Regional Anaesthesia For Hip Fracture – Are We Measuring What Matters?

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Hip fracture is a common and painful injury that typically affects frail older adults [1]. Early and effective analgesia after hip fracture is important for humane reasons but also because pain contributes to the development of delirium in this population [2]. Despite this, hip fracture pain is often poorly managed within the first few hours [3, 4]. Even under ideal conditions, hip fracture pain can be challenging to treat given that older adults are particularly susceptible to the complications of NSAIDs (e.g. acute kidney injury, peptic ulceration) and opioids (constipation, respiratory depression, and delirium) [3].

Regional anaesthesia techniques have been hailed as a possible solution to this conundrum. Their use in the acute hip fracture setting is associated with improvements in pain, reduced opioid use, shorter hospital length of stay, and lower odds of delirium. A number of techniques are in use, including the femoral nerve, 3-in-1, fascia iliaca compartment block (FIB), and PENG blocks. However, such a range of options can paradoxically make it harder to scale up the use of RA techniques and a single technique would make it easier for generalist clinicians to "teach, learn, and improve their skills through repetition".

In the UK, FIB currently leads the pack and has become rapidly integrated into emergency medicine practice [1]. This block aims to deposit local anaesthetic within the fascia iliaca compartment to reach the femoral, obturator, and accessory obturator nerves. It is now recommended by national guidelines and competence in performing FIB is a requirement for completion of training in emergency medicine in countries such as the UK and Australia.

However, despite its pre-eminence in emergency medicine practice, the analgesic effects of FIB are reported to be modest [5] and anatomical studies suggest that local anaesthetic deposited within the fascia ilaca compartment often fails to reach all three nerves supplying the hip capsule[5]. There is also ongoing uncertainty around the technical delivery of FIB, e.g. infra-inguinal versus supra-inguinal and landmark versus ultrasound-guided approaches.

Into this maelstrom of uncertainty enters the pericapsular nerve group (PENG) block. This technique aims to overcome some of the limitations of FIB by targeting the same nerves more proximally to achieve denser anaesthesia of the anterior hip capsule [6]. PENG blocks are increasingly popular in anaesthetic practice but have not been widely adopted by emergency physicians (ref santi). Although evidence in favour of PENG blocks is growing, most trials have been led by anaesthetists in the peri-operative setting and it is not yet known how they compare when administered by generalist emergency physicians in the ED setting.

In this issue of *Anaesthesia*, Di Pietro et al report a single-centre randomised controlled trial (RCT) comparing PENG and FIB for hip fracture analgesia in the ED (ref santi). Sixty-four hip fracture patients with moderate to severe pain were randomised to receive either a FIB or PENG block, which was performed by an emergency physician using ultrasound guidance. Di

Pietro et al reported significantly reduced pain and reduced need for rescue opioids in the patients randomised to PENG. The implication is clear: PENG may offer superior early analgesia to FIB in the ED setting.

However, there are a number of reasons why the effectiveness of regional anaesthesia techniques can be difficult to measure meaningfully, particularly in the acute hip fracture context.

First, objective tests of nerve blockade (such as cold spray in the sensory distribution of the femoral nerve) do not directly measure the intended affect (i.e. analgesia) and are not patient-centred. Second, some patients with hip fracture have little pain at rest but experience severe pain on movement, such as during sleep, being transferred from trolley to bed, and when using a bedpan. Simple pain scores may therefore be misleading as patients are likely to be asked about pain when they are lying still on a trolley or bed. This is one possible reason why previous studies have reported little significant benefit of FIB in hip fracture. For example, one small trial reported that mean pain score at baseline in the FIB group was only 2.3 on a scale of 0 to 10. Dynamic assessments — such as pain during repositioning, use of a commode, or dressing changes — may better reflect clinical realities, but would be difficult to measure consistently and at fixed time points. Passive movements of the hip could be used as part of a dynamic assessment but risk inflicting unnecessary pain and worsening previously undisplaced intracapsular femoral neck fractures. Third, up to a quarter of patients with hip fracture have cognitive impairment[10] and may not be able to reliably communicate pain using a numeric rating scale. For this reason, patients with cognitive impairment are often excluded from evaluations of analgesic interventions in the hip fracture population. However, this is sub-optimal given the high proportion of patients with hip fracture that have cognitive impairment and the need for findings to be generalisable to this population. These patients are particularly important as they suffer disproportionately from untreated pain given their limited ability to verbalise distress.

Observer-reported outcomes such as the Face-Legs-Activity-Cry-Consolability (FLACC) scale, widely used in paediatrics, may be adapted for use in older adults, but are not yet validated [11].

Finally, it is not clear when pain should be assessed. Early pain relief is important for facilitating x-rays and moving patients between ED trolley and inpatient bed. However, longer term analgesia is important to provide therapeutic effect until the point of operation.

Di Prieto et al cleverly addressed this last challenge by choosing as their primary outcome the percentage of summed pain intensity difference (%SPID). This was determined using pain scores measured at baseline then at 5, 15, 30, and 60-minutes post-intervention. This measure has been used in previous studies and so there was sufficient pilot data available on which to power their randomised trial. However, %SPID does not overcome many of the other difficulties described in this commentary. In common with many hip fracture studies, Di Prieto et al chose to exclude patients with cognitive impairment but this decision undermines the generalisability of their findings to all patients with hip fractures.

One consequence of the difficulties in measuring regional anaesthesia effectiveness is that each study selects a different primary outcome. The result is a patchwork of outcome measures across studies, which hampers data synthesis, interpretation, and translation of findings into practice. It is also unclear how each study arrives at its choice of outcome measure, which is fundamentally entangled with value judgements about what matters most. What we need now is a validated measurement tool or core outcome set for evaluating pain interventions in the acute hip fracture setting. This is the next logical step before further studies are designed to answer important questions around FIB (e.g. landmark versus ultrasound; supra-inguinal versus inguinal) or to validate the finding of Di Prieto et al that FIB might already have been superseded by more effective techniques.

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