

Document Control	
Title	Management of Chest Wall Trauma in Adults
Version	2.1
Supersedes	<p>Supersedes: Management of Chest Wall Trauma in Adults v2.0</p> <p>Description of amendment(s): Updated guidance on thoracic trauma referral and pathway</p>
Minor Amendment	<p>Date: 22.01.20</p> <p>Notified To: WYMTN Clinical Lead Date: 22.01.20</p> <p>Summary of amendments: Addition of Minor / Mod / Severe injury categories Modification of LTHT patient management guidance</p>
Authors	<p>Originated By: Rashmi Menon. Amended by Jon Jones / Richard Milton (EM / Thoracic surgery)</p> <p>Designation: Consultant in Anaesthesia Anaesthesia Lead for Major Trauma</p> <p>Co-Authors: Dr Kris Welsh</p> <p>Designation: Aneasthetic Registrar</p>
Ratification	Ratified by: WYMT Network
Application	All trauma patients
Circulation	<p>Issue Date: 22/01/2020</p> <p>Circulated by: Tina Wall, Trauma Network Manager</p>
Review Date	January 2022
Date placed on the Internet	22/01/2020



Table of Contents

Management of Chest Wall Trauma in Adults	1
INTRODUCTION	4
SCOPE OF THIS GUIDELINE	4
INJURY PATTERNS	4
Rib fractures	4
Pulmonary contusion	4
Flail chest.....	4
INITIAL MANAGEMENT IN ED	5
Indications For Thoracic Surgical Opinion	5
Indications For Ventilatory Support	6
PLACE OF PATIENT CARE	7
Critical care.....	7
Critical care outreach	Error! Bookmark not defined.
Ward level care.....	Error! Bookmark not defined.
PAIN MANAGEMENT IN CHEST WALL TRAUMA	8
Assessing Pain.....	8
CHEST WALL TRAUMA PAIN PATHWAY	8
STEP 1 LTHT Analgesic Ladder	8
STEP 2 Patient-Controlled Analgesia Systems (PCAS)	9
STEP 3 Local/Regional Anaesthetic Techniques	10
Rib fixation.....	11
Supportive Management For Chest Wall Injury.....	11
CHEST DRAIN MANAGEMENT.....	12
Indications For A Chest Drain	12
Chest Radiograph Prior To Chest Drain Insertion.....	12
Insertion Of A Chest Drain.....	13
Management Of The Patient With A Chest Drain	14
When To Remove A Chest Drain	14
Governance	15
PROPHYLACTIC ANTIBIOTICS	15
Penetrating chest trauma.....	15
Blunt chest trauma:	15
RIB FRACTURE FIXATION	15
Indications for considering rib fracture fixation:.....	16
Timing of surgical fixation	16
Follow-up.....	16
SUMMARY	16
APPENDIX 1 - ALGORITHM FOR OPERATIVE INTERVENTION IN RIB FRACTURES....	17
APPENDIX 2 - RIB FRACTURE PAIN PATHWAY	18
GUIDELINE DEVELOPMENT GROUP LTHT	18

INTRODUCTION

- Chest trauma is common.
- Rib fractures and lung injuries are the commonest sites of chest injury.
- In the management of most chest injuries, insertion of an appropriately sized, correctly positioned chest drain is the only surgical procedure required.
- Good analgesia is paramount to optimise respiratory function.

SCOPE OF THIS GUIDELINE

This guideline covers the management of chest trauma and rib fractures and includes advice about investigations, referral, chest drains and analgesia.

INJURY PATTERNS

Rib fractures

- Rib fractures are the commonest injury in blunt trauma.
- Ribs 4 – 8 are the most common fractured ribs.
- Fractures of the 1st to 3rd ribs indicate high energy trauma: consider subclavian or brachial plexus injuries.
- Fractures to ribs 9 – 12 can be associated with intra-abdominal injury.
- The commonest injuries associated with rib fractures are haemothoraces and pneumothoraces.
- Elderly patients are at increased risk of respiratory tract infection and death.
- The greater the number of fractures, the higher the risk.

Pulmonary contusion

- Blunt force trauma to the chest wall results in pulmonary contusion. This may or may not be associated with rib fractures.
- Pulmonary contusion can result in respiratory failure requiring invasive respiratory support.

