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# Ultrasound guided nerve block anesthesia for the resection of giant shoulder-back tumor in a patient with severe asthma: A case report

Liu Q *et al.* Giant tumor resection under nerve block

Qian Liu, Qing Zhong, Ni-Na Zhou, Ling Ye

## Abstract

### BACKGROUND

General anesthesia in critically ill patients is associated with increased risk of complications. Nerve block anesthesia is an alternative, but could be challenging in cases with surgical field that involves multiple dermatomes.

### CASE SUMMARY

We report successful resection of a giant lipoma in the left shoulder and upper back under supraclavicular brachial plexus block plus the third-fourth thoracic vertebra (T3-4) paravertebral block in an elderly patient with severe asthma. Briefly, a 70-year-old patient presented with a slowly growing giant mass (25, 15 and 5 cm in length, width and depth, respectively) that extended from the lateral side of the left scapula to the axillary midline, and from the fifth thoracic vertebra (T5) intercostal to the mid medial section of the left upper arm. He had sharp intermittent pain over the mass for the past 7 d. The patient also had severe bronchial asthma for the past 8 years. A pulmonary function test revealed only 20% of the predicted forced expiratory volume in 1 second (FEV1, 0.49 L). After controlling asthma with glucocorticoid, the tumor was resected under ultrasound guided supraclavicular brachial plexus block and T3-4 paravertebral block. The surgery was completed with no incidents.

### CONCLUSION

Ultrasound-guided brachial plexus block combined with thoracic paravertebral block could be a viable alternative to general anesthesia and epidural anesthesia in patients with poor cardiopulmonary function undergoing shoulder, back and axillary surgery.

**Key Words:** Ultrasound; Giant tumor; Brachial plexus block; Paravertebral block; Case report

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**Core Tip:** A giant lipoma that extended from the lateral side of the left scapula to the axillary midline, and from the fifth thoracic vertebra intercostal to the mid medial section of the left upper arm was resected under ultrasound-guided brachial plexus block combined with thoracic paravertebral nerve block in an elderly patient with severe asthma. The patient recovered well after operation. This anesthetic method could be a viable alternative to general anesthesia and epidural anesthesia in patients with poor cardiopulmonary function undergoing shoulder, back and axillary surgery.

## INTRODUCTION

General anesthesia is associated with a variety of complications, including respiratory depression, deep venous thrombosis, pulmonary embolism, postoperative hemorrhagic shock, pneumonia, and renal failure. Pulmonary complications represent a particular challenge in patients with existing pulmonary disease<sup>[1]</sup>. Regional anesthesia promotes postoperative recovery, and has been associated with reduced risk of postoperative complications<sup>[2]</sup>. Nerve block anesthesia could provide sufficient anesthesia if the surgery is confined to the area innervated by the target nerve, but has been limited by inaccuracy and local complication. Ultrasound guidance ensures accurate delivery of the anesthetic agent to target area and improves the safety of nerve block anesthesia<sup>[3,4]</sup>.

Brachial plexus block is primarily used in surgeries in the upper limbs, whereas thoracic paravertebral block is used in surgeries that in the chest<sup>[5-7]</sup>. Here, we report combined use of brachial plexus block and thoracic paravertebral block to resect a giant lipoma (25, 15 and 5 cm in length, width and depth, respectively) that involved both the left shoulder and upper back in a patient with severe asthma.

## **CASE PRESENTATION**

### ***Chief complaints***

A 70-year-old man (170 cm; 60 kg; body mass index 20.8 kg/m<sup>2</sup>) presented with sharp, acupuncture-like intermittent pain for 7 d. The pain occurred at a frequency of 5-6 episodes per day, with each lasting for 1-2 min. The pain intensity was 3 on the visual analog scale (VAS). The patient disclosed a giant mass in the left shoulder and upper back. The mass had been growing at a slow pace for 10 years.

### ***History of present illness***

The patient had severe bronchial asthma for 8 years (3 attacks per a day on average), and used salbutamol aerosol to control symptoms.

