7. Acute pain management in elderly patients

As a greater proportion of the population falls into the 'elderly' category (aged ≥ 65 years), more and more elderly patients are presenting for treatment of acute pain. Medical conditions which often lead to acute pain are more likely in older adults.

These conditions include the following:

- Acute exacerbations of arthritis
- Osteoporotic fractures
- Cancer
- Acute medical conditions, such as ischaemic heart disease, vascular disease and herpes zoster
- Traumatic injuries
- Surgery

7.1 Factors affecting pain control in elderly patients

Factors that make effective pain control more difficult in elderly patients include age-related alterations in pharmacokinetics and pharmacodynamics, an altered perception of pain and potential difficulties in assessment, diminished physiological reserve and concurrent diseases, and polypharmacy which leads to an increased risk of drug interactions.

In addition, the elderly may fail to report pain because they think it is a common aspect of ageing, they acquiesce to family members/medical staff, or they have fears about intervention or the unwanted effects of analgesics, especially opioids.

7.1.1 Age-related alterations in pharmacokinetics and pharmacodynamics

Age-related alterations in pharmacokinetics and pharmacodynamics occur as a result of the progressive physiological decline because of increasing age and the increasing likelihood of concurrent disease. These changes are summarised in Table I.

Table I: Physiological changes in older people, resulting changes in pharmacokinetic and pharmacodynamics variables and consequences for pharmacological treatment (2020 ANZCA Pain Guidelines)

Bodily system or process	Parameter and changes	Resulting pharmacokinetic/ pharmacodynamic changes	Changes in pharmacological treatment
Body composition	Body fat 10–50%	For lipophilic medicines Vd t1/2	Calculate doses of lipophilic medicines on total body weight
	Muscle 20%	No relevant effect	None
	Body water 10%	For hydrophilic medicines Vd	Calculate doses of hydrophilic medicines based on lean body weight
	Plasma volume ↔	None	None

Liver	Liver size 25–40%	Bioavailability of oral medicines	↔ IV bolus dose oral dose of some medicines
	Hepatic blood flow 25–40%	Hepatic clearance (CL) of high extraction medicines (e.g. morphine)	
	Phase 1 metabolism 25%	Hepatic CL of some low-extraction medicines (e.g. ibuprofen)	Maintenance doses of some medicines (e.g. morphine)
Heart	Cardiac output ↔ or to 20%	Central compartment volume	Initial IV bolus doses
		Peak concentration after IV bolus	IV injection speed
Central nervous system (CNS)	Cerebral blood flow, volume and metabolism 20%	Distribution to the CNS	Minimal clinically relevant changes for most drugs, but: bolus doses of medicines during titration maintenance doses of some medicines
		Apparent volume in the CNS	
	Blood–brain barrier transport (medicine-specific effect)	Apparent volume in the CNS Apparent increase in CNS sensitivity	
Absorption of medicines	Oral and transmucosal absorption	No relevant effect of ageing	However, oral bioavailability of some medicines due to first-pass effect
	IM absorption	↔	None
	SC absorption	↔	None
	Transdermal absorption	Hydrophilic medicines ↔ lipophilic medicines	No clinically relevant effect for transdermal (TD) opioids
Protein binding of medicine	Plasma albumin 20%	Unbound fraction of medicines	
	Alpha-1-acid glycoprotein 30–50%	Cerebral uptake of medicines ↔ hepatic clearance of high-extraction medicines hepatic clearance of low-extraction medicines	Possibly changed clearance and oral bioavailability Possibly changed cerebral effects
Kidneys	Kidney size 30%	clearance of renally excreted medicines ↔ effect on opioids, but often clearance of metabolites (e.g. morphine [M6G], tramadol [M1])	Maintenance dose of renally excreted medicine (alpha-2-delta ligands: gabapentin, pregabalin) or medicines with renally excreted metabolites (morphine, tramadol, pethidine) Monitor for accumulation of renally excreted medicines

The information in Table I centres on opioids, given its widespread use. These changes have variable prevalence and are generally attributable to ageing alone. However, these changes may be compounded by a higher incidence of degenerative and other concurrent diseases in elderly patients.

7.1.2 Altered perception of pain and potential difficulties in assessment

The assessment of pain, and the evaluation of the efficacy of treating this pain, are often more difficult in elderly patients. This may be due to differences in pain perception and the reporting of pain, cognitive impairment and difficulties in measuring pain. Thresholds to pain are often increased in elderly patients, making diagnoses more difficult in conditions such as acute myocardial infarction (MI) and peritonitis, where pain is usually the presenting symptom. Importantly however, pain tolerance can be reduced in elderly patients, necessitating its immediate treatment. Elderly patients often underreport pain for a number of reasons, including fear, anxiety, depression and cognitive impairment. Cognitive impairment may make the measurement of pain very difficult, especially if the patient is noncommunicative. Behaviour, such as restlessness, grunting and grimacing, needs to be assessed in these circumstances.

The need for specific methods to assess pain in elderly patients is recognised in international guidelines. There is also a need to educate healthcare staff in the use of patient-appropriate pain assessment tools in order to make valid assessments of pain in elderly patients.

7.1.3 Diminished physiological reserve and concurrent diseases

Diminished physiological reserve and concurrent diseases can affect many analgesic drugs, as well as the techniques employed. Thus, the dose and duration of effect of anticoagulant drugs may be altered. This is relevant if regional techniques are used.

