessels. ESPB is easy to perform via US. In our patient, neuroaxial structures were not easy to examine, and central blocks or general anesthesia were not utilized because of the risk of malign hyperthermia. This block is not the first-line anesthetic technique in many centers; however, it is a good second option, and it can be utilized when another type of anesthesia can cause major complications or is contraindicated [7]. Accordingly, thoracic ESPB was selected in our case.

Thoracic operations are not only painful, but they also impair lung function and cause atelectasis [8]. Therefore, general anesthesia contributes lung disorientation because of single lung ventilation, airway injuries, and lung injuries. Alagoz et al. [9] performed ESPB and thoracic paravertebral block in combination for VATS and added intravenous sedoanalgesia. They concluded that the combination of these methods provided optimal surgical conditions and effective postoperative analgesia.

In a patient with DMD and severe respiratory failure, a case report was reported by Vandepitte et al. [10] in which the intercostal nerve block, accompanied by US, was administered for anesthetic purposes in a thoracic surgery. What made our case unique was the provision of anesthetic efficacy with ESPB alone in VATS.

Conclusion

Safe and effective anesthesia can be provided with ESPB performed with US in thoracic surgery, and the patient's comfort can be increased by providing a high level of analgesia during the postoperative period; accordingly, we contend that severe complications that may occur as a result of general anesthesia can be avoided.

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