

## Time to Adequately Heed Acute Pain in the Emergency Department - More Regional Blocks Warranted

Tom C. R. V. Van Zundert<sup>1,2</sup>, André A. J. Van Zundert<sup>2,3</sup>

<sup>1</sup>Department of Emergency Medicine, Holy Heart Hospital, Mol, Belgium.

<sup>2</sup>Udayana University, Bali, Indonesia.

<sup>3</sup>Department of Anaesthesia and Perioperative Medicine, Royal Brisbane and Women's Hospital and The University of Queensland, Brisbane, QLD, Australia.

### Introduction

All healthcare stressors converge in the emergency department (ED), which sees an annual increase of 6-7% with more than 25 million patient visits in the UK. This translates to 44,435 attendances per 100,000 population in the period 2019-2020 [1]. Acute pain is the primary reason patients seek emergency medical care. Consequently, substandard acute pain treatment is one of the most frequently heard complaints and has been labelled as a public health problem [2]. Pain remains under-acknowledged, -assessed and -treated, mainly in case of overcrowding in the ED and especially in the more vulnerable groups, including the elderly and children. Many patients express an initial pain score of 10 out of 10 on the visual analogue scale (VAS) in the ED. Generally, initial pain treatment combines oral acetaminophen, NSAID and/or (IV) opioids. Nevertheless, despite these pain killers, most patients continue to suffer and score their pain at 8/10 or higher. Untreated pain can have both short- and long-term effects, including sensitisation to pain episodes in later life [3].

Most visits to the emergency department involve patients with conditions that include: a) injuries and trauma from (motor vehicle) accidents, physical assaults or falls, with or without circulatory shock; b) cardiovascular and cerebral attacks or loss of consciousness; c) severe pain of diverse causes, both acute and chronic origin; d) acute worsening of a serious illness or disease, including problems with breathing and bleeding; e) mental illness; f) burns; g) anaphylactic and allergic reactions; g) drug overdoses

and poisoning; and h) pregnancy-related complications. In most of these cases, patients present with pain as a substantial factor.

### Painful clinical scenarios presenting at an emergency department

Injuries frequently result in emergency trauma care, whereby the patient experiences significant pain due to fractures (open, closed, multifragmentary) and dislocations, caused by a variety of penetrating, blunt and deceleration trauma. An anaesthesiologist, trained in regional anaesthesia blocks, is an added value to the ED. Regional anaesthesia can provide effective pain relief, using a variety of peripheral and central nerve blocks, while avoiding many of the risks associated with systematically administered analgesia and anaesthesia. The establishment of successful blocks, however, is a patient-centred team-effort. Firstly, a thorough knowledge of the anatomy for the identification of useful landmarks in addition to using ultrasound-guided techniques, are essential skills for an anaesthesiologist. Secondly, an efficient and optimal use of local anaesthetic solutions, injected as a single block or administered via a continuous catheter-based technique, is needed to perform a successful block. Lastly, adequate support from nurses and appropriate monitoring are essential requirements. Peripheral and central nerve blocks form an important part of the multimodal approach to acute pain management, which underpins enhanced recovery after surgery pathways (ERAS) for a large variety of surgical trauma interventions.<sup>4</sup> In this Editorial, we focus on the

### Address of Correspondence

Professor André A. J. Van Zundert,

Professor and Chair of Anaesthesiology, Royal Brisbane and Women's Hospital & The University of Queensland, Brisbane, QLD, Australia.

E-mail: [vanzundertandre@gmail.com](mailto:vanzundertandre@gmail.com)

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benefits of nerve blocks in patients presenting at the ED with hip fractures.

### **Hip fractures– the most frequently occurring severe injury in the elderly**

The progressive ageing of the population results in 4.5 million expected hip fractures worldwide by the year 2050 [5]. Even though the elderly usually suffers a hip fracture after a minor trauma, the consequences are major. For the geriatric patient, who often show multi-morbidity and geriatric syndromes (i.e., frailty, malnutrition, polypharmacy, cognitive impairment, and mental disorders), these fractures result in: a) higher mortality rates of 8-10% in the first 30 days and 15-30% within the first year of the hip fracture (Verbeek 2021); b) longer length of stay (LOS); reduced quality of life with 10% of patients never returning to their own residence, but to alternative long-term care as they become dependent of care takers [6] and d) a high incidence of postoperative delirium, ranging from 4 to 53%, which is the most common complication of hip fracture surgery and which is also associated with a higher mortality rate [6-10]. Furthermore, hip fractures are one of the most expensive clinical conditions with huge costs related, estimated at 20 billion US\$ spent annually on this injury and about 1% of the annual NHS budget in the UK [11].

### **Hip fractures cause excruciating pain in an emergency department**

In the first 24 hours following a hip fracture, 50 to 70% of patient records show severe to very-severe pain scores [11]. Excruciating pain significantly limits the patient's mobility and negatively impacts outcomes, compromising cardiovascular and pulmonary function and exacerbating pre-existing multimorbidity, related to the body's neuro-endocrine stress response.