Flail chest

- Definition: 3 or more ribs fractured in at least 2 places.
- The clinical significance of a flail chest is the presence of an incompetent segment of chest wall large enough to impair respiration, compounded by underlying pulmonary contusion.
- Despite the radiological appearance of a flail chest, patients may not have a clinically apparent flail segment. This could be because the patient may be in too much pain to breathe effectively or the chest wall musculature may be in spasm; either may mask paradoxical chest wall movement. Alternatively, the patient may have required early intubation for other reasons.
- The combination of flail chest and pulmonary contusion is associated with higher mortality than either isolated contusion or flail.

INITIAL MANAGEMENT IN ED

Patients should be managed according to the established trauma management guidelines. Specific management for patients with significant chest injury is guided by the degree of respiratory impairment in conjunction with other factors, e.g. shock, associated head injuries or the need for anaesthesia for extra-thoracic injuries.

- Application of high flow oxygen as per BTS guidelines.
- Drainage of any associated pneumothorax or haemothorax, if indicated.
- Assessment by the anaesthetist present at the trauma call regarding need for mechanical ventilation.
- Fluid resuscitation
 - Resuscitate with blood products if hypotensive due to haemorrhage.
 - Consider risks and benefits of permissive hypotension as part of damage control resuscitation.
 - Balance against risk of fluid overload and development of ARDS in a lung with contusions.
- Early, good quality pain relief
 - Paracetamol
 - NSAIDs (if no contra-indication)
 - IV morphine and/or IV ketamine
 - Regional anaesthetic techniques

Indications For Thoracic Surgical Opinion

Consider discussing chest trauma with thoracic surgeons if any of the following are present:

- Any case that may require surgical intervention to the chest
- Radiological or clinical suspicion of a flail chest
- Sternal fractures
- Pneumomediastinum
- Subcutaneous emphysema
- Significant symptom burden
 - Failure of pain control
 - Inability to cough effectively / clear pulmonary secretions
 - Ventilatory compromise

(note that these are *relative* indications and not absolute, particularly in the case of subcutaneous emphysema and sternal fracture)

Chest wall injuries can be considered as:

Minor

< 4 rib fractures

Lung contusions without an oxygen requirement or < 40% oxygen requirement

Small haemothorax (< 500 ml from ICD)

Pneumothorax +/- ICD

Moderate

>3 rib fractures

First & Second rib fractures

B/L rib fractures (> 3 rib fractures on each side)

Moderate haemothorax (1L of blood from ICD)

Lung contusions with > 40% oxygen requirement

Persistent chest wall pain despite analgesia as per WYMTN guideline recommendations

Pneumomediastinum with concerns of a possible tracheobronchial or oesophageal injury

Severe

Deformity of chest wall/ thoracic cavity

Flail chest (radiological flail segment with paradoxical chest wall movements on clinical examination)

Persistent air leak at 48 hours

Massive haemothorax (> 1.5L of blood from ICD)

Rib 1-2 fractures with underlying vascular injury

Lung contusions with progressive respiratory failure requiring ventilation.

Sternal fracture with a mediastinal haematoma and abnormal ECG suggestive of potential mediastinal vessel injury or cardiac contusion.

In general 'minor' injuries can be managed at a Trauma Unit. Moderate / Severe injuries will likely need transfer to the MTC. Patients managed at the TU should be considered for referral to the Thoracic Surgical trauma clinic. Generic referrals marked "For the attention of thoracic trauma / acute clinic" can be sent to Sadaf Hafeez (Clerical officer, sadaf.hafeez@nhs.net) **AND** Eve Hodgson (Assistant Patient services co-ordinator, eve.hodgson@nhs.net). (0113 2068808 & 0113 2068856)

CT scan of the chest should generally be obtained prior to referral and should be strongly considered in any patient requiring admission because of chest wall injuries.

In cases of penetrating trauma to the chest, as part of the trauma call, the Vascular/Trauma surgeon should be present in ED on arrival of the patient and ALL great vessel injuries must be referred to the vascular surgical team. Acute involvement of other surgical specialities (e.g. thoracics) should be decided during the initial patient assessment.

Indications For Ventilatory Support

Ventilatory support is rarely needed for isolated chest wall injury. Hypoxia due to severe underlying lung contusions or due to pre-existing lung disease makes it more likely.

