Pain management in acute hip fracture - SHFA March 2023

Advisory protocol from the Scottish Hip Fracture Audit Steering Group

This advice takes into account both the available evidence, and expert consensus from the Scottish Hip Fracture Audit Steering Group and others. Please note that this guidance is not intended to provide a set of rigid rules. In all patients a tailored approach is needed. Consider prior medication, drug allergies/intolerances, patient weight, comorbidities, stage of admission, and so on. Prioritise safety and seek senior medical or pharmacist advice if in doubt.

Key points

* Pain is distressing and is associated with harms such as delirium, poor mobility, and sleep disturbance. Use of opioids should not be avoided because of concerns about causing delirium.
* Patients often have little pain at rest but severe pain on movement.
* Up to half of acute hip fracture patients are unable to communicate effectively about their pain because of dementia and delirium and consequently these patients are more likely to experience poorly controlled pain.
* The severity of pain changes over time. Patients should be reviewed regularly and analgesia should be titrated accordingly.
1. Principles
	1. Offer multimodal analgesia

If no contraindications, offer the patient a nerve block on admission to hospital and at the time of surgery.

* 1. Take surgical procedure into account

Anticipate more pain in patients undergoing intramedullary nail procedures and less pain in patients undergoing sliding hip screw/pin and plate operations.

* 1. Measure pain using a 10-point scale
* Use a 10-point pain scale or local equivalent for all patients, adapting use for patients unable to communicate because of cognitive impairment or drowsiness through use of informant history, facial expressions and other non-verbal signs. See appendix for sample pain scale.
* Record pain scores on admission to hospital, with every set of observations, after interventions, and at other times appropriate to the patient.
	1. Assess pain at rest and pain on movement separately

Assess pain on walking or on physiotherapy, or in non-mobile patients the leg can be gently pin rolled.

* 1. Anticipate pain associated with physiotherapy sessions

Treat with short-acting potent analgesics such as alfentanil (see sample protocol below). This may require forward planning between physio and nursing staff.

* 1. Daily review of pain treatment and titrate analgesia

Medical staff or the acute pain team should perform assessment of analgesic adequacy at least twice daily. Titrate opioids to pain scores. Some patients may be able to stop regular opioids by around day 5 post-operatively: assess for this.

* 1. Kidney disease

Acute Kidney Injury (AKI) is common in hip fracture patients. If the patient is receiving morphine, active metabolite accumulation frequently leads to new opioid toxicity in the presence of AKI. This is less of a risk with oxycodone but can still occur. If the patient has Chronic Kidney Disease (CKD) refer to manufacturer guidance or the Renal Drug Database for dose adjustments or consult a pharmacist.

* 1. Opioid toxicity

Signs of opioid toxicity include drowsiness, reduced respiratory rate, pinpoint pupils and myoclonic jerks. Patients vary greatly in their vulnerability to toxicity. Monitor for these signs in all patients receiving opioids.

Other adverse effects that may occur with opioids include delirium, hallucinations, hyperalgesia, nausea and constipation. These adverse effects can be managed through dose reduction, trialling alternative opioids or prescribing medicines to manage these adverse effects, e.g. laxatives for constipation.

* 1. Discharge with appropriate analgesia

Include and communicate a plan for how this should be stepped down. This is important for patients being transferred to rehab wards as well as those being discharged home.

1. Sample multi-modal analgesia protocol
	1. Foundational analgesia

Paracetamol 1g oral FOUR times daily regularly

In patients <50kg reduce dose (e.g. to 500mg FOUR times daily). Refer to the BNF regarding hepatoxicity risk adjustments (e.g. patients with chronic high alcohol consumption).

Nerve block

1. First line choice
	* Ultrasound guided Fascia Iliaca block
	* 30ml+ of levobupivacaine or ropivacaine
2. Alternatives
	* Landmark Fascia Iliaca block
	* PENG block
	* 3-in-1 or femoral nerve block

NSAIDs are best avoided in most patients due to cardiac, renal and GI side effects. With senior input NSAIDS could be considered for short-term use in young (<65) patients.

