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CLINICAL INFORMATION

Ultrasound-guided thoracic paravertebral block for closed loop ileostomy repair in severe COPD: a case report



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Abstract

Background and objectives: Ultrasound-guided thoracic paravertebral block is usually considered a good alternative to epidural thoracic for anesthesia and pain control in thoracic and breast surgery. Furthermore it has also been used during abdominal surgery lately, especially hepatic and renal surgery. However, its role is poorly defined in this context. The purpose of this report was to highlight the role of thoracic paravertebral block in providing effective anesthesia and analgesia during both the abdominal surgical intervention and pain control in post-operative period, avoiding possible complications which general anesthesia may arise, which are fairly common in patients with chronic obstructive pulmonary disease and similar comorbidities.

Case report: The authors present a case of abdominal surgery successfully performed on a woman affected by severe chronic obstructive pulmonary disease requiring closed loop ileostomy repair performed with ultrasound guided thoracic paravertebral block without any complications.

Conclusions: Thoracic paravertebral block may be a safe anesthetic method for abdominal surgery in those patients who would undergo potential severe complications by using general anesthesia.

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PALAVRAS-CHAVE

TPVB guiado por ultrassom;
Cirurgia abdominal;
DPOC;
Analgésia de dor aguda

Bloqueio paravertebral torácico guiado por ultrassom para correção de ileostomia em alça em DPOC grave: um relato de caso**Resumo**

Justificativa e objetivos: O bloqueio paravertebral torácico guiado por ultrassom é geralmente considerado uma boa alternativa à anestesia peridural torácica para o controle da dor em cirurgia torácica e mamária. Além disso, ultimamente o bloqueio paravertebral torácico tem sido usado durante cirurgias abdominais, especialmente hepática e renal. No entanto, seu papel está mal definido nesse contexto. O objetivo deste relato foi destacar o papel do bloqueio paravertebral torácico em fornecer anestesia e analgesia efetiva tanto na intervenção cirúrgica abdominal quanto no controle da dor pós-operatória, evitando as possíveis complicações que podem surgir da anestesia geral, bastante comuns em pacientes com doença pulmonar obstrutiva crônica e comorbidades similares.

Relato de caso: Apresentamos um caso de cirurgia abdominal realizada com sucesso em uma mulher com doença pulmonar obstrutiva crônica grave que precisou de correção de ileostomia em alça, realizada com bloqueio paravertebral torácico guiado por ultrassom sem complicações.

Conclusões: O bloqueio paravertebral torácico pode ser um método anestésico seguro para cirurgia abdominal em pacientes que poderiam apresentar complicações possivelmente graves com o uso de anestesia geral.

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Background and objectives

Ultrasound-guided thoracic paravertebral block (TPVB) is usually considered a good alternative to epidural thoracic one for anesthesia and pain control in thoracic and breast surgery. Furthermore it has also been used during abdominal surgery lately, especially hepatic and renal procedures.¹ However, its role is poorly defined in this context.² The purpose of this report is to highlight the role of TPVB in providing effective anesthesia and analgesia during both the abdominal surgical intervention and pain control in post-operative period, avoiding possible complications which general anesthesia may arise, which are fairly common in patients with chronic obstructive pulmonary disease and similar comorbidities.³

Written informed consent was obtained from the patient for publication of this case report.

Case report

A 72-year-old woman (weight 58 kg, height 1.59 m) came to our attention for a stoma closure, due to a long history of ulcerative colitis previously treated with proctocolectomy and ileo-anal S-pouch reconstruction. She was a current smoker, affected by COPD in treatment with nocturnal oxygen-therapy, β_2 agonists and n-acetyl-cysteine and history of exacerbations and previous hospitalizations for respiratory disorder. She was also diagnosed with bronchiectasis in the median and upper right lobes, a pulmonary coin lesion in the apical segment of the inferior right lobe and an infrarenal abdominal aortic aneurysm.

At the admission she underwent routine and disease-oriented perioperative tests. EKG and chest X-ray showed lung hyperinflation with flattened hemidiaphragms and possible bullous changes in the right upper and median area. Spirometry reported FEV1 45% of predicted and FEV1/FVC

ratio < 0.60; we specify that the patient was in therapy with bronchodilators at the moment of the exam. Abdominal CT-scan with IV contrast showed the presence of the aortic aneurysm and protrusion of intra-abdominal contents through the stoma. Blood analysis were normal except for white blood cells ($10.52 \times 10^9 \cdot L^{-1}$), fibrinogen ($481 \text{ mg} \cdot \text{dL}^{-1}$), PT (1.0), aPTT ratio (1.22), platelets count (36.7000), glucose ($162 \text{ mg} \cdot \text{dL}^{-1}$), urea ($49 \text{ mg} \cdot \text{dL}^{-1}$), GGT ($52 \text{ U} \cdot \text{L}^{-1}$), alkaline phosphatase ($183 \text{ U} \cdot \text{L}^{-1}$).

On the 2nd day after admission she was brought to the operating room after wearing compression stockings and i.v. administration of antibiotic prophylaxis with ampicillin/sulbactam 3 g. Standard monitoring, lead-II continuous EKG and pulse oximetry were started. Baseline parameters were a blood pressure of 120/80 mmHg, a heart rate of 80 bpm and a 92% oxygen saturation in ambient air.