Absolute indications

- Respiratory failure requiring ventilation
- Associated severe injuries needing organ support

Relative indications

- Impending respiratory failure ($P_aO_2 < 8\text{kPa}$, $P_aCO_2 > 6.5\text{kPa}$, Respiratory Rate > 20)
- Age > 65 years with 4 or more rib fractures
- Large flail segment
- Pre-existing severe lung disease (asthma/COPD)
- Large/bilateral lung contusions

PLACE OF PATIENT CARE

Any trauma patient being transferred from a TU Emergency Department MUST be transferred to the LGI ED regardless of why the patient is being transferred (ie patients with acute thoracic trauma should not be transferred to SJUH).

Guidance on appropriate placement on patients within LTHT can be found on the WYMTN website MTC guidelines section.

TU patients & Critical care

Assuming transfer to the MTC is not considered appropriate then suggested indications for consideration of level 2 critical care admission include:

- Ventilatory compromise not requiring invasive ventilation
 - Tachypnoea, hypoxia, increasing oxygen requirements
 - Large/bilateral lung contusions
- All patients with a regional anaesthetic infusion
- Patients at high risk of deterioration
 - Multiple rib fractures if older than 65
 - Pre-existing significant respiratory disease
 - Clinical or radiological flail segment
 - Multiple rib fractures and a chest drain
 - Any patient whose pain is not managed by step 2 of the analgesia pathway

PAIN MANAGEMENT IN CHEST WALL TRAUMA

- Pain from rib fractures is severe and reduced respiratory effort/secretion clearance risks the development of respiratory tract infection.
- Analgesia should be rapidly escalated and the patient referred to the acute pain team if pain is limiting the ability to mobilise or participate in chest physiotherapy.

Assessing Pain

- The severity of pain should be assessed and documented on a 0-3 Pain Intensity Verbal Descriptor Scale (0=none, 1=mild, 2=moderate, 3=severe).
- Pain score should be done at rest and during movement.
- Dynamic pain score refers to pain associated with movement, deep breathing and coughing.

CHEST WALL TRAUMA PAIN PATHWAY

STEP 1 LTHT Analgesic Ladder

Patients with minor severity of rib fractures may be managed by Step 1 of the pain pathway. Please refer to the [Leeds Teaching Hospitals Acute Pain Manual](#).

Paracetamol	1g 6 hourly PO/IV	All patients unless contra-indicated Reduce dose if <50kg
Non-steroidal anti-inflammatory drugs		All rib fracture patients unless contra-indicated
Ibuprofen	400mg 6 hourly PO OR	Review or stop after 3 days GI protection in at risk patients Contraindications: renal impairment, bronchospasm, peptic ulcer disease Caution in significant bleeding
Naproxen	500mg 12 hourly PO	
Weak Opioids		Useful in mild-moderate pain
Dihydrocodeine	30mg 6 hourly PO	
Tramadol	50-100mg 6 hourly PO/IV	
Strong Opioids		Rescue analgesia
Oral morphine	10mg PRN (Max 120mg in 24 hours)	

STEP 2 Patient-Controlled Analgesia Systems (PCAS)

Start an IV Morphine PCAS in patients whose pain is not adequately controlled by step 1 of the analgesic ladder.

- Refer to the Trust guidance: [Clinical Practice Guidelines for the Prescription and Administration of a Patient Controlled Analgesia System \(PCAS\) for the Management of Acute Pain in Adults](#)
- Ensure the infusion is prescribed on a Trust-approved PCAS prescription chart and that an observation chart to assess safety and efficacy of pain management is completed.
- Unless advised otherwise by the acute pain team/ anaesthetist/ intensive care bleep holder or there is a specific contraindication, patients should be started on a standard morphine PCAS (Morphine IV 1mg bolus 5 minute lockout).
- On commencement of the PCAS all other **acute** opioid prescriptions must be stopped. Long term opioids may be continued.
- Troubleshooting:
 - Inadequate pain relief Consider increasing bolus dose
 - Complications Symptomatic relief of respiratory depression/itching/drowsiness/nausea/constipation

Adjuncts

Any patient failing treatment due to inadequate pain relief or unrelieved symptoms should be discussed with:

- Acute pain team OR
- Acute anaesthetist OR
- Intensive Care Bleep Holder

Options for further management that may be suggested include:

- Change to oxycodone PCAS
- Increased bolus dose of opioid
- Background infusion of opioid (Critical Care patients only)
- Ketamine addition to a morphine PCAS – discuss with acute pain team.
 - Ketamine enhances the analgesic effect of opioids and reduces tolerance. It is especially useful in patients with opioid tolerance due to chronic pain or IV drug use or severe acute pain not managed by opioids.
- Clonidine
 - Oral/subcutaneous injection 50 micrograms 3 times a day

Any patient receiving a non-standard PCAS, ketamine or clonidine must be referred to the acute pain team as soon as possible.

