

London Major Trauma system

Management of Older Major Trauma Patients

Third Edition

April 2021



Abbreviations

AHP	Allied health professional
BOAST	British Orthopaedic Association Standards for Trauma
BP	Blood pressure
CXR	Chest X-ray
DNACPR	Do not activate cardiopulmonary resuscitation
DOAC	Direct oral anticoagulant
DoLS	Deprivation of liberty safeguards
ED	Emergency department
HCA	Healthcare assistant
IEP	Image exchange portal
INR	International normalised ratio
MTC	Major trauma centre
MDT	Multidisciplinary team
NICE	National Institute for Health and Care Excellence
NS	Neurosurgeon
ONS	Office for National Statistics
PCC	Prothrombin complex concentrate
PHC	Pre hospital care
SCI	Spinal cord injury
SLT	Speech and language therapy
TARN	Trauma audit research network
TBI	Traumatic brain injury
TTL	Trauma team leader
TU	Trauma unit (hospital designation, not ward designation)
VTE	Venous thromboembolism
WBCT	Whole body CT scan

* The terms families, relatives and next of kin are used within this guidance. However not every older patient will have family/relatives available to support decision making. In such cases health advocates or close friends of the patient may be involved to support decision making in the best interests of the older person.

Table of contents

Abbreviations.....	2
Executive summary.....	4
Definitions.....	4
Key principles for the early management of trauma in older people.....	5
Clinical guidance for care of older trauma patients	
Admission policy for older trauma patients MTCs.....	6
Admission policy for older trauma patients TUs.....	8
Neurotrauma.....	11
Spinal injuries.....	13
Pelvic injuries.....	15
Complex limb injuries.....	16
Chest injuries.....	17
Anticoagulation / reversal of DOAC effect.....	19
Falls prevention.....	20
Nutrition.....	22
Psychosocial elements.....	23
Governance standards.....	24
References.....	25
Appendix 1: ED screening tool for trauma in older people.....	26
Appendix 2: Management of delirium in older trauma patients.....	27
LMTS Older trauma guideline group/contributors.....	30

Executive summary

There are 12.5 million people aged 65 or over living in the UK. This is the fastest growing age group, and the Office for National Statistics (ONS) estimates that by 2040 one in four people in the UK will be aged 65 or over¹. The ageing of the population has meant that the incidence of traumatic injury in older people is rising in both absolute numbers and as a percentage of national trauma admissions annually. The 2017 Trauma Audit Research Network (TARN) report, *Major trauma in older people* highlighted that the proportion of older trauma patients in England and Wales was increasing², and **low level falls remain a leading cause of severe injury in this group**.

All older major trauma patients should receive the same standards of care as for any other major trauma patient. Trauma networks should ensure that geriatricians are involved in the development and/or review of local older people's trauma policies and guidance³. All staff working with trauma in older people should be trained to understand the effects of altered physiological reserve and increased comorbid diseases common in older patients. Trauma courses and orientation programmes at major trauma centres (MTCs) and trauma units (TUs) should include the principles of assessing and managing older injured patients.

The overall aim of this third edition is to continue to support improvements in the recognition of injury, clinical management, outcomes and experience for older trauma patients and their families.

Admission pathways for MTCs and TUs have been supplemented with ageing-specific suggestions for the clinical management of major trauma in older people. Rehabilitation priorities have been added to clinical topics. More guidance is provided on falls assessment and a section on nutrition in older trauma has been included. Guidance in this report should be used in conjunction with the existing local older people specific policies, NICE guidance NG39, *Major trauma: Assessment and initial management*⁴ and Major Trauma MTC and TU Quality Indicators⁵.

At a network, MTC and TU level there should not be a requirement to develop multiple clinical guidelines specifically for older major trauma. **Given the identified and continued rise in the proportion of older patients within the trauma system, it is more appropriate that all local and network guidelines relating to trauma should include elements which are specific to older and/or frail patients.**

Cite this document as: Pan London Major Trauma System Management of Older Trauma. Third Edition, April 2021. https://www.c4ts.qmul.ac.uk/downloads/london-major-trauma-system-older-trauma-guidance_third-editionApril2021.pdf

Definitions

Published reports on the care of the older trauma patient lack consensus for the definition of which age may be considered 'older'.

For the purposes of this document, **older** is defined as a *patient aged 65 years or more*. We acknowledge that this may vary amongst clinical settings and patients.

Major trauma is defined as *serious and often multiple injuries where there is a strong possibility of death or disability*⁶.

Key principles in the management of trauma in older people

- Ageing, comorbid disease, medications and frailty may all affect the expected physiological presentation of major trauma in older people.
- Older trauma patients may not present with an obviously significant mechanism. Trauma team training in older trauma, experienced ED clinician review or use of screening tools should enable early identification of all injuries.
- Consider timely anticoagulant reversal during the initial assessment of all older trauma patients.
- Obtain a collateral history and medicines review as soon as possible after admission.
- All clinical, nursing and therapies assessments should identify the presence of pain and instigate management. In older trauma patients with cognitive impairment, staff should look for the non-verbal manifestations of pain.
- Involve therapists early in the patient pathway (within 24 hours if possible). Specialised assessment and intervention will help to maximise recovery and minimise adverse outcomes.
- Prioritise early, appropriate repatriation to ensure older patients receive care closer to home.
- In cases of futility and for those requiring palliative care post injury, early discussion with the relatives is essential.
- Improving outcomes for older major trauma patients requires effective multi-disciplinary working, and network/MTC/TU specific agreements must facilitate this.

Frailty

Early frailty identification is to augment decision making and expedite access to specialist geriatrician services, not to deny access to care.

For more information visit <https://www.cgakit.com/cga>



Clinical guidance | Admission policy: MTCs

Who this applies to

This policy applies to adult patients aged 65 years and over (but this could be younger if frailty is deemed an issue in patients younger than 70) who are admitted to an MTC following traumatic injury. This policy also applies to the early identification of older trauma patients admitted to critical care.

Which clinical team is responsible?

It is presumed that an adult patient requiring care for their traumatic injuries in an MTC will be admitted under the general trauma service (this may be led by the weekly trauma surgical service or trauma and resuscitation anaesthetic service) or a specialty team who manage specific traumatic injuries (e.g. orthopaedics, general surgery, cardiothoracics, plastics, neurosurgery).

Older trauma patients should receive the same trauma care following admission as that given to younger adults (those under 65 years of age).

Older patients should be admitted to a setting where staff have received training in the clinical, nursing and rehabilitation of older trauma patients.

In the emergency department

MTCs should ensure that staff training includes awareness of trauma team activation for lower energy mechanisms, such as simple or low level falls in older patients (currently reflected in Pre hospital care [PHC] triage tools). On arrival to hospital, older patients should have their injuries assessed by the trauma team, who have the necessary knowledge and skills to identify the patient's injuries, complete resuscitation, immediate management, and conduct an appropriate secondary survey.

Patients should also be assessed for any immediate concomitant issues or exacerbation of comorbidities to include at least 12 lead ECG, blood tests, postural blood pressures (at a clinically appropriate time point), cognitive assessment and chest X-ray (CXR) if not undergoing CT imaging. Pre-admission functional status, co-morbidities, advanced directives and patient's wishes should be ascertained at the earliest opportunity and taken into account when deciding about suitability for admission to critical care, ceilings of care and do not activate cardiopulmonary resuscitation (DNACPR) orders. Next of kin should be involved in discussions if the patient lacks capacity.

Immediate reversal of anticoagulation should take place in the ED prior to ward admission. (See *local network guidance* and page 19 for further information.)

Unless absolutely necessary (due to injury, haemodynamic instability or urinary retention), urinary catheters should be avoided in the older patient due to the increase in UTI, delirium and associated length of stay⁶.

Prior to the patient leaving the ED, the status of movement allowed for the protection of spinal injuries or pelvic injuries should be documented and communicated with the care team.

Potential safeguarding issues should be considered and escalated as per the trust pathway.