Due to the multiple comorbidities and the predictable difficulties related to respiratory weaning, we chose to perform a locoregional anesthesia approach with ultrasound-guided TPVB and paravertebral continuous catheter placing, to provide supplementary postoperative analgesia.

Before the insertion of the paravertebral catheter, the patient was turned to left-lateral position and $0.05 \text{ mg} \cdot \text{kg}^{-1}$ of midazolam IV and local anesthesia with lidocaine 2% were administered.

Left paravertebral space (T10–T11) was identified using an ultrasound-guided parasagittal in-plane approach. For this purpose the transducer was placed 2.5 cm lateral to the midline in a sagittal orientation, leading to a clear visualization of the main landmarks: T10 and T11 transverse processes, the pleura (which marks the anterior boundary of the paravertebral space and is easily recognizable for its high echogenicity and its characteristic lung sliding motion) and the superior costotransverse ligament (which can be seen as a slightly less echogenic and oblique line posterior to the pleura, forming the posterior boundary of the

paravertebral space). A Contiplex S. Ultra 0.85 × 1000 mm (B-Braun) needle was then inserted at the caudal border of the transducer and directed cranially toward the paravertebral space under real-time ultrasound-guidance. Even if a tender loss of resistance can be detected at the passage of the needle tip through the superior costotransverse ligament, we injected 1 mL of Levobupivacaine 0.5% (not blended with Adrenaline) to confirm the correct needle placement in the paravertebral space, upon visualization of pleural anterior displacement. The remaining 14 mL of Levobupivacaine 0.5% (with no Adrenaline as previously) were then injected to fully dilate the paravertebral space and the catheter for continuous infusion was placed with no complications.

After the completion of TPVB, the block was evaluated for success with a sensory block test to assess the homolateral dermatomal distribution area.

The whole surgical intervention took place in about 90 min with no complications and permanent stability of blood pressure, heart rate and blood oxygen saturation values.

We prescribed multimodal analgesia with paracetamol 1 g IV q8 h, an elastomeric pump containing ropivacaine 0.2% and Ketorolac 30 mg q8 h for rescue analgesic requirements. The capacity of the pump was 200 mL with the nominal flow rate of 6 mL.h⁻¹, infused in the paravertebral space.

The postoperative Aldrete score⁴ was 7 (0 points for activity, 1 point for circulation, 2 for others), so the patient was transferred to the Post-Acute Care Unit. Then functioning of the paravertebral catheter was checked and the dermatomal distribution verified every 30 min. No complications or parameters alterations occurred and Aldrete score remained unmodified when she was moved to the surgical ward 2 h later. No rescue analgesic treatment was needed and no Postoperative Nausea and Vomiting (PONV) occurred.

During the ordinary ward stay the patient was routinely evaluated by the anesthesiology service's consultants in the context of Acute Pain Service reporting good postoperative analgesic control and no need of supplemental analgesic therapy during nor after the end of the continuous ropivacaine infusion.

After 5 days, paravertebral catheter was removed: the tip was complete and there were no signs of infection.

She was discharged after 6 days from the intervention, in optimal medical conditions.

Conclusions

To our best knowledge this is the first case in which ultrasound-guided TPVB was performed for closed-loop ileostomy repair, without general anesthesia.

TPVB in abdominal surgery is usually applied in inguinal herniorrhaphy, cholecistectomy, urological (i.e. percutaneous nephrolithotomy) and gynecological procedures, but

there is a relatively small number of studies examining the analgesic efficacy of TPVB in this context and only few of these contemplate the ultrasound-guided approach with continuous postoperative infusion.¹

The most recent systematic review of randomized controlled trials comparing TPVB versus other anesthesiological techniques brings evidence that in minor abdominal surgery, such as herniorrhaphy or ventral hernia repair, in which especially somatic analgesia is needed, single-shot TPVB provides satisfying anesthesia during the whole surgical procedure.² Our case report suggests that it may have a potential role as an alternative regional anesthesia technique also in major abdominal surgery, where both somatic and visceral analgesia is desired.

Moreover, using continuous infusion with the catheter previously placed in the paravertebral space, we granted post-operative analgesia that lasted approximately > 48 h after the surgical procedure with proven efficacy, reducing pain scores, opioid consumption, and PONV in comparison to conventional intravenous analgesia.

Potential complications of the execution of TPVB could be represented by epidural spread of the local anesthetic drug, vascular puncture, pneumothorax and block failure. However, their incidence may be dramatically reduced with the advent of ultrasound-guided techniques which also have made TPVB more accessible to the wider anesthesia community.⁵

In conclusion TPVB is a loco-regional anesthesia technique used mainly for thoracic surgery, but it should be a valid alternative to epidural thoracic block for anesthesia and pain control also in abdominal surgery especially when ultrasound-guided and in continuous. Our case report emphasizes the potential role of this technique and for this reason we believe in the importance of developing further studies in this direction.

Conflicts of interest

The authors declare no conflicts of interest.

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