* 1. Opioids

Below are suggested starting doses for patients not taking opioids before admission. The doses may need to be reduced with extreme old age, very low body mass, or severe frailty. Conversely, the doses may need to be increased for younger, more physiologically robust patients. See explanatory notes for the approach to those on opioids pre-admission. Note that the oxycodone to morphine dose conversion is 1.3-1.5 times here; some sources give a dose conversion of 2 times but here we have adopted a conservative approach. In all cases, titration to pain through frequent assessment is required.

NB: analgesia for movement pain should ideally be given before mobilisation or physiotherapy sessions if pain scoring has revealed significant movement pain. Alfentanil works in 5-10 mins whereas oxycodone and morphine should be given 30-60 mins prior to the painful event. Alfentanil 1mg/2ml solution for injection be used for sublingual administration. If the patient experiences significant pain during a physiotherapy session and requires intervention to allow the session to continue, alfentanil can be used for rapid pain control. After 5-10 mins the session can be restarted. Oral oxycodone or morphine will require a delay of 30-60 minutes before the full effect is achieved.

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|  | First line choice | Alternative |
| Rest pain | Oxycodone immediate release oral solution FOUR times daily | Age <85 dose 3mg  | Age≥85 dose 2mg  | Oral morphine solution FOUR times daily(NB avoid in AKI/CKD; use oxycodone or alternative) | Age <85 dose 4mg | Age ≥85 dose 3mg |
| Breakthrough analgesia | Oxycodone immediate release oral solution hourly when required | Age <85 dose 4mg | Age ≥85 dose 3mg | Oral morphine solution hourly when required((NB avoid in AKI/CKD; use oxycodone or alternative) | Age <85 dose 5mg | Age ≥85 dose 4mg |
| Acute control of movement pain (e.g. to cover physiotherapy session) | If required, alfentanil 5-10 mins) prior to mobilisation or if pain needs to be controlled during physiotherapy session | 100 micrograms (subcutaneous) or 200 micrograms (sublingual) | Breakthrough dose of oxycodone immediate release or oral morphine solution 30-60 mins prior to mobilisation (avoid morphine in AKI/CKD - use oxycodone or alternative) |

* 1. Laxatives

All patients receiving opioid analgesia should receive regular laxatives. Use a stimulant laxative in conjunction with an osmotic laxative.

E.g.: Senna 15mg once daily

 Lactulose 10ml twice daily or Macrogol 1 sachet twice daily

* 1. Anti-emetics

All patients should be prescribed anti-emetics PRN. Consider the parenteral route when prescribing anti-emetics. Avoid deliriogenic drugs such as cyclizine where possible.

1. Explanatory notes

How to do pain assessment: Measure pain scores both at rest and on movement. We recommend using the 10-point pain Numerical Rating Scale or local equivalent.

In patients unable to verbally communicate their pain because of cognitive impairment or drowsiness, the 10-point scale can still be used. Assess using facial expression, posture, and information from nurses and carers, quantifying using the 10 point scale. Movement pain can be assessed with gentle pin-rolling of the affected limb. Objective pain scales can be used (e.g. PAINAD, Abbey Pain Scale) but require appropriate training across the staff group and can be time consuming to use. Staff must be trained in the use of any pain assessment tools in clinical use.

Pain is a cause of distress and restlessness but always assess for urinary retention, delirium, constipation, and other causes.

When to measure pain scores:

* on admission to hospital
* 30 mins after pain intervention such as nerve block or titrating opioids
* hourly until pain is controlled
* with every set of observations

Daily pain review and titrating drugs to pain: In the early phase this can be challenging. Thorough pain reviews in conjunction with frequent pain score assessments should be done at least daily by medical staff or the acute pain team. Take into account pain scores at rest and pain scores on movement and look carefully for signs of opioid toxicity or side effects. Titrate opioid doses accordingly, altering regular opioid doses for rest pain and breakthrough/mobilisation opioid doses for mobilisation pain. Ensure constipation and nausea have been adequately treated.

Oxycodone versus morphine: oxycodone is recommended first-line rather than morphine for these reasons: (a) in the presence of acute kidney injury or chronic kidney disease, oxycodone metabolites are much less likely to accumulate and cause opioid toxicity than morphine metabolites, (b) oxycodone has a more predictable bioavailability than morphine, leading to a more predictable response, (c) oxycodone may be less likely to cause delirium than morphine. However, oral morphine solution 10mg/5ml is treated as a Schedule 5 Controlled Drug in the UK meaning that in some wards it can be carried on the drug trolley and administered by one person, leading to a significant advantage in reduction of nursing workload compared with other opioids. For this reason, some centres may opt to use morphine as the first line opioid in patients with no evidence of renal failure.