According to the NICE guidelines, patients should receive their hip operation within 36 hours which results in non-emergent operations after their arrival at the ED [12].

Therefore, these patients suffer longer with preoperative pain, often scoring their pain as 10/10 on the VAS [3] while being moved several times (i.e., for imaging, from ED gurneys onto ward beds, for pressure area care). These patients have the right to receive better care in the form of adequate preoperative pain relief.

### **An opioid-sparing pain management strategy**

Managing acute pain in the emergency department is often challenging. Pain control for an acute hip fracture is repeatedly inadequate in the ED, particularly when it is overcrowded and understaffed [9]. Undertreatment results

in patient harm and patient discomfort. Overtreatment can lead to a slew of adverse side effects (i.e., nausea and vomiting, hypotension, respiratory depression and hypoxemia) and elderly-specific complications (i.e., postoperative delirium and postoperative cognitive decline) which all worsen outcomes in trauma [10]. When resulting to opioids, conventionally recommended doses (e.g., 0.1 mg/kg of morphine) are often not an effective pain control method and additional doses are required [9] which increases the risk of opioid overdose, dependence, addiction and adverse reactions [13]. Moreover, opioids further stimulate the production of pro-inflammatory cytokines, which are often related to postoperative delirium [8]. Thus, routine use of opioids may contribute to an unacceptably high rate of morbidity and mortality [6, 10].

### **Essential knowledge of anatomy of regional anaesthesia**

The hip capsule is innervated by contributions from branches of the femoral, obturator, superior gluteal, sciatic nerves and the nerve to the quadratus femoris. Ultrasound-guided techniques, such as the '3-in-one' block and the 'fascia iliaca compartment' block cover at least the femoral, obturator and lateral cutaneous nerves. Patients with a hip fracture benefit hugely from these safe and effective regional anaesthesia blocks, with a high success rate across all studies, ranging from 80 to 100% [10]. Single-injection nerve blocks with local anaesthetics providing effective pain relief can potentially be combined with adjuvants (e.g., dexamethasone, epinephrine, dexmedetomidine, clonidine, magnesium, and opioids) which further prolong the duration of analgesia [3]. As the anterior aspect of the labrum plays a significant role in postoperative pain, surgeons can infiltrate this densely innervated area during arthroplasty, increasing the duration of pain relief [6].

### **Use of regional anaesthesia in the department of emergency medicine**

The anaesthesia literature contains an array of various (and evolving) regional anaesthesia blocks that have proven to be useful for pain relief in patients with hip fractures. Earlier techniques, based on surface landmarks and the use of nerve stimulators, resulted in a higher incidence of paraesthesia during the performance of the block and painful contractions. Furthermore, these earlier techniques produced blocks with a slower onset, lower quality and shorter duration when compared to newer ultrasound-guided nerve block techniques [14].

A growing body of evidence shows that regional anaesthesia performed in the ED is quick, safe and effective, particularly when performed under ultrasound guidance [8, 9, 13, 15-

19]. Skilled anaesthesiologists in regional anaesthesia, can provide an initial single-short injection (e.g., 'fascia iliaca compartment' block; or '3-in-1' femoral nerve block) as soon as possible after arrival at the ED to produce about 8 hours of analgesia, depending on the choice of local anaesthetic solution. This allows bed transfers and patients examinations to occur without the patient experiencing pain. Later, a continuous 'fascia iliaca compartment' block or a central neuraxial block (epidural) with the use of a catheter can be placed for opioid-sparing analgesia. The catheter insertion can even be done in the postoperative phase. This intervention results in rapid, safe and effective pain reduction, improved patient satisfaction, reduced morbidity and mortality, reduced opioid consumption, fewer opioid adverse effects, reduced need for procedural sedation, reduced delirium, reduced constipation, reduced LOS and reduced rehabilitation time [4, 6, 20, 21]. Single injection nerve blocks with local anaesthetics providing effective pain relief, can potentially be combined with adjuvants, e.g., dexamethasone, epinephrine, dexmedetomidine, clonidine, magnesium and opioids, which further prolong the duration of analgesia [3].

In addition to pain management for hip fractures, regional anaesthesia could also be used as an effective analgesia technique for other painful traumata, including fractures and dislocations. Options consist of thoracic or lumbar epidural analgesia, paravertebral blocks, peripheral nerve blocks, eye blocks, head and neck blocks, and erector spinae plane blocks [22]. Skilled anaesthesiologists should be able to produce an effective single ultrasound-guided nerve block for pain relief within 15 minutes of patient arrival ('door-to-block' time) at an ED. The institution of a regional anaesthesia block is more time-consuming and can be challenging in extensively injured patients seeing that exposure of the back is required for central neuraxial blocks. Nevertheless, pain treatment should receive sufficient priority to initiate early effective multimodal analgesia and should not be seen as a disruption of patient flow at the ED. Regional anaesthesia is safe and the incidence of systemic toxicity due to local anaesthetic overdose is low, provided experienced anaesthesiologists know how to best practice these blocks, how to prevent complications to occur and when they occur how to solve them accurately. Furthermore, the use of regional analgesia techniques also is environmentally friendly as it allows for a reduction in environmental contamination of anaesthetic gases and for a reduction in airway manipulation, which is recommended whenever possible in COVID-19 patients [23].