On admission to hospital the older patient should receive the following

- » Pain assessment and management plan. (Patients with altered cognition may not be able to verbally express pain. Therefore, nonverbal cues should be carefully monitored.)
- » Pressure area assessment and plan.
- » Venous thromboembolism (VTE) assessment and plan.
- » Multifactorial falls assessment and intervention strategies based on individual risk (see page 20).
- » Delirium, dementia and cognitive assessment (see appendix 2, page 29).
- » Alcohol dependency screen.
- » Frailty assessment (e.g. clinical frailty score or other validated score).
- » Nutritional assessment.
- » Check for any advanced directive/DNACPR (if not already ascertained).

Within 24 hours of admission the older patient should receive

- » Tertiary survey of injuries.
- » Daily consultant led multidisciplinary team (MDT) discussion.
- » Medicines reconciliation.
- » Check for any advanced directive / DNACPR (if not already ascertained).

Within 72 hours of admission the older patient should receive

- » Review and assessment by a Registrar or Consultant Geriatrician.
- » Comprehensive geriatric assessment (performed collaboratively by the MDT).
- » Assessment for mental health or psychological disturbance (e.g. self-harm, victim of violent crime, domestic or elder-abuse).
- » Confirmation of collateral history of pre-admission functional and physical status (i.e. further details gained from primary care, coordinate my Care, family, carers etc.).
- » Mobilisation and rehabilitation assessment at the earliest opportunity with input from physiotherapy, occupational therapy, speech and language therapy and other allied health professionals as indicated.
- » Consideration of advanced care planning or palliative care referral for those with advanced frailty in whom prognosis is poor and there has been a lack of response to treatment (be aware that older people may take longer to respond to treatments or recover from their injuries and reversible causes such as hypoactive delirium should be excluded before pursuing palliative management).

During inpatient stay the older patient should receive

- » Bone health and multifactorial falls prevention assessment.

Care pathway / Discharge planning

» Discharge assessment, with estimated length of stay and identification of need for repatriation for ongoing care and rehabilitation, should occur within 24 hours of admission. Where clinically appropriate this should include those with expected poor prognosis.

» Regular reviews of rehabilitation needs and early goal setting during admission to optimise the patient pathway.

» Repatriation documentation to be prepared for transfer to trauma unit. This should include the rehabilitation prescription, image exchange portal (IEP) transfer of images and treatment summary for GP on transfer of care as per local network repatriation policy.

» Each TU should have a trauma coordinator (or similar role) responsible for overseeing patient repatriations. The trauma coordinator should be made aware of the patient's age and any older person specific needs prior to repatriation.

» Pharmacy requirements to be addressed (e.g. need for dosette boxes on discharge).

» MTC follow up appointments should be booked and patient/relative informed.

» There should be early MDT discussions regarding appropriate available discharge options, depending on clinical needs and local commissioned services, e.g. Repatriation / Home / home with care package / inpatient rehab / interim placement / non weight bearing pathway / community therapy / charities and support groups. Consider dual plans where appropriate (i.e. repatriation vs home).

Post discharge

» TARN data should be completed within 28 days from admission.

Clinical guidance | Admission policy: TUs

Who this applies to

This policy applies to adult patients aged 65 years and over (could be younger if frailty deemed an issue in patients younger than 65) who are admitted to a TU following trauma. This policy also applies to the early identification of older trauma patients admitted to critical care.

Which clinical team is responsible?

Each TU which admits older trauma patients should determine which surgical specialty will lead the patient's care on their site specific guideline. In those who do not have injuries requiring surgical intervention (e.g. minor head injury or minor chest injury) the patient can be admitted under the care of the geriatric team, except for those with specific orthopaedic injuries where orthogeriatric review should be provided. When admitted under surgical specialties, the patient should be reviewed daily by specialty team, with geriatric consultation or review as indicated.

A trauma coordinator (or similar role) will identify older trauma patients on repatriation from MTC to TU.

Older patients should be admitted to a setting where staff have received training in the clinical, nursing and rehabilitation of older trauma patients.

In the emergency department

TUs should ensure that staff training includes awareness of trauma team activation for lower energy mechanisms, such as simple or low level falls in older patients. Current prehospital triage tools screen for older people's trauma but have a low sensitivity for conveyance to an MTC. TUs should therefore be prepared for this and screen for older people's trauma at triage.

The presence of injury is not always apparent and it is recommended that TUs adopt a screening triage tool for use in the ED. Triage nurses should use the tool on patients that self-present or arrive by ambulance. Fulfilling a criterion on the tool prompts an immediate senior doctor (ST4+) review to assess for major trauma (see Appendix 1 page 28). This senior doctor review involves a primary survey, decision regarding trauma team activation, analgesia, appropriate imaging and management.

Ongoing clinical care can be provided by other members of the ED team if appropriate but initial assessment by a senior doctor has been shown to reduce the rate of missed injuries.

On arrival to hospital, older patients **with known or potential major injuries** should have a full trauma team assessment. This should be conducted by those with the necessary knowledge and skills to identify the patient's injuries, complete resuscitation and immediate management, and conduct an appropriate secondary survey.

TUs should have a policy for trauma assessment of older inpatients who fall whilst a hospital inpatient or for those who deteriorate post trauma admission. This policy may include transferring the patient back to ED for trauma team activation and rapid access to imaging and/or transfer, depending on local resource availability.

Patients should also be assessed for any immediate concomitant issues or exacerbation of comorbidities – to include at least 12 lead ECG, blood tests, postural blood pressures (at a clinically appropriate time point), cognitive assessment and CXR.

Pre-admission functional status, co-morbidities, advanced directives and the patient's wishes should be ascertained at the earliest opportunity and taken into account when deciding about suitability for admission to intensive care, ceilings of care and do not activate cardiopulmonary resuscitation (DNACPR) orders. Next of kin should be involved in discussions if the patient lacks capacity.

Additional imaging may be required before a decision about requirement for stepped up MTC level care is made.

Based on the injuries identified, a discussion with the MTC liaison (or specialty team, such as neurosurgery for isolated non-time-critical head injury) should take place so that a decision has been made whether the patient requires MTC admission. The result of this discussion should be clearly documented in the patient notes.

The MTC will provide clinical support for the patient if they are not transferred, in the form of ongoing management guidance or follow up by a specialist if required

Clinical guidance | Admission policy: TUs

Immediate reversal of anticoagulation should take place in the ED prior to ward admission. (See *local network guidance and page 19 for further guidance*.)

Unless absolutely necessary (due to injury, haemodynamic instability or urinary retention), urinary catheters should be avoided in the older patient due to the increase in UTI, delirium and associated length of stay⁶.

Prior to the patient leaving the ED, the status of movement allowed for the protection of spinal injuries or pelvic injuries should be documented and communicated with the care team. Status of clearance of cervical or other spinal injuries should be documented within one hour of imaging reporting.

Potential safeguarding issues should be considered and escalated as per the trust pathway.

On admission the older patient should receive

- » Pain assessment and management plan. (Patients with altered cognition may not be able to verbally express pain. Therefore, nonverbal cues should be carefully monitored.)
- » Pressure area review and plan.
- » VTE review and plan.
- » Multifactorial falls assessment and intervention strategies based on individual risk. (See *page 20*).
- » Delirium, dementia and cognitive assessment. (See *appendix 2, page 29*).
- » Alcohol dependency screen.
- » Frailty assessment (e.g. clinical frailty score or other validated score).
- » Nutritional assessment.
- » Check for any advanced directive / DNACPR (if not already ascertained).

Within 24 hours of admission the older patient should receive

- » Tertiary survey of injuries.
- » Daily consultant led MDT discussion.
- » Medicines reconciliation.
- » Check for any advanced directive / DNACPR (if not already ascertained).