7.1.4 Polypharmacy, leading to an increased risk of drug interactions

Polypharmacy is particularly relevant when elderly patients receive PCA. The concomitant administration of long-acting CNS depressants (e.g. benzodiazepines) should be avoided.

7.2 Measurement of pain

7.2.1 Patient self-report measures of pain

Unidimensional measures of pain intensity are more commonly used than multidimensional measures to quantify pain in the acute pain setting. Unidimensional measures used in younger adult patients, which have been shown to be appropriate for use in elderly patients, include the verbal numeric rating scale (VNRS), FACES pain scale (FPS), verbal descriptor scale (VDS) and the NRS, while there is equivocal support for the use of the VAS.

Testing of different self-assessment scales may be warranted, including in patients with severe impairment, as elderly patients may need more time to understand and respond to questions regarding pain. Immediate reports of present pain may be reasonably accurate and as valid as reports of cognitively intact patients, but recall of past pain is less likely to be as reliable.

7.2.2 Other measures of pain

Assessment of pain in noncommunicative patients is more difficult. Behaviours such as restlessness, frowning and grimacing, or sounds such as grunting or groaning, have been used in attempts to assess pain. In cognitively intact adults, some of these behaviours have been shown to correlate with patient self-report of pain. However, these may not always be valid indicators of pain in the nonverbal adult and can be difficult to interpret.

More than 28 different observational pain assessment scales have been developed and are used in patients with varying degrees of dementia. Scales with the strongest evidence of usefulness in patients with dementia include FPS, Abbey Pain Scale (APS), Pain Assessment in Advanced Dementia (PAINAD – a simple, reliable and validated five-item observational tool), Pain Assessment Checklist for Seniors with Limited Ability to Communicate (PACSLAC), and Mobilization-Observation-Behavior-Intensity-Dementia Pain Scale (MOBID).

7.3 Analgesic techniques in the elderly

As with younger patients, multimodal drugs and techniques should be used and drugs should be titrated in a 'start low, go slow' manner.

7.3.1 Patient-controlled analgesia

PCA should not be withheld from elderly patients simply because of their age. The basic requirements for PCA are that the patient must fully understand the technique, that breakthrough pain must be reported, and that there are no contraindications to its use. It is suggested that the size of the bolus dose should be reduced and a continuous background infusion should be avoided.

7.3.2 Epidural analgesia

Elderly patients can be safely managed with an epidural, providing there is appropriate monitoring and staff education. The following are five important guidelines regarding opioid analgesia in elderly patients:

- The epidural opioid requirements decrease with increasing patient age.
- The spread of a given volume of local anaesthetic drug in the epidural space is greater in elderly patients; it is advised that lower doses and infusion rates are used.

- Elderly patients may be more prone to side effects (e.g. hypotension) and spinal stenosis may predispose them to neurological complications.
- Elderly patients are more likely to have ischaemic heart disease where coronary blood flow may be reduced rather than increased in response to sympathetic stimulation.
- Many elderly patients may be taking anticoagulants as chronic medication, therefore, neuraxial analgesia may not be feasible.

Analgesic drugs in the elderly are outlined in Table II.

Clinical practice points are as follows:

1. Pain thresholds increase in elderly patients, but their pain tolerance decreases.
2. PCA and epidural analgesia are more effective in elderly patients.
3. Acute pain may be underreported.
4. Self-report measures of pain can be used in elderly patients, as opposed to other measures.
5. There is an age-related decrease in opioid requirements in elderly patients.
6. Extreme caution is required with the use of NSAIDs and COX-2 inhibitors in this age group.
7. Paracetamol is the preferred non-opioid analgesia, except in frail patients.

Table II: Analgesic drugs in elderly patients

Opioids	Pure agonists are good, but the dose should be decreased in the event of renal dysfunction. The effective duration of a single dose can be increased, if desired. Pruritis, nausea and vomiting decrease with opioid use. Thus, the routine administration of antiemetics is not recommended owing to their side effects. Agonist-antagonists are not recommended because of the increased incidence of delirium.
Pethidine	Pethidine is best avoided because a significant accumulation of the metabolite norpethidine might occur. It can also cause cognitive dysfunction.
Fentanyl	Fentanyl is a good drug in elderly patients, particularly those with renal impairment. It also causes less confusion than other analgesic drugs.
Tramadol	The elimination half-life is prolonged with tramadol. Thus, elderly patients require lower daily doses.
Local anaesthetic drugs	Clearance may be decreased with local anaesthetic drugs, so lower doses should be used.
NSAIDs and COX-2 inhibitors	There is an increased risk of complications, such as renal impairment, cardiac failure and hypovolaemia. There is an increased risk of gastrointestinal side effects and an increase in cognitive dysfunction in frail elderly patients who take NSAIDs.

Paracetamol	Paracetamol is a safe drug in the elderly. There is no need to reduce the dosage unless the patient is very frail.
Nitrous oxide	Ideally, nitrous oxide should not be used in elderly patients because of the likelihood of vitamin B_{12} deficiency occurring.

COX – cyclo-oxygenase, NSAIDs – nonsteroidal anti-inflammatory drugs, PCA – patient-controlled analgesia