Use of sustained-release opioids in the acute phase: sustained release opioids are not recommended for acute hip fracture patients. This is because of the risk of opioid toxicity, poorer pain control despite higher doses and the loss of flexibility with respect to being able to titrate rapidly in a predictable way. They can however be considered from day 5 onwards in patients with stable pain or predictable analgesic requirements and may be better reserved for younger and more robust patients. Sustained-release opioids should not newly be provided on discharge home from hospital after acute hip fracture.

Alfentanil for rapid pain relief: we advise that alfentanil is prescribed for use to provide rapid pain relief especially when a patient is experiencing pain during a physiotherapy session. Patients commonly have acceptable pain control at rest but when undergoing physiotherapy cannot proceed because of pain. Alfentanil can provide rapid pain relief that can then allow the session to continue. Alfentanil works within a small number of minutes and lasts for 10-15 minutes, as opposed to oral oxycodone which takes 30-60 minutes to reach peak effect. Alfentanil can also be used to relieve severe pain when oral oxycodone is not appropriate because of the delay in relieving pain.

Patients on regular opioids pre-fracture: this is common and can range from 8/500 co-codamol to large doses of sustained-release oxycodone or morphine, or fentanyl patches. It is essential that an accurate medication history is taken to ensure pre-admission analgesia is considered to manage acute on chronic pain. The approach in acute hip fracture varies from patient to patient. Smaller opioid doses such as involving codeine and dihydrocodeine can usually be converted to the advised doses of oxycodone (or morphine as an alternative) though the doses may need to be increased. Higher pre-admission opioid prescriptions should be continued with the addition of either (a) regular immediate release oxycodone or morphine doses equivalent to approximately a 10% increase in morphine equivalent dosing, or (b) a similar percentage increase in the sustained release prescription. Overall, a conservative approach with use of immediate release drugs to allow for rapid and safe titration is advised.

Step-down: some patients may be able to stop opioid dosing by post-operative day 5, or even sooner if clinically appropriate. If opioids are still required from day 5 onwards, consider dose reduction in oxycodone or morphine if this is appropriate and stop when possible. If ongoing opioid therapy is required after discharge, the choice of drug depends on the context, e.g. whether going home or to a care home. Low dose codeine is an acceptable choice for patients being discharged home though some patients may be able to use low dose strong opioids in liquid form (though this should be risk assessed by a pharmacist).

Fascia-Iliaca blocks: fascia-Iliaca blocks are safe and easy to perform. In patients without contraindications this procedure should be performed as soon as possible after diagnosis, preferably in the Emergency Department, and should be repeated intra-operatively. The procedure can be repeated pre-operatively if there is a delay to surgery or if the patient experiences severe pain which has not responded to opioid analgesia. Ultrasound guidance has been shown to increase block success compared with a landmark-based technique, however the expertise to perform ultrasound guided blocks may not be available in emergency departments. Transfer from ED to the ward should not be delayed by waiting for a nerve block. Instead, transfer should be expedited and the nerve block should be performed as soon as possible on the ward.

Pain team involvement: strongly consider referral to the pain team if the patient is complex, for example:

* + if the patient is on long-term high dose opioids pre-admission the patient is taking other analgesic agents such as gabapentin or pregabalin
	+ patients on methadone or buprenorphine for opioid substitution therapy if the pain proves difficult to treat e.g. the patient has a higher level of pain than expected
	+ the patient develops opioid toxicity alongside poorly treated pain

Injuries/operations associated with a higher risk of severe pain: certain types of injury or operation have a higher risk of pain, e.g. femoral shaft fractures and use of an intramedullary nail. Such patients may need higher doses.

Laxatives and use of suppositories or enemas: most patients should be prescribed senna alongside an osmotic laxative such as macrogol or lactulose. Some patients find it difficult to drink macrogol in sufficient quantities and lactulose is a suitable alternative. We advise that if a patient is constipated at day 3 post-operatively then use of glycerol suppositories or an enema (e.g. sodium citrate or phosphate enema) is strongly considered.

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On behalf of the Scottish Hip Fracture Audit (approved by the Steering Group)

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