Within 72 hours of admission the older patient should receive

- » Review and assessment by a Registrar or Consultant Geriatrician.
- » Comprehensive geriatric assessment (performed collaboratively by the MDT).
- » Assessment for mental health or psychological disturbance (e.g. self-harm, victim of violent crime, domestic or elder-abuse).
- » Confirmation of collateral history of pre-admission functional and physical status (i.e. further details gained from primary care, coordinate my Care, family, carers etc.).
- » Mobilisation and rehabilitation assessment at the earliest opportunity with input from physiotherapy, occupational therapy, speech and language therapy and other allied health professionals as indicated.
- » Consideration of advanced care planning or palliative care referral for those with advanced frailty in whom prognosis is poor and there has been a lack of response to treatment (be aware that older people may take longer to respond to treatments or recover from their injuries and reversible causes such as hypoactive delirium should be excluded before pursuing palliative management).

During inpatient stay

- » If there is a change in clinical status due to progression of injury or identification of missed injury, staff should contact the MTC liaison (as per local guidance), or specialty team for isolated injuries. Consult local network policy for trauma in-patients requiring emergency onward transfer to MTC.
- » Bone health and multifactorial falls prevention assessment.

Clinical guidance | Admission policy: TUs

Care pathway / Discharge planning should include

- » Discharge assessment with estimated length of stay within 24 hours of admission and where clinically appropriate incorporating those with expected poor prognosis.
- » Regular reviews of rehabilitation needs and early goal setting during admission to optimise the pathway.
- » Discharge summary for GP to ensure follow up reviews as indicated.
- » Review of pharmacy requirements (e.g. need for dosette box on discharge).
- » Booked follow up appointments; patient/relative(s) informed.
- » There should be early MDT discussions regarding appropriate available discharge options, depending on clinical needs and local commissioned services, e.g. Repatriation / Home / home with care package / inpatient rehab / interim placement / non weight bearing pathway / community therapy / charities and support groups. Consider dual plans where appropriate (i.e. repatriation vs home).

Post discharge

- » TARN data should be completed within 28 days from admission.



Clinical guidance | Neurotrauma

This includes patients with suspected or confirmed brain injury.

Diagnosis of brain injury

Trauma clinicians require an increased awareness of potential neurological injury in all older trauma patients. There should be a low threshold for initiating a 'trauma call' and obtaining a head CT scan in the older patient, especially in the following presentations:

- » When known or suspected to have sustained head injury.
- » Following a low level fall (e.g. from standing or sitting).
- » When taking prescribed anticoagulant medication.
- » When there is no clear medical cause of fall or unclear reason for ED attendance.

These suggestions are in light of the perceived number of older patients who present as a 'collapse' and who, after admission, are found to have an acute or chronic subdural haematoma.

In the emergency department

Where an older patient has clear external signs of head injury **or** has neck pain **or** has endured a fall, **and** if a decision has been made to CT the patient's head, this should include the cervical spine. (See *section on spinal immobilisation on page 13.*) Any injury with acute intracranial blood identified via the CT report should result in a discussion with the MTC team (ED/ trauma consultant or neurosurgeon, dependent on local policy), and such referrals should be logged and documented by the referrer and the advisor. As per the suggested ED screening /triage tool (See *appendix 1, page 28*) the presence of blood on CT head should trigger review of other potential traumatic injuries by experienced trauma clinician or a delayed trauma call.

Anticoagulated patients with a head injury and normal initial CT head may require a repeat scan. There is no clear evidence for optimum timeframe for this repeat CT, thus local policy or a senior clinician should decide based on mechanism, frailty, social support and degree of anticoagulation.

Anticoagulation reversal in traumatic brain injury (TBI)

Patients on warfarin with intracranial bleeding should receive prothrombin complex concentrate (PCC) in addition to vitamin K, unless the bleed is extremely small and risk of procoagulation is considerable. In those patients known or suspected to be on anticoagulants, an INR test should be completed as soon as possible. (Point of care testing may be required.) **Anticoagulant reversal should be carried out within one hour of the decision to reverse.** However, it is suggested that PCC should be immediately available in the ED⁷. (See *page 19 for advice on patients prescribed direct oral anticoagulants, DOACS.*)

Administration of platelets should be considered if the patient is taking any antiplatelet therapy⁸.

Restarting anticoagulation after TBI

In the absence of robust evidence in this field, **individualised treatment plans balancing risk of thrombosis and bleeding made in collaboration with geriatric and neurosurgical teams are required.** In minor TBI, early initiation of LMWH may be appropriate after admission. Timing of restarting anticoagulation should be clearly documented.

Holistic and ongoing care for older people with neurotrauma

Senior staff in trauma units should be able to discuss management with family/next of kin as advised by the MTC team (usually neurosurgical advice). These may be difficult discussions for inoperable or palliative care cases. Older trauma education should include approaches to these discussions.

If the patient is not admitted directly under a neurosurgeon, they should also have a named neurosurgeon (or named neurosurgical team) jointly managing their care. (This can be done remotely if in a TU.)

If a patient is triaged to an MTC but does not require MTC level care, the patient should be a priority for early repatriation back to their local trauma unit to reduce patient and family emotional stress.

Three pathways for isolated TBI in older patients

1. Unsurvivable

Discussion with neurosurgeon by phone and/or remote medicine; patient can stay at TU.

2. No immediate neurosurgeon input

The patient can stay at TU and repeat scan performed in 48 hours (or as specified by the neurosurgical team). If the patient deteriorates within this time frame, with a reduction in Glasgow Coma Score (GCS) or new neurological presentation, there should be a rapid discussion with the neurosurgical team with a view to critical transfer to ED at MTC (not dependent on bed status of MTC).

A scan prior to transfer may enable necessary theatre preparation. Such patients should also be part of a virtual head injury / TBI meeting at the MTC, or virtual ward round approach in discussion with the responsible trauma unit teams.

3. Neurosurgeon intervention required

Patient should be immediately transferred to MTC ED with a time critical head injury pre alert.

A wider discussion and agreed consensus based on patient, family and staff feedback should focus how patients and families are able to access neurosurgical specialists, for initial assessment decisions, ongoing inpatient care and outpatient care. This may include the use of communication technology to facilitate remote or virtual consultations.

Key principles for starting Neurotrauma rehabilitation in older people

- Vestibular assessment for all patients with a traumatic brain injury or those with significant skull fractures or facial fractures without intra cranial bleeding to look for benign paroxysmal positional vertigo or other neurovestibular disorders
- Collateral history within 24 hrs.
- Mobilisation out of bed as early as possible
- Access to exercise programme as early as possible
- Rehab prescription up to date and given on day of discharge
- Where possible, minimise ward or bed transfers to prevent disorientation or delirium
- Therapy team to contact the MTC for handover
- Consider non opiate based medications for isolated TBI if headaches are present
- Ensure delirium/infection is considered as a cause for cognitive difficulties prior to standardised cognitive assessment
- Early removal of catheter if not clinically indicated
- Patients with skull fractures or facial fractures without intra cranial bleeding should have an OT assessment and given education on managing mild TBI/concussion type symptoms.
- Family members should also be educated on mild TBI symptoms and give written head injury discharge advice.



Cervical spine immobilisation

Evidence for the benefits of pre-hospital cervical spine immobilisation in reducing secondary neurological injury in unstable injuries is poor. There are however well documented cases of worsened neurological injury in patients with poorly fitting collars or hyperextended positions. Presence of severe degenerative disease in older patients (including ankylosing spondylitis) puts them at particular risk and consideration should be given for pragmatic alternatives to hard collar stabilisation including self-extrication, careful handling and movement mitigation, with transport in a position of comfort using soft padding and tape if necessary.

- » Older patients are at high risk of pressure ulcers, pneumonia and respiratory failure, dysphagia, delirium and raised intracranial pressure with prolonged cervical immobilisation. Many find hard collars and lying flat uncomfortable, painful and frightening. Prompt assessment, imaging and imaging reporting are essential to minimise morbidity and distress.
- » Assessment, imaging and imaging reporting should be completed within two hours of arrival/decision to immobilize. If continued immobilization is required rigid extrication collars should be switched to soft padded collars (such as Miami-J) at the earliest opportunity and movement restrictions should be clearly documented within one hour of imaging reporting.
- » Interpretation of cervical imaging in the presence of severe degenerative disease can be challenging. Escalation for specialist reporting should be included in local trauma protocols to prevent delays in decisions regarding immobilisation.

