

# Should We Go “Regional” in Intensive Care?

Alexandra Lazar\*

Department of Anesthesiology and Intensive Care, George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Targu Mures, Romania

Received: 22 October 2021 / Accepted: 25 October 2021

Pain is one of the major concerns in Intensive Care Units (ICU). The majority of the patients admitted in ICU experience a certain degree of pain during their stay. Opioid analgesia constitutes the main analgesic option for ICU patients [1].

Opioids are known to have serious side effects, some of them such as ileus, respiratory depression, which leads to prolonged mechanical ventilation, can interfere with the patient’s outcome can lengthen the stay in ICU and leads to iatrogenic withdrawal syndrome (IWS) [1, 2]. In the last few years, a new concept of pain management in ICU patients was introduced: opioid free analgesia (OFA). This concept implies achieving good quality analgesia without using any type of opioids, in any manner [3].

An elegant method to provide analgesia and to avoid all the side effects of the opioids is regional analgesia (RA). Regional analgesia can be employed as a standalone method of analgesia or in combination with other analgesics, as part of multimodal analgesia. Regional analgesia is present in the anesthesiologist/ intensivist armamentarium for decades and if in the operating theaters is an everyday used procedure, in ICU is not as often encountered.

Regional analgesia procedures which can be performed on the critically ill patient comprise: epidural analgesia, performed at different levels of the spine, varying with the major site of pain, limb neural blocks – especially for trauma patients, transversus abdominis plane block for patients with laparotomies or paravertebral, intercostal or interpleural blocks for patients with thoracotomies. Not only surgical patients can benefit from RA, non-surgical ones as well. Some of the procedures which can be done on these patients are epidural and coeliac plexus for pancreatitis or sympathetic blocks for ischemia.

Some of the relevant, known advantages of RA in ICU patients are: good quality and prolonged analgesia – especially if continuous techniques are employed, re-

duced stress, better neurocognitive evaluation, reduced number of days on mechanical ventilation, ischemia prevention [4].

What makes the ICU patients special, in regards to RA, is a far more interesting aspect than the advantages and the indications of RA, which are very well known by the intensivists. The question raised by this paper is raised mainly because of the critically ill patient particularities.

Performing RA in ICU patients poses some challenges, related to the particularities of the critically ill patients, human and environmental factors.

The ICU patients have modified pharmacokinetics and pharmacodynamics; hence the drug metabolism is altered. Local anesthetics (LA) will have a faulted elimination and the risk of toxicity is higher in ICU patients which may lead to Local Anesthetic Systemic Toxicity (LAST). This entity has as first signs, neurologic modifications, followed by cardiovascular manifestations which comprise rhythm abnormalities and even cardiac arrest. Because the vast majority of ICU patients are not conscious, the neurologic signs of LAST can be hidden and the LAST can be observed only when cardiovascular symptoms occur [4].

Another particularity in critically ill patients is the problematic control of the spread of LA in mechanically ventilated patients who receive epidural or spinal analgesia. The spread of LA is influenced by the parameters of mechanical ventilation, increases in intrathoracic pressure, or changes in patient’s position [5].

Performing RA in critically ill patients implies increased accuracy even if ultrasound guidance is used, due to tissue edema – which can shadow the landmarks - the neuromuscular weakness – which determines a weak motor response to nerve stimulation [6].

In ICU the number of septic patients is higher than in other wards creating specific circumstances when it comes to RA, especially when catheters for continuous LA infusion are in place. The catheters could become

\* Correspondence to: Alexandra Lazar, Intensive Care Unit , George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Targu Mures, Romania. E-mail: alexandra.lazar@umfst.ro

means of infection spreading. This aspect has to be carefully weighed when deciding upon a continuous analgesia technique in a septic critically ill patient [7,8].

Critically ill patient's position has to be changed every few hours and this can lead to catheter dislodgement and ultimately to failure to provide adequate analgesia [4].