STEP 3 Local/Regional Anaesthetic Techniques

If pain is not adequately controlled by step 2, the following techniques may be considered after consultation with:

- Acute Pain Team OR
- Acute Anaesthetist OR
- Intensive Care Bleep Holder

It is recommended that these patients are admitted to a level 2 critical care bed. At Leeds General Infirmary it is required as patients with continuous regional anaesthetic infusions cannot be managed on L10.

Continuous Epidural Analgesia

- Good quality continuous pain relief
- Small studies have shown benefit over intravenous opioids in reducing pain scores, shorter duration of mechanical ventilation and development of pulmonary complications.
- Consider in patients whose pain is not adequately controlled with a PCAS and 'at-risk' patients - elderly, underlying lung disease, flail segments, >4 rib fractures.
- It may not be practical initially in some major trauma patients due to urgency of damage control surgery, coagulopathy and difficulty positioning due to associated injuries. It may be performed later.
- Insertion takes place in critical care or in theatres (acute or trauma).
- Epidurals may cause hypotension and there is a risk of infection if epidural catheters stay in for longer than 72 hours. Hence strict aseptic precautions should be followed during insertion and the need for continuing the epidural should be reviewed on a daily basis.
- Patients may be weaned to an opioid PCAS after the acute phase.
- Refer to [Clinical Practice Guidelines for the Delivery of Epidural and Paravertebral Analgesia in Adult Acute Pain Management](#)

Paravertebral infusion

- Unilateral analgesia
- Less risk of hypotension as compared to an epidural
- Higher risk of pneumothorax than epidurals, however this is not an issue if an intercostal drain is in situ
- Insertion in critical care or in theatres (acute or trauma)
- Patients with paravertebral catheters in situ need the same degree of monitoring as patients with indwelling epidural catheters.

Serratus anterior plane block

- Ultrasound guided insertion of a infusion catheter between a rib and the serratus anterior muscle. Initial block can be supplemented with an infusion.
- Surgical emphysema may make ultrasound guidance challenging.
- Limited local experience may preclude use of this block.

Rib fixation

- Surgical fixation of rib fractures may aid in pain management.

Supportive Management For Chest Wall Injury

Patients with rib fractures are at high risk of hypoventilation, retaining secretions and developing secondary infections leading to a worse prognosis. As a result they should be aggressively managed to prevent chest infection.

- Use of humidified oxygen to loosen secretions and help sputum clearance
- Early and aggressive respiratory physiotherapy, encouraging deep breathing, coughing and clearance of secretions
- Incentive spirometry can greatly assist in building up lung capacity and avoiding atelectasis and should be offered to all patients if able to use it
- Use of nebulised saline and bronchodilators may be used to aid the removal of secretions if the above measures fail. Regular around the clock bronchodilators and saline are **not** indicated routinely in all patients.
- Rib belts and other stabilizing devices: these consist of a broad band of material with handles at either end that the patient places around his/her chest and holds firm to 'splint' the ribcage during coughing. Instead of purpose made devices, a cushion or pillow also can be used. There exists anecdotal reports of better cough due to less pain as the ribs are splinted.

CHEST DRAIN MANAGEMENT

Indications For A Chest Drain

- Potentially life-threatening conditions requiring a chest drain are:
 - Tension pneumothorax
 - Open pneumothorax, in conjunction with closing/covering the open wound
 - Massive haemothorax
- Other indications are:
 - 'Large' simple pneumothorax not under clinical tension
 - If unsure as to whether or not to drain an asymptomatic pneumothorax visible on CXR then discuss with thoracics.
 - Any pneumothorax in a haemodynamically unstable patient
 - Bilateral pneumothoraces
 - Large pleural effusions - which in the context of trauma will almost invariably be haemothoraces
- The presence of surgical emphysema alone is not an indication for a chest drain if no pneumothorax can be identified on imaging.
 - Consider a chest drain in worsening surgical emphysema.
- The identification of an asymptomatic pneumothorax on a Trauma CT is not an indication for a chest drain in an otherwise stable patient.
- Consider a chest drain in a patient with an asymptomatic pneumothorax who is to be intubated and ventilated for theatre.
- The presence of needle decompression cannulae that have been placed prior to arrival in the Emergency Department does not mandate the insertion of a chest drain unless clinically indicated.
- Self-ventilating patients should not be left with finger thoracostomies, which may behave like an open pneumothorax. These patients require a chest drain.