Adequate equipment (point-of-care ultrasound machine; dedicated regional anaesthesia chart, drugs, needles),

monitoring and trained nursing support, readily available resuscitation equipment and drugs (including lipid emulsion), and a departmental protocol, should always be available for immediate use in areas where these blocks are performed.

### **Barriers to the use of regional anaesthesia in the emergency department**

Emergency physicians usually know how to apply a digital block (finger surgery), a wrist block (distal radius fracture) or intravenous regional anaesthesia (IVRA) but are seldomly trained in major regional anaesthesia techniques (i.e. central neuraxial or peripheral nerve blocks). A Canadian study revealed that many emergency physicians expressed an interest in expanding their knowledge and improving the integration of regional anaesthesia techniques into their skillset [24]. However, less than half of them felt comfortable using (ultrasound-guided) regional anaesthesia techniques and indicated the need for additional training, on-the-job practice, protocols and support from the nursing staff. Lack of formal training and lack of dedicated on-the-job practice result in being sceptical with a low level of satisfaction among emergency physicians as they did not feel comfortable with their current knowledge and the use of ultrasound-guided regional anaesthesia techniques.

Consequently, non-anaesthesiologist emergency physicians perform only a very limited number of blocks, and very seldom use the full breadth of available pain blocks on their patients, including the more advanced pain blocks [25]. In addition to adequately trained physicians, adequately trained nurses in regional anaesthesia and their procedures, monitoring and potential complications, are needed to provide safe anaesthesia to patients.

A lack of interdisciplinary communication, collaboration and support with other specialists, may be another reason for underuse of regional anaesthesia in the ED.

Furthermore, a lack of adequate equipment for use in regional anaesthesia, including the lack of point-of-care ultrasound machines and adequate monitoring of patients, is an important aspect. Hospitals need to address these vexing problems, stressing the importance of a departmental protocol, which needs to be available to create uniformity in treatment of patients. Other specialists should not see pain treatment as a disruption of patient flow at the ED. Indeed, sometimes the institution of a regional anaesthesia block is more time-consuming, and it can be challenging in patients in severe pain. Positioning the patient to expose the patient's back is required. Morbidly obese patient with extensive (fat) tissues between the skin surface and the target nerves, are often poor candidates for a regional block. Furthermore,

overcrowded and understaffed emergency departments are often overwhelmed by the huge flow of patients, so that not all patients will receive the timely care and attention they need. Many hospitals are teetering on the edge of being overwhelmed, especially in case of a pandemic or a mass casualty.

Pain treatment should receive sufficient priority to early initiate effective multimodal analgesia. This encompasses: a) patient screening for contra-indications; b) an electronic or standardised documentation process; c) a designated storage area for regional anaesthesia equipment and drugs; d) a point-of-care ultrasound machine and regional anaesthesia block supplies; and e) interdepartmental agreements to avoid delays in communication.

Although the incidence of systemic toxicity due to local anaesthetic overdose is low and regional anaesthesia is safe when performed by skilled hands, one should always prepare for the worst. Therefore, readily available resuscitation equipment and drugs (including lipid emulsion) should always be available for immediate use in areas where these blocks are performed.

Anaesthesiologists have another added value in teaching diverse valuable pain techniques to their non-anaesthetists ED colleagues, which will further improve team working, which is so essential in an ED.

## Conclusion

Anaesthesiologists are valued specialists, qualified to contribute to emergency medicine. They have added value in an ED as they are experts in providing support in problems related to airway, cardiac resuscitation, advanced life support, shock and allergic reactions and help stabilise and prepare patients for surgery. They can play an additional crucial role at ED in providing pain relief blocks in an incredible variety of pain conditions.

In this editorial, we focused on taking care of patients with hip fractures which are painful injuries that urgently need attention in an ED. Trained anaesthesiologists are the champions of ultrasound-guided regional anaesthesia to provide quick, safe and effective pain relief using nerve blocks. And with that, they are in an excellent position to provide teaching opportunities for their fellow emergency physicians. As such, patients with acute pain due to musculoskeletal injuries should no longer continue to suffer, while waiting for further work up and definite treatment. Superior analgesic effect of (ultrasound-guided) regional anaesthesia blocks should become within reach of every ED, avoiding the devastating side effects of opioids.

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**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

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