Patients unable to comply with spinal immobilisation for assessment and imaging:

Some patients are extremely intolerant of immobilisation, particularly those with dementia, delirium or coexistent traumatic brain injury, which can impede further clinical assessment and imaging.

These patients should be reviewed by a senior clinician who should consider several aspects of management:

- » Optimise comfort: Ensure collar is correctly sized/fitted, switch to soft padded collar if necessary, position of comfort is optimized and appropriate analgesia has been offered
- » Delirium reduction strategies: reassurance and regular orientation, minimize sensory deprivation (glasses/hearing aids), low stimulus environment if possible, hydration, check for urine retention/constipation, 1:1 nursing if necessary
- » Balance of risk/benefit of immobilization; consider mechanism of injury, comorbidities, clinical assessment and risk of pneumonia/aspiration
- » Balance of risk/benefit of sedation to maintain immobilization and facilitate safe imaging: Sedation is not without risk and should not be considered standard practice in these situations. Local policies will be dependent on availability of training of staff, monitoring equipment, availability of sedation/anaesthetic agents and expected duration of immobilization.
- » Sedation with pharmacological agents may occasionally be deemed in the patient's best interests to facilitate safe ongoing assessment/management and should be guided by senior clinicians (see appendix 2, Management of delirium, page 29, and local delirium guidelines).

Prolonged cervical immobilization:

- » Patients being managed conservatively with prolonged cervical immobilization who are poorly tolerant of collars or experiencing complications should have immobilization decisions reviewed with senior decision makers. Documentation of best interest decisions after consultation between neuro/spinal surgeons, geriatricians, allied health professionals and the patient/relatives are essential

Clinical guidance | Spinal injuries

Network guidance for spinal injury

Each trauma network should have guidance on the management of spinal injury for older patients. There are four general pathways (adapted from South East London Kent and Medway network spine pathway):

- » Stable fractures for analgesia.
- » Unstable fractures for brace therapy.
- » Unstable fracture requiring surgical intervention.
- » Highly unstable fracture for urgent intervention.

Fragility fractures in the thoracic region are relatively common in older patients and are often incidental findings on imaging. Physical examination and imaging beyond plain films (CT or MRI) should aid in the determination of acuity in these injuries.

Network guidelines should acknowledge the special conditions relating to spinal injury in older patients, especially in relation to incidental findings and comorbidities. The guidelines should incorporate whether benefit from transfer to a major trauma centre is clear and how a discussion between local senior clinicians (geriatric or surgical) and the network spinal consultant can be facilitated – including how the patient and/or family are involved in this process.

Spinal cord injury

Although uncommon, there is increased risk of spinal cord injury (SCI) in older people due to degenerative disease and canal stenosis, with incomplete cord syndromes possible from relative low energy mechanisms. Network spinal injury pathways should include management of cord injury in older people including the incomplete cord syndromes. Older patients with SCI should be referred to spinal cord injury centres within four hours of identification of the injury as recommended in national guidance from the Multidisciplinary Association of Spinal Cord Injury Professionals (MASCIP)⁹.

NHS referral information can be found at www.spinalcordinjury.nhs.uk/home.htm.



Clinical guidance | Pelvic injuries

This guidance should be read in conjunction with: *The British Orthopaedic Association Standards for Trauma “BOAST: Management of Patients With Pelvic Fractures”*¹⁰, and the NICE major trauma guideline NG37 *“Fractures (complex): Assessment and management”*¹¹.



Assessment of haemodynamic compromise

Older patients have poor resilience to haemodynamic instability following haemorrhage. Hypovolaemic shock may be difficult to detect in older people due to pre-existing hypertension, altered cardiovascular reserve or beta-blocker therapy. Early assessment of lactate or base deficit (excess) and haemoglobin on arrival to the ED may help to detect haemodynamic compromise following pelvic trauma, irrespective of mechanism of injury¹². All older patients who present to the ED with a suspected pelvic fracture should be assessed by the trauma team.

Code red or major haemorrhage protocols should be activated as for any adult patient with known or suspected haemorrhage. Vasoconstrictors should be avoided. Pelvic binders should be applied as part of haemorrhage control. However, caution must be exercised for long term application (more than 12 hours) in older patients with poor skin integrity.

Pelvic Injuries

As per NICE NG37¹¹ (section 1.2.8, *below*), all adult patients with blunt major trauma and suspected multiple injuries should have a whole body CT (WBCT). If a pelvic fracture is identified on X-ray after a low energy fall, then activation of the trauma team for a full trauma assessment is recommended.

A pelvic or sacral insufficiency fracture which commonly accompanies a simple pubic ramus fracture will at least cause back pain, and may render the pelvis unstable. Urgent CT should be requested in symptomatic older patient (pain, reduced mobility).

NICE NG37, Whole-body CT of multiple injuries
1.2.8 | Use whole-body CT (consisting of a vertex-to-toes scanogram followed by CT from vertex to mid-thigh) in adults (16 or over) with blunt major trauma and suspected multiple injuries. Patients should not be repositioned during whole-body CT.

Complex or unstable

Complex pelvic injuries should be referred to a pelvic surgeon, as for any adult trauma patient. Pelvic surgery (including minimally invasive techniques) may be indicated for any age group to restore mobility and function.

Acetabular fractures

All older patients with acetabular fractures should be referred to the MTC pelvic surgery service for expert advice and possible transfer. This referral should occur within 12 hours of radiological (CT) confirmation of the injury. The referral should include IEP CT scan images and a documented lower limb neurological assessment.

Rehabilitation

Older adults may be less likely to be able to comply with altered weight bearing statuses. Regular communication between orthopaedic teams and therapists should take place to ensure minimum restrictions to allow maximum function.

Clinical guidance | Complex limb injuries

Bony and soft tissue limb injuries in older people have an increased risk of complications, even with relatively low energy mechanisms, due to pre-existing peripheral vascular disease or chronic venous disease, diabetes, steroid use, reduced bone density and skin/soft tissue fragility.

Complex lower limb injuries in older trauma patients essentially constitute two groups:

Open fractures and / or severe soft tissue injuries (*degloving, tissue loss*)

For older patients with open fractures each network should have local triage and transfer guidelines to ensure early consultant led decision making and management. This should be at an orthopaedic center, typically the MTC. Management should be based on the BOAST Open Fractures standard¹³ and NICE NG 37¹¹.

For older people with open fractures, avoiding excision of skin and negative pressure dressings, and instead primarily stabilizing fractures and closing wounds is preferable wherever possible.

The decision to proceed to amputation is challenging for older people in comparison to younger patients, and early expert debridement and fixation with the aim of judicious limb salvage maybe preferred, based on senior (consultant grade) orthopaedic opinion. Decision to amputate should only be made in the multidisciplinary setting wherever possible.

Trauma network policies for open fractures and degloving injuries should include specific management considerations for older patients.

Periarticular fractures and periprosthetic fractures

These are challenging injuries with a variety of surgical management options. Primarily the aim of treatment (operative or non-operative) should be to facilitate early / immediate weight bearing and

rehabilitation (as with hip fractures) and to avoid prolonged bed rest and lengthy hospital stays. Internal fixation, external fixation and acute arthroplasty may all be viable surgical tools. Non operative management is rarely able to facilitate early rehabilitation in lower limb injuries. Acute arthroplasty / Revision arthroplasty in some fractures may be preferable to internal fixation. Specialist advice is available from the MTC and early communication is recommended.



Rehabilitation

For all older patients with significant orthopaedic limb trauma, multidisciplinary input from geriatricians, orthopaedic surgeons, nurses physiotherapists, occupational therapists and other allied health professionals is required, similar to the successful multidisciplinary model of hip fracture treatment.

Older adults become deconditioned quickly when early mobilisation is delayed or not prioritised. Prompt decisions regarding weight bearing status, including for upper limbs allows early mobilisation.

Older adults may be less likely to be able to comply with altered weight bearing statuses. Regular communication between orthopaedic teams and therapists should take place to ensure minimum restrictions to allow maximum function.

Clinical guidance | Chest injuries

Chest wall injuries are common in older patients and are associated with significantly higher morbidity and mortality than younger patients, whether they occur as part of isolated or multi-system trauma.