CAUTION

- There is no evidence to support *not* inserting a chest drain in a patient with a symptomatic large haemothorax, for fear of releasing the tamponade effect. Such large effusions usually cause tension, and these patients have a 'B' problem due to their lung collapse as well as a 'C' problem.

Chest Radiograph Prior To Chest Drain Insertion

- It is important not to delay decompressing a suspected tension pneumothorax.
- There may be enough time to obtain a chest x-ray whilst setting up for the insertion of a chest drain.
- This is not the same for a patient who has suffered a traumatic cardiac arrest or a patient in extremis with a suspected chest injury, who will most likely require immediate bilateral thoracostomies.

Insertion Of A Chest Drain

- All clinicians who are expected to be able to insert a chest drain should be trained using a combination of didactic lecture, simulated practice and supervised practice until considered competent.
- Written consent should be gained whenever possible. Complications of the procedure include pain, intra-pleural infection, wound infection, drain related visceral injury, bleeding from intercostal vessels and drain blockage. All of these possible sequelae should be detailed in the consent process.
- In a conscious alert patient, give sufficient local anaesthetic & give it enough time to work.
- A 28 Fr chest drain is sufficient in most situations.
- Small bore Seldinger drains should be avoided in trauma unless there is a specific indication, and after discussion with an appropriate specialist team.
- The usual point of insertion would be in the 5th intercostal space between anterior and mid-axillary lines, as per ATLS guidelines.
- All 'trauma' drains must be inserted using blunt dissection: trocars must NOT be used.
- Having inserted the chest drain, secure it in place and connect it via the drain tubing to an underwater seal rocket bottle.
- Take care to ensure that drains are adequately secured.
- A simple dressing around the drain site is all that is required. This allows inspection of the drain insertion site.
- Obtain imaging to ensure correct positioning of the chest drain – either a chest x-ray or CT scan if the patient is en route to the scanner.
- A second drain must not be inserted through the site of a previously dislodged drain because of the increased risk of infection (BTS 2010).

CAUTION

- Trauma patients are not the patients on whom to practice inserting your first chest drain. If you're not happy or experienced in chest drain insertion, assist a more experienced colleague.
- Be aware of the patient who has obvious scars on their chest or who gives a history of previous thoracic surgery: there are likely to be adhesions.
- Be aware of the patient who has a history of COPD. Bullous disease can be mistaken for a pneumothorax.
- A ruptured left hemidiaphragm and intrathoracic stomach can mimic a pneumothorax.
- A ruptured right hemidiaphragm and intrathoracic liver can mimic an effusion.
- If, after chest drain insertion or after imaging, there is concern that the chest drain is in the incorrect place, seek advice from a more experienced colleague or ask Thoracic Surgery for advice. The patient may need a new drain and advice about how to deal with the existing one.
- **NEVER** clamp a chest drain.

Management Of The Patient With A Chest Drain

- What to measure:
 - Swinging or not
 - Presence of an air leak
 - Constant
 - On expiration
 - On coughing
 - Fluid
 - Volume
 - Colour / consistency
- When to measure
 - Hourly
 - 24hour total
- Inspect the drain site
- Suction
 - Avoid suction on chest drains unless advised by thoracic surgery.

CAUTION

- In most trauma situations effusion is likely to be haemorrhagic.
- Involve thoracic surgery early if there is significant blood loss of greater than 1000ml on insertion or ongoing blood loss of ≥ 100 ml per hour, or persistent air leak after >24 hours.
- If the effusion is consistent with gastric contents, consider oesophageal rupture, ruptured diaphragm, or a misplaced (intra-gastric) drain. In these situations, seek advice from a more experienced colleague or from Thoracic Surgery.

When To Remove A Chest Drain

- If the drain has stopped draining it is no longer needed or it has stopped functioning correctly.
- If placed for pneumothorax, there should be no air leak for 24 hours prior to removal.
- Ensure that there is a stitch that can be used to close the drain hole.
- Chest drain removal is usually a two-person job – one person to remove the drain and the other to secure the wound with the stitch.
- There is some evidence (following elective thoracic surgery) that removing the drain at the end of full expiration leads to a lower incidence of non-clinically significant pneumothorax.
- It is not mandatory to obtain a chest x-ray following drain removal if the patient remains well and there are no concerns on auscultation. If in any doubt, a chest x-ray is indicated.