### ***History of past illness***

The patient had no other significant medical history.

### ***Personal and family history***

Family history is non-remarkable.

### ***Physical examination***

Body examination confirmed the giant mass (25, 15 and 5 cm in length, width and depth, respectively) that extended from the lateral side of the left scapula to the axillary midline, and from the fifth thoracic vertebra (T5) intercostal to the mid medial section of the left upper arm. The mass was non-tender.

### *Laboratory examinations*

To prepare for surgery, a pulmonary function test was conducted. Forced expiratory volume in 1 second (FEV1) was 0.49 L (about 20% of the predicted value), and FEV1/forced vital capacity (FEV1/FVC) was 54% of predicted value. The preoperative erythrocyte sedimentation rate was 20 mm/h; the percentage of neutrophils was 74.4%. Partial oxygen pressure, oxygen saturation and partial carbon dioxide pressure were 78 mmHg, 94% and 44 mmHg, respectively.

### *Imaging examinations*

Ultrasound examination as well as computed tomography report from a local hospital (images not available) suggested clear boundary to surrounding tissues.

### **FINAL DIAGNOSIS**

The final diagnosis is benign tumor of the shoulder and back.

### **TREATMENT**

Glucocorticoid treatment (budesonide inhalation twice a day) was initiated to control asthma to a reasonable condition. General anesthesia in this patient was risky. Thoracic epidural block was considered but not adopted considering the risk of hypotension as well as the technical difficulty<sup>[8]</sup>. Since the tumor was confined to the area of the seventh cervical vertebra (C7) to T5 (Figure 1), we decided to use a combination of brachial plexus block and thoracic paravertebral block<sup>[6,8]</sup>. Since the tumor occupied a wide range of area innervated by C7-T5 (Figure 1), surgery was conducted under brachial plexus block (0.4% ropivacaine 15 mL) plus thoracic paravertebral block (the third-fourth thoracic vertebra, T3-4, 0.4% ropivacaine 15 mL) under ultrasound guidance using a 10-MHz linear array probe (Figure 2A and B). Local infiltration anesthesia included 1% lidocaine (3ml) for the block as well as the incision site (Figure 1).

## **OUTCOME AND FOLLOW-UP**

The surgery was completed with no incidents. The pain intensity remained 2-3 in the 10-point VAS scale during the first 8 h after surgery. Postoperative pathological examination revealed lipoma. The patient developed mild pulmonary infection on the third day after operation, but recovered after empirical antibiotic treatment.

## **DISCUSSION**

Many types of brachial plexus block, including intermuscular sulcus <sup>4</sup>block, supraclavicular brachial plexus block, infraclavicular brachial plexus block and axillary brachial plexus block, are available for surgery in the upper limbs depending on the specific location. Supraclavicular brachial block provides anesthesia from the distal end of the upper limb to the mid humerus, part of the area occupied by the tumor mass in the index patient. The incidence of pleural puncture and pneumothorax after paravertebral block is 1.1% and 0.5%, respectively. The incidence of pulmonary complications and hypotension, however, is lower than epidural anesthesia. The incidence of permanent nerve injury is also lower after paravertebral block than epidural anesthesia<sup>[6,8]</sup>. Ultrasound guided brachial plexus block in combination with thoracic paravertebral block has been used for postoperative analgesia or auxiliary anesthesia in breast surgery<sup>[6,8,9]</sup>. The index patient had severe asthma. General anesthesia could induce asthma attack upon tracheal intubation due to high airway responsiveness<sup>[10,11]</sup>. In regional nerve block, the airway is not manipulated/stimulated, thus minimizing the risk asthma attack<sup>[11]</sup>. Previous studies suggested, that in patients undergoing thoracotomy, paravertebral block is superior to thoracic epidural anesthesia<sup>[12]</sup>. In a recent case report, a giant <sup>3</sup>tumor that involved both the chest wall and axillary envelope was resected under ultrasound-guided interscalene brachial plexus block and serratus anterior plane block<sup>[8]</sup>. Exact location and size of the tumor in the index case are different. In another case report, combination of block anesthesia was used a patient with tumor in the area innervated by both the brachial plexus and T1-5 intercostal nerves<sup>[13]</sup>. Such a combination of block anesthesia could in theory provide