Contrast CT scan is the investigation of choice to define intrathoracic and chest wall injuries early in the older trauma pathway. This is predominantly due to the poor recognition of fractures and lung contusions with X-ray and the prognostic influence of an accurate diagnosis in ensuring the correct treatment strategy.

In addition to the admission policies presented in these guidelines, chest injury guidelines should also include anaesthetic / critical care, pain management and physiotherapy team reviews. Severe chest wall injuries including radiological and clinical flail chests, injuries causing respiratory compromise or where pain control cannot be achieved should be discussed early with the MTC trauma or thoracic surgeon. A small proportion of patients will benefit from early, operative chest wall stabilisation (14).

Significant considerations for rib fractures in trauma in older people

Ten per cent of older major trauma patients have rib fractures and up to 50% of fractures in this group are undetected by plain X-ray. A meta-analysis of 50,000 patients, including 15,000 people aged over 65 years indicated an odds ratio for mortality of 1.98 for those over 65 years with any rib fractures, and for all ages an odds ratio for mortality of 2.02 with 3+ rib fractures. Associated pulmonary contusion or pre-existing chronic lung disease are also significant prognostic findings (15).

The type and number of affected ribs is an important consideration. Vertebrosteral ribs (ribs 1-7) have greater physiological significance than vertebrocostal ribs (ribs 8-10).

Key objectives in rib fracture management in older people

- » Management on a specific older person's rib fracture/chest wall injury pathway
- » Early recognition of injuries and complications – CT scan
- » Early and regular pain assessment. This should include assessing pain at rest (static) and pain on deep breathing/coughing (dynamic) and neuropathic pain measures
- » Timely analgesia and access to advanced pain management options e.g. regional anaesthetic techniques
- » Reduced duration of invasive ventilation and lung protective ventilation strategies (if required).
- » Decreased mortality
- » Patient satisfaction and return to baseline function in their pre-trauma residence.

These can be achieved by:

- » Appropriate analgesia sufficient to allow normal breathing and coughing
- » Early mobilization and physiotherapy
- » Breathing exercises e.g. the active cycle breathing technique
- » Targeted oxygen therapy, using the lowest FiO₂ to achieve adequate SpO₂
- » Infection prevention
- » In more severe cases, ventilatory support to prevent atelectasis and suction to remove mucus or secretions from the airways
- » Surgical fixation within 48 hours (if required).
- » Early consideration of video-assisted thoracic surgery (VATS) to washout haemothorax or empyema

Clinical guidance | Chest injuries

Network considerations

Patients should be managed using a locally agreed pathway which includes a section specifically tailored to older patients.

A specific analgesia protocol for older patients – including indications for neuraxial blocks, regional blocks (e.g. paravertebral, erector spinae plane or serratus anterior blocks) and opioid analgesia must be available. This may be a network guideline or local trauma unit guideline, as appropriate. It is an acknowledged dichotomy that a higher proportion of older trauma patients would benefit from regional anaesthetic techniques but are more likely to have contraindications (e.g. anticoagulants) to deep regional techniques e.g. epidural or paravertebral block insertion.

To minimise the requirement for transfer between centres, hospitals should ensure that adequate facilities and expertise are available 24/7 onsite to provide rapid and effective analgesia (to maximise early treatment benefit; including management of thoracic epidural) and also maintain local expertise to manage simple pneumothoraces and haemothoraces associated with blunt trauma.

Incentive spirometry or vital capacity can be used to identify patients at risk of deterioration¹⁶. Active Cycle Breathing Techniques are a simple technique

that can aid expectoration and reduce pain scores¹⁶. Advanced respiratory positive pressure airway devices can be considered (either high flow nasal cannulae or CPAP) although the evidence in the over 70 age group is limited¹⁷.

Other specific cautions in the older people are: NSAIDs should be used with extreme caution due to renal, cardiac and GI risks. They should be used for shortest duration course possible e.g. 3-5 days.

- Opioids should be used in lower doses. If a strong opioid is required, clinicians should have a low threshold for choosing oxycodone due to its favourable side effect profile.

Network agreed guidelines for the insertion, management (including transfer policy) and removal of intercostal drains in trauma, including site, technique and the use of prophylactic antibiotics, **must be available**. Persistent (more than 48 hours) air leak, flail chest and patients with consequent respiratory compromise should be discussed with a major trauma or thoracic surgeon.

Small pneumothoraces identified on CT should be considered for conservative management without chest drainage unless there are other clinical indications or the patient requires positive pressure ventilation. Network guidelines for chest trauma and rib fixation must include special considerations relating to trauma in older patients.



Clinical guidance | Anticoagulation

Reversal of the anticoagulant effect of DOACs in older trauma patients

Each MTC and TU should have a policy for the reversal of warfarin and other anticoagulants following major trauma. PCC should be immediately available for every major trauma patient with life threatening bleeding. Anticoagulant reversal should be administered on arrival in older trauma patients (no longer than within one hour of decision to reverse).

Please consult local haematological guidelines on when to contact the on call haematologist for cases of DOAC anticoagulation reversal.

Factor Xa inhibitors

Rivaroxaban, **Apixaban** and **Edoxaban** are factor Xa inhibitors, for which reversal agents are currently unavailable.

Current consensus suggests that for older patients who are prescribed Rivaroxaban, Apixaban or Edoxaban (or another factor Xa inhibitor) and have a known or suspected life threatening haemorrhage as a result of trauma:

- » Administer 25-50u/kg four-factor prothrombin complex concentrate (e.g. Octaplex® or Beriplex®) and 5mg intravenous vitamin K as soon as possible after arrival at the ED. Vitamin K will not reverse the anticoagulant effect of a DOAC but may help correct any coagulopathy resulting from co existing vitamin K deficiency.
- » Ensure that IV Tranexamic Acid bolus has been administered
- » If bleeding continues, the on call haematologist should be consulted emergently as the patient may require further haemostatic agents.

Factor IIa inhibitors

Dabigatran is a direct thrombin (IIa) inhibitor which has an antidote called **Idarucizumab**.

In older patients who have received dabigatran and have a known or suspected life threatening haemorrhage as a result of trauma:

- » Administer Idarucizumab 5g intravenously as soon as possible after arrival at the ED.
- » If bleeding reoccurs and clotting times are prolonged then a second dose of Idarucizumab 5g may be required¹⁸. For more information on the administration see the electronic medicines compendium

<https://www.medicines.org.uk/emc/product/5073>



Preventing falls in older people

The most common mechanism of injury in older patients is a fall from standing height (<2m). Thorough assessment of the cause of the fall and implementation of individualised multi-factorial intervention is essential for all older patients. *This can help to prevent falls during the inpatient stay and lower the risk of further falls and fractures after discharge.*

Many older people who have fallen have no significant injuries identified after assessment in the ED and are discharged promptly. *These patients must also have falls screening risk assessment and intervention.*

Much of this can be achieved in hospital, however referral to specialised community or falls services after discharge may be appropriate for some patients.

Screening and Assessment for Falls

The priority of assessment for anyone presenting with a fall should be to rule out concerning medical causes that require urgent intervention.

This can largely be achieved through taking an accurate history of the fall;

- » Assess for symptoms/signs of cardiac syncope or pulmonary embolus (e.g. drop attacks, chest pain, breathlessness, and palpitations)
- » Look for other precipitating acute illnesses (e.g. infection)
- » Screen for alcohol or drug misuse
- » Ask about dizziness on standing (suggestive of postural hypotension)
- » Ask about dizziness on turning suddenly (suggestive of neuro-vestibular disorders)
- » Ask about frequency of falls

Basic investigations can help to rule out or stratify risk:

- » ECG
- » Lying/standing blood pressure as soon as able

Falls in older people | Context

Major injury results from 5 to 6 per cent of all falls.