One of the known contraindications of performing RA is the use of anticoagulants. Critically ill patients are on anticoagulants as part of their daily treatment, to prevent deep vein thrombosis. When planning RA timing of the procedure has to be in concordance with anticoagulant administration recommendations, to avoid hematomas. Ultrasound guidance constitutes a real help in this respect. Although no official recommendations have been made regarding the use of RA in ICU patients, it is wise to follow the guidelines and recommendations in this respect when intending to perform such a procedure [9].

Regional analgesia, neuraxial techniques mainly, produce hypotension especially when the LA is administered as a bolus. Critically ill patients often present with hemodynamic instability controlled with vasopressor therapy. This a delicate situation for providing analgesia by a neuraxial technique – epidural or spinal- and the risks and benefits must be very carefully acknowledged. Another aspect which needs specific consideration in ICU patients on vasopressor therapy is the risk of nerve injury due to vasa-nervorum vasoconstriction [4,9].

The last, definitely not the least, important and also unique characteristic of critically ill patients is the impossibility of consent for the procedure and the potential risks. The intensivists are reluctant in performing RA in unconscious patients, especially when coagulopathies or sepsis are present.

Circling back to the question - Should we go “regional” in ICU? - an appropriate answer could be yes, we should, bearing in mind all the particularities of critically ill patients and carefully weighing in the risks and the benefits of every procedure. As presented above it is easy noticeable that performing RA for critically ill patients needs experienced pain specialists who need many years of training in order to achieve the appropriate competence. This aspect, along with the multitude of risk factors of an ICU patient, reduces the likelihood of performing RA on a daily basis in critical care settings.

The future looks good though, newer technologies are being developed with many features being applica-

ble in medical practice. Some of these – such as needle guidance in real time, enhanced ultrasound images or predicted trajectories of the needle - could definitely steepen the learning curve for specialists and enhance patient's safety during RA.

## ■ ABBREVIATIONS:

ICU – Intensive Care Unit  
 IWS – Iatrogenic Withdrawal Syndrome  
 OFA – Opioid Free Analgesia  
 LA – Local Anesthetic  
 LAST – Local Anesthetic Systemic Toxicity  
 RA – Regional Analgesia

## ■ CONFLICT OF INTEREST

None to declare.

## ■ REFERENCES

1. Jacobi J, Fraser GL, Coursin DB et al. Clinical practice guidelines for the sustained use of sedatives and analgesics in the critically ill adult. *Crit Care Med* 2002; 30: 119–41
2. Sultana A, Torres D, Schumann R. Special indications for Opioid Free Anaesthesia and Analgesia, patient and procedure related: Including obesity, sleep apnoea, chronic obstructive pulmonary disease, complex regional pain syndromes, opioid addiction and cancer surgery. *Best Pract Res Clin Anaesthesiol.* 2017;31(4):547-560.
3. Devlin JW, Mallow-Corbett S, Riker RR. Adverse drug events associated with the use of analgesics, sedatives, and antipsychotics in the intensive care unit. *Crit Care Med.* 2010;38:S231–43.
4. Venkataraju AM, Narayanan M. Analgesia in intensive care: part 2. *BJA Education*,2016; (12): 397–404.
5. Visser WA, Gielen MJ, Giele JL. Continuous positive airway pressure breathing increases the spread of sensory blockade after low-thoracic epidural injection of lidocaine. *Anesth Analg.* 2006;102:268-271
6. Venkataraju A, Bhatia K. Practice of regional anaesthesia in critical care units in the North West England. *Reg Anesth Pain Med* 2013; 38: E149–50
7. Gimeno AM, Errando CL. Neuraxial Regional Anaesthesia in Patients with Active Infection and Sepsis: A Clinical Narrative Review. *Turk J Anaesthesiol Reanim.* 2018;46(1):8-14.
8. AABGI Guidelines ‘Regional anaesthesia and patients with abnormalities of coagulation’. *Anaesthesia* 2013; 68: 966–72
9. Ventham NT, Hughes M, O’Neill S, Johns N, Brady RR, Wigmore SJ. Systematic review and meta-analysis of continuous local anaesthetic wound infiltration versus epidural analgesia for postoperative pain following abdominal surgery. *Br J Surg* 2013; 100: 1280–9