CAUTION

- Occasionally drains stop working because they have become blocked or kinked, or dislodged. They can be within the soft-tissues.

Governance

- All trusts should conduct regular audit of chest drain insertion.
- A lead for training of all staff involved in chest drain insertion should be identified.
- All incidents should be reported via local incident reporting systems and regularly reviewed.

PROPHYLACTIC ANTIBIOTICS

Penetrating chest trauma

- All patients who require insertion of an intercostal drain or open surgery need a minimum of 3 doses of IV prophylactic antibiotics.
- If the drain is to remain for longer than 24 hours, antibiotics should be continued whilst the drain remains in situ to a maximum of 72 hours.
- Initial antibiotic choice should be as per local open fracture prophylaxis.
- Further management should be in consultation with a microbiologist.
- Patients with penetrating trauma who do not require operative intervention (including chest drain insertion) do not require antibiotic cover.

Blunt chest trauma:

- Prophylactic antibiotic cover is not required for intercostal drains inserted for blunt trauma.

RIB FRACTURE FIXATION

- Most patients with rib fractures can be managed conservatively without the need for specific surgical intervention.
- Some patients with multiple rib fractures, with or without a flail chest, can develop long-term problems, including persistent pain, chest wall deformity and dyspnoea on exertion.
- There is evidence that surgical fixation of rib fractures in selected patients can improve short- and long-term outcomes. The elderly especially are at increased risk of respiratory complications following blunt chest trauma.
- The patient's co-morbidity and extra-thoracic injuries should be taken into account in deciding on the appropriateness or otherwise of surgical rib fixation.

Indications for considering rib fracture fixation:

- Need for a thoracotomy to repair other intrathoracic injuries
- Open rib fracture
- Stabilisation of a flail chest, especially if associated with pulmonary restriction due to paradoxical movement
- Patient failing to wean from prolonged intubation
- Deteriorating pulmonary function in non-intubated patient due to failure of chest wall mechanics
- Uncontrolled pain due to rib fractures
- Progressive chest wall deformity ('stove in' chest)

Timing of surgical fixation

- Earlier stabilisation is technically easier than delayed surgery and has a more predictable benefit in terms of pain relief.
- Delayed surgery in an elective setting may be considered, particularly if other injuries have taken priority in the early period. Indications include painful non-union, reduction of overriding ribs or correction of a chest wall deformity or defect; the results are less predictable in terms of pain relief.

Follow-up

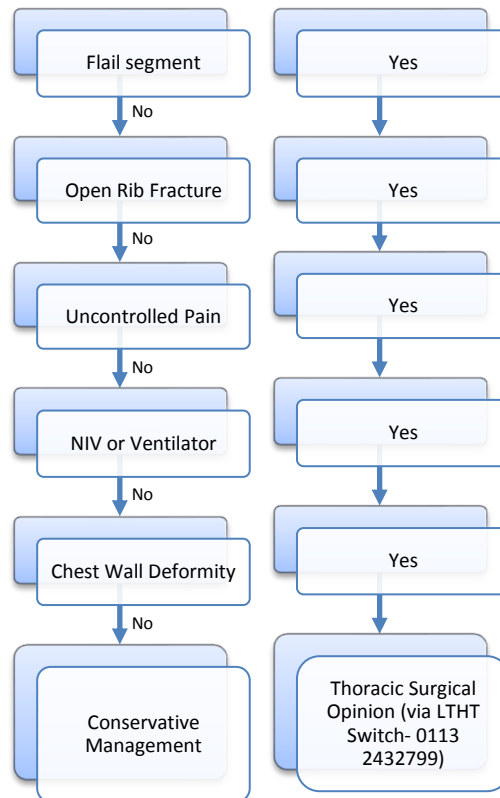
Follow-up, either locally or in Thoracic surgical clinic, is still recommended for these patients. Delayed complications include haemothorax, chronic pain and progressive chest wall deformity or restriction.

- Fax a copy of ED / ward notes together with generic referral form marked "For the attention of thoracic trauma / acute clinic" to 68824.
- Advise the patient that they will be contacted directly and should expect to be seen with 1 – 2 weeks. If they have not heard within 7 days they should contact 0113 2068760 (A delayed out-patient appointment may be appropriate in patients who have been an in-patient for several weeks).