- » The risk of falls -- and thus, risk of injuries increases with increasing age. With our ageing population, this means that the incidence of falls is increasing.
- » Each year there are 300,000 fragility fractures in the UK.
- » There are 88,000 hip fractures annually, from which 80 per cent of people do not return to baseline function or mobility post-operatively.
- » Bed occupancy: Falls and related injuries account for more NHS bed days than heart failure, myocardial infarction and stroke combined.
- » The reduction and prevention of falls and fractures involves comprehensive multifactorial assessment and intervention, coupled with effective bone health prevention and treatment.

Establishing risk of further falls:

A person presenting with a single non-injurious fall who has normal gait and balance is considered at low risk of recurrent falls. Simple tests for gait and balance can be used in the urgent and emergency care setting for those who are not injured (e.g. 'Timed up and go test' or '30 second sit to stand').

Anyone with any of the below features should be considered at higher risk for falls and should have a multifactorial assessment and intervention plan:

- » Anyone who presents with a fall resulting in injury
- » Anyone with a gait or balance disorder
- » Anyone who has had 2 or more falls in the last 12 months
- » Anyone who is frail (e.g. Clinical Frailty Scale 4-9 or local definition)

Clinical guidance | Falls prevention

Multifactorial assessment and intervention:

Assessment should be completed as soon as possible after attendance in hospital. Multiple healthcare professionals can be involved in this process depending upon what services are available and where the patient is being managed (e.g. ED physicians, nurses, acute frailty teams, trauma teams, physiotherapists, occupational therapists, geriatricians, pharmacists).

Assessment should include:

- » Falls history (frequency, nature of falls, associated injuries)
- » Medical assessment (cardiac syncope, postural hypotension, neurovestibular disorders)
- » Medication review
- » Functional assessment (baseline mobility and if a walking aid is normally used, level of assistance with activities of daily living, carers)
- » Basic vision screen (visual acuity, cataracts, use of vari/bi-focals)
- » Hearing impairment and use of hearing aids
- » Cognitive assessment and delirium screening (e.g. 4AT)
- » Fracture risk assessment (e.g. FRAX score)
- » Continence (nocturnal urinary frequency)

Effective interventions can include:

- » Prompt, timely provision and assessment of a walking aid making sure it is within the patient's reach
- » Call bell within reach and remind the patient to use it (for those with dementia or delirium consider alternatives)
- » Medication review and adjustment of medication if postural hypotension identified
- » Make sure spectacles are available and hearing aids are working and properly fitted
- » Anti-slip socks (or safe footwear)
- » Anti-slip mats on seats and pressure cushion
- » Decluttered/tidy environment, especially the patient's pathway to the toilet
- » Patient education leaflet

For patients with cognitive impairment due to dementia, delirium or following traumatic brain injury, consider the following:

- » Regular toilet visits (and/or make sure the urine bottle is within reach), rule out urine retention and treat any UTI present. Do not leave patients at risk of falls alone in the bathroom.
- » Nursing cohorted patients; use of a high visibility bay for the patient where staff are vigilant and there is preferably at least one person working in the bay at all times with eye-line supervision
- » One-to-one nursing if the healthcare team still feel that the patient is at very high risk of falls despite the measures above (discussions should be held with a senior nurse)
- » Falls alarms connected to the bed and chair, with prompt response when the alarm goes off
- » Bed and rails assessments
- » Excellent dementia care (according to local dementia protocols)

Prevention of readmission to hospital after another fall

For those who have fallen or are at risk of further falls, consider referral to community based falls prevention services. Evidence-based balance, strength and exercise programmes combined with multifactorial assessment, intervention and education have been shown to decrease falls by 60 per cent in people who are at high risk of falling. Patients appropriate for these programmes need to be able to follow simple instructions and consent to be contacted by a member of the community/local falls and bone health community prevention team.

Patients aged 50 or over with a diagnosis of osteoporosis and/or fragility fracture should have a bone health assessment and be given appropriate advice and treatment. For many patients referral for DEXA scans or to local bone health clinics is indicated

For more details, please see:

- » [NICE CG61, Falls in older people: Assessing risk and prevention](#)
- » [NICE Clinical Knowledge Summary, Osteoporosis - prevention of fragility fractures](#)

Clinical guidance | Nutrition

Pre-injury malnutrition or poorer nutritional support in hospital may contribute to delayed recovery or adverse outcomes in older patients

Key nutritional principles for the older trauma patient include:

- » Assess nutritional status on admission and weekly throughout admission. If patient is found to be at risk of malnutrition then referral and involvement of the dietitian is necessary.
- » Dietitians play a valuable role in optimising nutritional management plans as part of the MDT. Local pathways may automatically generate a referral or early input should be requested for older patients.
- » **If a patient is at risk of malnutrition, addressing this is critical to preventing further decline and improving outcomes.**

Nutritional screening is required on admission and weekly thereafter:

- » A proactive approach to nutritional screening aims to prevent decline in nutritional status, which is particularly important due to the age and functional ability in this cohort, therefore, weekly screening should be performed.
- » Nutritional status and frailty screening needs to be assessed on admission. There are a variety of local and national tools in existence. Valid tools should ideally include:
 - » Actual weight
 - » Height
 - » Weight history
 - » BMI
 - » Current clinical/disease state
 - » Current nutritional intake
- » Mobility or mechanism of injury may compromise ability to take accurate weights/heights, which may lead to unrecognised nutritional decline during hospital admission. Surrogate measurements may replace actual measurements e.g. ulna length/ mid upper arm circumference but it should be noted this only provides an estimate of nutritional state.
- » Older patients may be deemed to be at risk of other nutritional diagnosis rather than just being 'underweight' e.g. sarcopenia (low muscle mass: body mass) which may be further exacerbated by inadequate nutritional intake alongside changes to mobility as a result of trauma.
- » Types of injuries with significant nutritional implications may include: head, spinal cord, maxillofacial, gastro-intestinal.
- » Severity of injury could result in feeding difficulties as a consequence of injury, significantly altered nutritional requirements or increased length of inpatient stay.
- » It is important to realise nutritional barriers may be physical, psychological, social and behavioural.

Clinical guidance | Psychosocial elements

Older trauma patients may be more likely to have additional needs that influence their ability to express their preferences and choices in a way that can be taken into account when planning their acute and ongoing care. This may include cognitive and / or communicative impairments. In such cases it is essential to take every opportunity to appropriately engage patients and their family members, carers and friends when making decisions about care and clinical management.

Meeting the psychological needs of older trauma patients is a challenge for trauma networks. Pre-morbid factors, such as functional and cognitive impairment, may be exacerbated by the experience of a trauma, and the resultant hospital stay. For example, a patient with a significant cognitive impairment may have continued to function well within their usual routine and surroundings, however taking them outside of familiar environments can lead to an increased loss of independence, which may adversely affect quality of life and other psychological sequelae¹⁹.

Adverse psychological outcomes may be exacerbated by issues relating to isolation from family and friends, as would be true for a patient of any age who has experienced a trauma, particularly if the patient is not in their local hospital. It is important to consider the psychological impact of issues related to an older patient's longer term rehabilitation, particularly if this requires a change in their living situation and any associated financial demands. Establishing psychological status, both pre and post injury, should be a priority when planning for rehabilitation, recovery and discharge.

Currently, the psychological sequelae following major trauma is poorly understood in this cohort of patients, requiring further investigation and research to characterise the issues and to establish appropriate management approaches.



Governance standards

Governance standards for older people's trauma for Pan London Major Trauma System peer review

<i>Standard</i>	<i>Measure</i>
To maintain oversight of older trauma patients admitted under non-trauma teams (surgery or medicine) a joint admission policy should be agreed in every MTC and TU.	Evidence of joint policy agreed between clinical specialties and signed by the trust board.
Within 72 hours of admission each older major trauma patient should be seen by a registrar or consultant geriatrician (as per suggested MTC and TU admission policies).	National standard. Audit clinical documentation.
An ED triage screening tool is available for the assessment of older trauma patients (for those with non-obvious injuries, low level falls, atypical presentations etc.).	Evidence of triage tool available for older trauma, with associated ED staff training.
Each MTC and TU reverses anticoagulation in the injured older patient within one hour of reversal decision.	Evidence of process and reversal agent availability in local policy. Audit decision of reversal and administration times.
In patients with suspected spinal injury, spinal precautions must be documented in the clinical notes within ONE HOUR of image reporting and prior to leaving the ED.	Audit of clinical documentation and radiology report
Multidisciplinary ED and post-ED trauma education or training in MTCs and Tus includes the principles of assessing and managing older injured patients.	Evidence of older person specific content included within ED and post-ED trauma education and training programmes.