adequate anesthesia, but the possibility of incomplete block is high due to anatomical specificity<sup>[4]</sup>. In the index case, the patient required <sup>1</sup> local infiltration anesthesia at the site of incision, suggesting that the nerve block was incomplete (Figure 1). Nonetheless, supraclavicular brachial plexus block plus T3-4 paravertebral block was the most appropriate combination based on the tumor location in our opinion.

In comparison to general anesthesia, nerve block anesthesia promotes postoperative recovery<sup>[14]</sup>, and reduce the risk of pulmonary, circulatory and intestinal complications, especially for patients with preoperative cardiopulmonary problems. As such, combination of nerve block anesthesia could be appropriate in a much wider setting than in the index patient, for example, frail elderly patients with limited cardiopulmonary reserve.

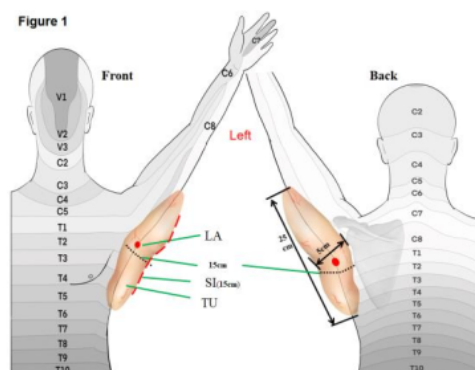
## <sup>1</sup> CONCLUSION

Ultrasound-guided brachial plexus block in combination with <sup>1</sup> thoracic paravertebral block is a viable alternative for patients with poor cardiopulmonary function undergoing shoulder, back and axillary surgery.

## ACKNOWLEDGEMENTS

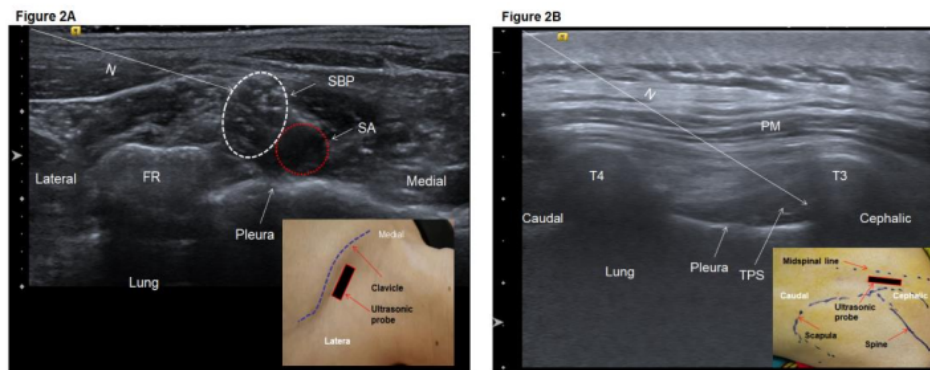
The authors thank the index patient for agreeing to publish this report.

## Figure Legends



**Figure 1** A schematic diagram of tumor dermatomes. The tumor reached the medial midpoint of forearm, the distribution area of the fifth thoracic vertebra nerve, the lateral

edge of scapula and the axillary midline; the tumor size was 25, 15, and 5 cm in length, width and depth, respectively. LA: Local anesthesia (the site of local infiltration anesthesia during surgery); TU: Tumor; SI: Surgical incision.



**Figure 2** title

A: title

B: title

N: Puncture path; SBP: Supraclavicular brachial plexus; SA: Subclavian artery; FR: First rib; PM: Paraspinal muscle; T3: The third thoracic vertebra (transverse process); T4: The fourth thoracic vertebra (transverse process); TPS: Thoracic paravertebral space.



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