

# ULTRASOUND-GUIDED PERIPHERAL NERVE BLOCKS, A SAFETY METHOD OF ANESTHESIA IN PATIENTS WITH SEPSIS WITH AN INITIAL ACUTE RESPIRATORY FAILURE - PRESENTATION OF TWO CLINICAL CASES

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## ABSTRACT

Anesthetic management of patients with severe sepsis is a great challenge. Systemic inflammation and acute organ dysfunction in response to infection is a major problem, especially respiratory failure and hemodynamic instability. Avoidance of lung injury during mechanical ventilation is possible with peripheral nerve blocks.

*Clinical case 1:* We present a 73-year-old male hemodialysis patient with sepsis. He had infectious complication of aneurysm formation of A-V fistula. The patient was hypoxic – SpO<sub>2</sub> 86-88%, with presence of tachypnea, RR-150/75, HR-125/min, Temp -38° C, coagulation abnormalities - INR 1, 58 (clopidogrel intake), elevated CRP and WBC.

The patient was indicated for emergency procedures of incision, drainage and ligation of A-V fistula. We performed supraclavicular brachial plexus block + sedation.

*Clinical case 2:* We present a 61-year-old woman with sepsis, with past medical history of diabetes, COPD, and endometrial cancer. She was with clinical presentation of necrotizing fasciitis of the upper extremity.

We performed ultrasound-guided supraclavicular brachial plexus block – "in plane" technique, 30 mL/25 mL ropivacaine 0.5% in moderate sedated patients.

During the operation the patients were conscious, hemodynamically and respiratory stable, with oxygen supply by a mask, and with excellent intraoperative and postoperative pain control.

We think that ultrasound-guided peripheral nerve blocks are safe and effective alternatives for septic patients with/without coagulation abnormalities.

**Keywords:** *US-guided peripheral nerve blocks, sepsis*

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## INTRODUCTION

The management of a septic patient continues to be a major challenge, both in resuscitation and anesthesiology aspects, despite the enormous advances of medicine in this area in recent years. Systemic inflammatory response and acute organ dysfunction are the main problems, particularly acute respiratory failure and hemodynamic instability, which an an-

esthesiologist faces in such patients on the operating table. When the source of sepsis is a surgically solvable problem, any delay and postponement of surgical intervention to stabilize organ systems is not the best solution. Each patient has a unique clinical situation, not a recurrent phenomenon with a clear clinical outcome. Is it not more appropriate to postpone mechanical ventilation when possible and to expect a favorable outcome after surgery and powerful broad spectrum antibiotic therapy? Or is this just postponing the inevitable? Are peripheral nerve blocks a sure and safe method of anesthesia and postoperative analgesia in these clinical situations? Would they provide optimal analgesia in compromised acidosis conditions? These are questions where the responses are dependent on subjective factors - clinical knowledge, experience, attitude, and not on objective factors. The categorical advantages offered by regional anesthesia in this situation are avoidance of: 1. general anesthesia and mechanical ventilation; 2. high doses of opioids in the first 24 hours, which would lead, along with general anesthesia, to a higher incidence of cognitive impairment, as well as better local rheological conditions (1-3).

### AIM

The aim of this article is to present two clinical cases of septic patients with respiratory failure in which surgical intervention to resolve the infectious source has occurred under ultrasound(US)-guided supraclavicular block.

### CASE PRESENTATION

We present two clinical cases: patients with sepsis and acute myocardial infarction undergoing operative upper limb interventions to resolve the infectious source.

#### *Clinical Case 1:*

We present a 73-year-old man with co-morbidity chronic kidney disease (CKD) - chronic dialysis and ischemic heart disease with a clinical picture of sepsis resulting from an infected aneurysmal A-V fistula. Clinical signs: adynamics, somnolence, tachypnea 25-30/min, hypoxic SpO<sub>2</sub> 84-86% on atmospheric air, O<sub>2</sub> mask 6 L/min SpO<sub>2</sub> 92-94%, RR - 150/75, HR - 125/min C. Laboratory constellation: CRP - 190 mg/L, WBC - 19. The patient was also with an abnormal coagulation status of INR -

1.58, with oral administration of clopidogrel and aspirin protect.

The surgical intervention was performed in the following order: after an O<sub>2</sub> mask of 6 L/min, the patient was monitored for ECG, SpO<sub>2</sub>. Following premedication of 1 mg midazolam and 50 µg of fentanyl, a US-guided supraclavicular block was performed with 30 mL ropivacaine 0.5% - 150 mg. The surgical intervention started 30 minutes after the local anesthetic was instilled, and once again 1 mg midazolam + 50 µg fentanyl were administered before the surgical incision. An incision was made, about 30 mL of purulent content were evacuated, followed by drainage and ligation of the A-V fistula. The operative intervention was performed smoothly with excellent surgical and postoperative pain control, hemodynamically stable, with no respiratory changes.

#### *Clinical Case 2:*

We present a 61-year-old woman with a severe upper limb infection, necrotizing fasciitis, with a 4-day prescription, covering a wrist area of 7-8 cm below the shoulder joint. There was severe underlying pathology consisting of endometrial carcinoma with subsequent chemotherapy, obesity - BW - 100 kg, ID - type 2, COPD, and ischemic heart disease. She was with a clinical picture of sepsis - somnolent to unresponsive in some moments, sometimes confused. There were limb lesions with the affected limb being very painful, swollen, and presence of hyperemia with necrosis and destruction of tissue in the area of the forearm and abundant purulent secretion. The clinical signs were: RS - tachypnea 30/min, blood gas sample - hypoxemia with hypocapnia. SpO<sub>2</sub> - 88% at room air with O<sub>2</sub>-mask 6-7 L/min, SpO<sub>2</sub> 96-97%. RR - 140/90, HR - 90/min, temperature 35.8°C. Laboratory performance: CRP - 390 mg/L, WBC - 22, blood glucose - 20 mmol/L. The patient was monitored - ECG, pulse oximetry, and O<sub>2</sub> mask was placed.

After fluid resuspension 500 mL Hartmann + 250 mL colloidal solution, the patient was premedicated with 50 µg of fentanyl. Supraclavicular block - "in plane" ropivacaine 125 mg - 25 mL, 0.5% was performed. Drainage, evacuation of necrotic materials and fasciotomy took place. The patient remained hemodynamically stable with no change in the respi-

ratory pattern. Intraoperatively, 2 x 25 mg of calypsol was administrated.

## RESULTS

The intraoperative period for both patients was smooth, with no hemodynamic and respiratory problems, and optimal intra- and post-operative analgesia.

### *Clinical case 1:*

The patient was placed in a clinic for vascular surgery with O<sub>2</sub> therapy for the first 24 hours. He received a broad-spectrum antibiotic combination. After 48h he was subfebrile at times, after 72 hours - afebrile. There was no tachypnea and need of O<sub>2</sub> after the 24th hour. He was discharged on the 7th post-operative day.

### *Clinical case 2:*

The patient entered into resuscitation with O<sub>2</sub> therapy and broad-spectrum antibiotic combination: meropenem + vancomycin + metronidazole. There was a decrease in the inflammation markers, CRP was 72 mg/L on the 4th postoperative day, but with cognitive disturbances. On the 6th postoperative day, she was admitted to an endocrinology clinic and on the 14th postoperative day she was discharged by the medical establishment. On the 5th and 9th postoperative day, the early issues were treated with short, moderate sedation.

## CONCLUSION

We and other authors believe that US-guided peripheral nerve blocks are a safe and reliable method in some cases of septic patients with an initial respiratory failure, as well as in patients with abnormal coagulation status.

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