References

1. ONS, Old age structure variant - UK population in age groups. 2019. <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/datasets/table/21oldagestructurevariantukpopulationinagegroups>
2. TARN, Major trauma in older people, (2017) www.tarn.ac.uk/Content.aspx?c=3793.
3. Fisher JM, Bates C, Banerjee J. The growing challenge of major trauma in older people: a role for Comprehensive geriatric Assessment? Age and Ageing, Volume 46, Issue 5, September 2017, <https://doi.org/10.1093/ageing/afx035>
4. NICE, Major trauma: Assessment and initial management. 2016. www.nice.org.uk/guidance/ng39
5. NHS, Quality surveillance tools <https://www.qst.england.nhs.uk>
6. Maurer L.R, Sakran J.V, Kaafarani H.M. Predicting and Communicating Geriatric Trauma Outcomes. Curr Trauma Rep 7, 1–7. 2021. <https://doi.org/10.1007/s40719-020-00209-3>
7. Keeling, D., et al., Guidelines on oral anticoagulation with warfarin - fourth edition. Br J Haematol, 2011. 154(3): p. 311-24.
8. British Society for Haematology, Guidelines for the use of platelet transfusions. 2016. www.b-s-h.org.uk/media/2641/bcsh_platelet_guideline_08_08_16_v2
9. MASCIP, Management of the older person with a new spinal cord injury. 2015. www.spinal.co.uk/wp-content/uploads/2015/08/MASCIP-Management-of-the-older-person-with-a-spinal-cord-injury
10. British Orthopaedic Association Standards for Trauma, BOAST: The Management of Patients With Pelvic Fractures. 2018. <https://www.boa.ac.uk/standards-guidance/boasts/trauma-boasts.html>
11. NICE, NG37, Fractures (complex): Assessment and management. 2016. www.nice.org.uk/guidance/ng37
12. Ojodu, I., et al., Predictors of mortality for complex fractures of the pelvic ring in the elderly: a twelve- year review from a German level I trauma center. Injury, 2015. 46(10): p. 1996-8.
13. British Orthopaedic Association / British Association of Plastic, Reconstructive and Aesthetic Surgeons, BOAST: Open Fractures. 2017. <https://www.boa.ac.uk/standards-guidance/boasts/trauma-boasts.html>
14. NICE IPG361 Insertion of metal rib reinforcements to stabilise a flail chest wall. 2010. www.nice.org.uk/guidance/ipg361
15. Battle, C.E., H. Hutchings, and P.A. Evans, Risk factors that predict mortality in patients with blunt chest wall trauma: a systematic review and meta-analysis. Injury, 2012. 43(1): p. 8-17.
16. Nyland BA, Spillman SK, Halub ME, Lamb KD, Jackson JA, Oetting TW, et al. A preventative respiratory compromise on a general in-patient ward. Respir Care 2016; 61:1580-7
17. Kourouchea, S et al Development of a blunt chest injury care bundle: An integrative review. Injury, 2018. 49(6):1008-1023
18. Pollack, C.V., Jr., et al., Idarucizumab for dabigatran reversal. N Engl J Med, 2015. 373(6): p. 511-20. Stevens, C.L. and A.M. Torke, Geriatric trauma: A clinical and ethical review. J Trauma Nurs, 2016. 23(1): p. 36-41.

Recommended reading:

The Silver book 2. British Geriatric Society: <https://www.bgs.org.uk/resources/resource-series/silver-book-ii>

Older people's trauma screening tool for TUs, MTCs, and Local Emergency Hospitals

Inclusion criteria: All patients ≥ 65 who self-present or arrive by ambulance with an obvious injury, mechanism of injury, or who have fallen $< 2m$

The purpose of the trauma call (& clinical priority for the patient) is adequate examination, early and adequate imaging and reporting, and early identification of all injuries

ANATOMY OF INJURY

- » Significant injury to ≥ 2 body regions
- » Suspected pelvic injury
- » Suspected head or spinal injury
- » Suspected chest injury

PHYSIOLOGY

- » Systolic BP < 110 mmHg
- » Heart Rate > 90 bpm
- » GCS < 15 (even if baseline)
- » Lactate > 2 or BE < -2

OTHER

- » Patient on anticoagulant medication or has a bleeding disorder
- » Severe pain
- » Acutely short of breath
- » Uncontrollable major haemorrhage



Immediate EM Consultant or Registrar (ST4+ or equivalent) review
Trauma Call - (document if decision not to activate).



In the absence of mechanism – but identification of injury on any imaging then re-screen patient



EM Consultant or Registrar (ST4+ or equivalent) review within 15 mins.
Repeat screen post examination / imaging.

- » History of unconsciousness
- » Significant medical history, co-morbidities
- » Inappropriate or inadequate history
- » Inappropriate awareness of symptoms / injury

* Triage screening tool adapted from HECTOR elderly trauma triage criteria and pre-hospital tools (by D Peel, A Osmond, H Tucker 2018)

**Red criteria are independently and significantly associated with the identification of trauma in a retrospective multivariate analysis

Appendix 2 | Management of delirium in older trauma patients

Delirium is a clinical condition characterised by

- » Disturbed consciousness (reduced awareness of the external environment).
- » Disturbed cognitive functioning (disorientation and short term memory loss).
- » Acute onset and fluctuating course.
- » Due to an underlying cause (or causes) that is (are) possibly reversible.
- » Other features include:
 - » Disturbance in perception (visual hallucinations)
 - » Disturbance in sleep
 - » Psychomotor disturbance (hyperactive or hypoactive).

Up to 50 per cent of patients having surgery / trauma develop delirium.

It is associated with poor outcomes and increased risk of:

- » Death.
- » Functional decline and institutional long term care.
- » Longer length of stay in hospital.
- » Hospital acquired complications, including: infection, falls, pressure sores, dehydration, malnutrition.

The prevention and treatment of delirium is possible if dealt with urgently.

Risk factor assessment, prevention and detection

The main risk factors are

- » Patients aged 65 or over.
- » Those with cognitive impairment (past or present) and/or a history of dementia.
- » Current hip fracture or severe trauma, including head trauma.
- » Severe illness.
- » Prior history of delirium

Other risk factors include

- » Visual / hearing impairment
- » Severe illness
- » Fever / hypothermia
- » Hypotension
- » Pain
- » Polypharmacy
- » Psychoactive medications
- » Malnutrition
- » Metabolic disorders (e.g. hyper/hypoglycaemia)
- » Renal impairment
- » Depression
- » Alcohol and/or smoking (and withdrawal)

Types of delirium include

- » **Hyperactive** - Restless, agitated and aggressive, sometimes with delusions and paranoid ideation
- » **Hypoactive** - Withdrawn, quiet and sleepy
- » **Mixed** - Restlessness and distress interspersed with drowsiness. Mixed delirium can be a result of pharmacological sedation.

If the patient exhibits an acute change in behaviour, treat this as delirium.

Formal, validated assessment tools include

- » **SQID** – Single question in delirium*: “Do you think [*insert patient name*] has been more confused lately?”
- » **4AT Test** – Screening instrument for delirium and cognitive impairment

Short cognitive assessment method (Short CAM)

* Sands, M.B., et al., *Single Question in Delirium (SQiD): testing its efficacy against psychiatrist interview, the Confusion Assessment Method and the Memorial Delirium Assessment Scale*. Palliat Med, 2010. 24(6): p. 561-5.

Appendix 2 | Management of delirium in older trauma patients

Management of delirium

Make the diagnosis of delirium. Collateral history is essential.

Assess thoroughly, investigate and treat any identified underlying cause. A review of the patient's medication is essential.