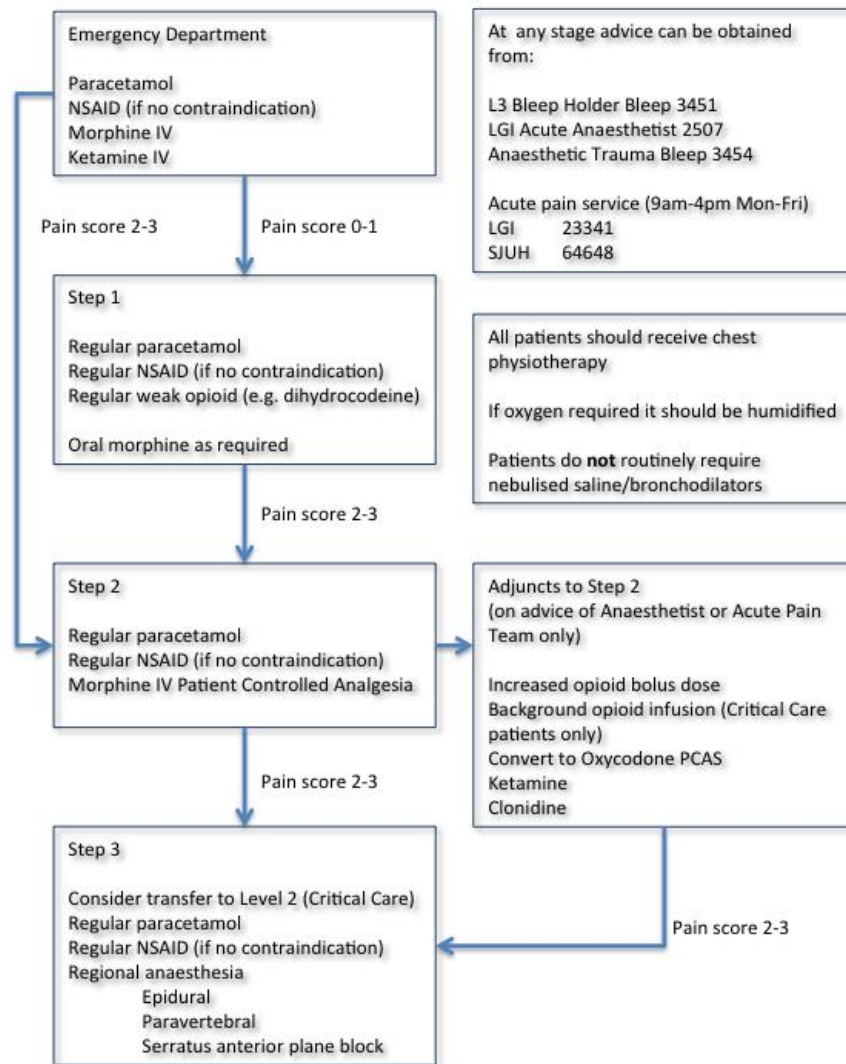
SUMMARY

- Blunt chest wall trauma is common.
- The combination of underlying pulmonary contusion coupled with hypoventilation from an unstable chest wall and pain is potentially life threatening.
- Risk factors predicting mortality include: increasing age (>65 years), 3 or more rib fractures, pre-existing disease especially cardiorespiratory, and the development of pneumonia.
- If patients are to be managed conservatively they need to be in an appropriate environment where deterioration will be recognised
- Seek Thoracic opinion early.

APPENDIX 1 - ALGORITHM FOR OPERATIVE INTERVENTION IN RIB FRACTURES



APPENDIX 2 - RIB FRACTURE PAIN PATHWAY



GUIDELINE DEVELOPMENT GROUP LTHT

Anaesthesia: Dr R Menon, Dr R Bayliss, Dr K Welsh,

Trauma and Orthopaedics: Mr N Kanakaris, Mr L Toth

Emergency Department: Dr J Jones, Dr A Wallace

Thoracic surgery: Mr R Milton

Acute Pain Team: Dr B Rippin, Sr K Duffy

Critical Care: Dr P Jackson, Dr G McNulty, Dr J Sira, Dr S Turner, Mr R Faulkner

Critical Care Outreach: Sr K Cole