De-escalation, effective communication, reorientation and reassurance. Restless, hallucinating and agitated patients are easily terrified or bewildered. Use a calm approach with the patient, try and find out what is frightening or threatening him/her and reassure accordingly. Explain to the patient where he/she is, who he/she is and what your role is. Ask for help from family and friends if they are available. Try not to sedate or restrain the patient – sedation often leads to fall(s) and restraint often makes the patient more aggressive.

ABC: Quick guide to assessing and treating delirious patients on the ward

Adapted from Guy's and St Thomas' *Clinical guideline for the prevention, recognition and management of delirium in adult inpatients**.

Airway and breathing	<ul style="list-style-type: none">» Check and correct hypoxia.» Remember to consider pulmonary embolism, pneumonia, hypercapnia.
Circulation	<ul style="list-style-type: none">» Check and correct hypotension.» Urgent blood tests to check and treat for post-operative anaemia.» Consider organ/tissue ischemia including MI.
Disability	<ul style="list-style-type: none">» Identify and treat pain.» Any evidence of neurological change e.g. stroke, seizure.
Drugs	<ul style="list-style-type: none">» Review drug chart, note any anti-cholinergics and discuss stopping them.» Only consider medication if conservative measures have failed and if patient at risk to self or others – general rule is little and often.» Don't give haloperidol to patients with a prolonged QT, with parkinsonism or with Lewy body dementia - use lorazepam instead. Starting dose for both haloperidol and Lorazepam should be 0.5mg. Use anti-psychotics very sparingly, ensure de-escalation measures are in place, and discuss with consultant first. Consult local guidelines.
Exposure	<ul style="list-style-type: none">» Specifically examine to exclude urinary retention and constipation.
Fluids and electrolytes	<ul style="list-style-type: none">» Check fluid balance and treat dehydration.» If not already catheterised, do not catheterise unnecessarily.» Urgent bloods for electrolyte disturbance – correct as needed.
Glucose	<ul style="list-style-type: none">» Consider hypoglycaemia.
Infection	<ul style="list-style-type: none">» Consider chest, urine, skin, wounds. (Check wound dressing, but do not remove it to look underneath unless there is significant ooze or pus. Check with a senior doctor or nurse first.)» All inflammatory markers will be raised post-operatively, but are very useful in the longer term, to monitor the level of inflammation.
Helpful tips	<ul style="list-style-type: none">» Be calm and polite, even if they're not.» Regularly orientate the patient to who you are, who and where they are.» Try not to disturb sleep with medication rounds or investigations.» Document patient's capacity if absent and how you acted in their best interests.

* Guy's and St Thomas' NHS Foundation Trust, *Clinical guideline for the prevention, recognition and management of delirium in adult inpatients*, | www.guysandstthomas.nhs.uk/resources/our-services/acute-medicine-gi-surgery/elderly-care/delirium-adult-inpatients.pdf Link: (2013)

Appendix 2 | Management of delirium in older trauma patients

Sedation for older trauma patients with delirium

Keep the use of sedatives and major tranquilizers in the treatment of delirium to a minimum; the use of sedation needs to be proportional and reasonable. It should be considered only after verbal and non-verbal de-escalation has failed. Sedation may be necessary in the following circumstances:

- » To carry out essential investigations or treatment.
- » To prevent the patient endangering himself / herself or others.
- » To relieve distress in a highly agitated or hallucinating patient.

Key principles

Use one drug only (Haloperidol – see local guidance and NICE CG103). Use the lowest dose possible – starting at 0.5mg. Use of more than one drug should be rare, and only under the direction of an experience clinician.

Do not use antipsychotic drugs for people with conditions such as dementia with Lewy bodies or Parkinson's disease.

Close respiratory and cardiovascular monitoring after sedation is essential. *One to one care is often required.*

Review all anti-psychotic medication at least every 24 hours.

If the delirium does not resolve:

- » Re-evaluate underlying causes.
- » Follow up and assess for possible dementia.
- » Refer to a liaison psychiatrist and / or consultant geriatrician.

LMTS Older trauma guideline group/contributors

Third edition (2021) updated by:

Elaine Cole, Director of Research and Innovation, Pan London Major Trauma System
George Peck, Consultant Geriatrician (Major Trauma), St Mary's Hospital
Dhanupriya Sivapathasuntharam, Consultant Geriatrician, Royal London Hospital
Rhonda Sturley, Consultant Geriatrician, St Georges Hospital
Lucinda Thomson, Trauma and Orthopaedic Physiotherapist, St Mary's Hospital
Jane Tippett, Consultant Nurse ED, King's College Hospital
Kevin Tsang, Consultant Neurosurgeon, St Mary's Hospital
Alex Trompeter, Consultant Orthopaedic Surgeon, St Georges Hospital
Alex Wickham, Consultant Anaesthetist, St Mary's Hospital
Charlotte Lindsay, Research Fellow/EM trainee, Centre for Trauma Sciences, QMUL (design/layout)

Older trauma specialty group members / First & second edition contributors:

Raj Ahliwalia, Consultant Geriatrician, King's College Hospital
Dan Bailey, Consultant Geriatrician, Kings College Hospital
Kat Baird, EM Specialist Registrar, NELETN
Duncan Bew, Consultant Trauma Surgeon, Kings College Hospital
Trish Burton, Trauma Nurse Coordinator, Royal London Hospital
Gareth Boyden, Trauma and Orthopaedics Physiotherapist, St Mary's Hospital
Clarence Chikusu, Consultant Geriatrician, St Peter's Hospital
Joseph Davies, NWL Network Manager, NWL/St Mary's Hospital
Nicola Dover, ED Senior Practice Development Nurse, North Middlesex University Hospital
Russell Durkin, Consultant in Emergency Medicine, Royal Free Hospital
Michael Fertleman, Consultant Geriatrician, St Mary's Hospital
Paul Hartnett, Consultant Orthopaedic Surgeon, King's College Hospital
Derek Hicks, Consultant in Emergency Medicine/Network Director, NELETN
Luke Hounsom, Consultant Trauma Medicine, Basildon Hospital
Fraser Ingham, Consultant Radiologist, Royal Free and Barnet hospitals
Dawn James, Trauma and Orthopaedics Nurse Coordinator, King's College Hospital
Heather Jarman, Consultant Nurse ED, St Georges Hospital
Ari Johar, Consultant Geriatrician, Royal Free Hospital
Chooi Lee, Consultant Geriatrician/Orthogeriatrician, Kingston Hospital
Natalie Marroney, Major Trauma Physiotherapist, St Mary's Hospital
Sabeena Obaray, Consultant EM, Royal London Hospital
Victoria Osborne-Smith, SELKAM network manager, SELKAM/ King's College Hospital
Rachel Parrott, Trauma and Orthopaedics Physiotherapy Team Leader, St Peter's Hospital
Roisin Purcell, Consultant Geriatrician, Whipps Cross Hospital
Nicola Radford, Consultant in Emergency Medicine, Homerton Hospital
Ines Reichert, Consultant Trauma and Orthopaedics, King's College Hospital
Davina Richardson, Clinical Service Lead Therapist, Major Trauma, St Mary's Hospital
Harriet Tucker, EM Specialist Registrar, SWLSTN
James Uprichard, Consultant Haematologist, St Georges Hospital
Julie Vowles, Consultant Geriatrician, Hillingdon Hospital
Anita West, Trauma Nurse Coordinator, Royal London Hospital
Karen Wheeler, Trauma Nurse Coordinator, North Middlesex University Hospital
Mark Wilson, Consultant Neurosurgeon, St Mary's Hospital
Adam Woodgate, Consultant EM, Royal London Hospital

About the London Operational Delivery Networks

The London Operational Delivery Networks brings together the individual ODNs operating across London to provide a capital wide system for governance and oversight, ensuring a collaborative pan London approach to implementing changes to care pathways and service improvements.

Major trauma

Trauma ODNs are responsible for all aspects of trauma care, from a patient's point of injury to rehabilitation and a return to socio-economic functioning. Fostering a culture of collaboration across the network, Trauma ODNs work to ensure there are effective pathways of care for patients between providers in the network, making sure people receive the right care