

SOUTH WALES TRAUMA NETWORK (SWTN)

CLINICAL GUIDELINE (CG)

ANALGESIA FOR RIB FRACTURES (ADULT MAJOR TRAUMA PATIENTS)

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Aims & Scope

The aim of this document is to describe:

- The importance of optimising analgesia in rib fracture management.
- The use of risk stratification tools in guiding analgesia and ongoing care.

Introduction

Rib fracture analgesia management can be difficult at times and appropriate control of pain requires complete patient assessment and placement of the patient in an environment that is able to safely and effectively manage the pain control techniques appropriate to the needs of the patient.

Pain assessment requires a holistic and escalated approach to ensure that pain is controlled whilst minimising the adverse effects of the analgesic techniques applied. Effective acute pain management is a core tenant of the network and has been highlighted as an area of improvement by patients experiencing the system pre-dating the trauma network.

Effective pain management for rib fractures reduces in-hospital mortality, morbidity including all pulmonary complications (chest infection, pneumonia, haemothorax, pneumothorax, pleural effusion, or empyema), ICU admission, or a prolonged length of stay.

As such each health board within the network should develop a policy for the management of analgesia in rib fractures which can be applied to both major trauma and non-major trauma patients in order to minimise morbidity and mortality and improve patient comfort. This should be based on local knowledge and experience.

Risk Stratification

Recent evidence suggests that the use of rib fracture management tool can help reducing morbidity and mortality in the following ways:

- Risk stratification that increase the risk of complications (incl. age, number of rib fractures, chronic disease, pre-injury anticoagulation and oxygen saturations on presentation). For example, even for patients with a risk score of 11-15, the probability of developing complications is 29%.
- Provide analgesic approaches suitable for each risk category. Techniques available include the regular use of Paracetamol and NSAIDs, weak and strong opioids, IV PCA and epidural or local block techniques (e.g. serratus anterior/erector spinae plane block/paravertebral block). These may be applied in isolation or in combination. The use of an acute pain service for full pain control and on call anaesthetic support as appropriate is recommended.
- Guide additional support that might be required (e.g. chest physiotherapy) and disposition.

Rib fracture management tools

Two examples are provided here of rib fracture management tools based the same risk stratification score. The view of network is that these should be locally adapted, based on local knowledge, experience and skills available, whilst maintaining core functions.

Standards for initial management of rib fractures and chest wall injury

In addition to TARN audit standards, the SWTN have developed a comprehensive standards, based on best practice evidence, which all hospitals (i.e. MTC and TUs) should aim to meet in relation to initial management. These are summarised below:

1. All patients with chest wall injury should have a rib fracture risk stratification tool completed on assessment in ED and Minor Injury Units (incl. documentation of a STUMBL score). Standalone tools or that contained within the network clinical guideline are appropriate. Compliance of use of risk stratification tools (incl. STUMBL score) assessed through regular internal audits.
2. All patients who are discharged should have a discharge advice sheet provided in ED with appropriate 'safety netting.'
3. All hospitals should work towards having a 24/7 pain service.
4. All hospitals to work towards having at least daytime cover 7 days/week access to physiotherapy to support recruitment and secretion clearance for admitted patients, with on call availability out of hours. Patient should be seen twice or more as indicated within a 24hr period.
5. All hospitals to develop 24/7 access to regionalised anaesthesia - ESB & paravertebral blocks
6. All hospitals should have clear pathways for admission and disposition
7. All admitted patients over the age of 65 to have a geriatric review including a Clinical Frailty Score
8. All clinical & operational issues pertaining to chest wall injuries should be discussed at respective hospital trauma M&M meetings, with actions reported into HB TQUIC meetings.
9. If a patient meets the criteria for rib fixation, should be discussed with the nearest thoracic service.

Rib fixation

Rib fixation forms an important part of analgesic control of rib fractures in selected patient groups.

Patients who are intubated or with multisystem trauma and multiple rib fractures should be transferred to the MTC via TTL (pathway 1 or 2). These patients should be discussed with the thoracic surgical service to be considered for rib fixation.

Non-intubated patients or those with isolated chest wall injuries who fulfil criteria for rib fixation should be discussed with the nearest thoracic surgical service (pathway 3).

Whilst there is presently no dedicated rib fixation service in the region, as a guide, the following groups of patients should be discussed with the nearest thoracic surgical service following a CT thorax (with 3D reconstructions):

4 or more rib fractures and ANY of the following:

Clinical flail segment?

Poorly controlled pain despite regional anaesthetic block?

Ventilated (invasive/non invasive)?*

Threatened respiratory failure with significant chest wall component (pain/flail)?

Significant coexistent cardiorespiratory disease?

*Generally pathway 1 or 2 transfers via MTC

TTL, all others pathway 3 to specialty

The above represents trigger points for discussion with respective thoracic teams. The outcome could be the following:

Patient accepted for rib fixation and transferred.

Patient not requiring rib fixation and to be continue to managed locally. Trauma Unit to contact thoracic team if any change in clinical condition, to reassess indications.

At the time of review work is ongoing in relation to the development of a regionalised rib fixation service.

References

Battle CE et al. Predicting outcomes after blunt chest wall trauma: development and external validation of a new prognostic model. *Crit Care* 2014; 18(3): R98.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4095687/> [Accessed 6/1/2020].

NICE guidance (IPG361). Insertion of metal rib reinforcements to stabilise a flail chest wall, 2010.

<https://www.nice.org.uk/guidance/ipg361> [Accessed 8/1/2020].

Appendix 1 – Example of a Rib Fracture Scoring and Pain Management Tool

RIB FRACTURES A SCORING TOOL TO DETERMINE THE PROBABILITY OF SERIOUS COMPLICATIONS POST BLUNT CHEST WALL TRAUMA					
Age: Score 1 point for every complete 10 years i.e. 63 years = 6 points	Rib Fractures: Score 3 points for every rib fractured. Flail: score 3 x 2 points for every flail rib	Chronic Lung Disease: e.g. asthma, COPD, smoker. If yes score 5 points	Pre Injury Anticoagulant: If yes score 4 points	Oxygen Saturation on room air: ≤94% - 2 points ≤89% - 4 points ≤85% - 6 points	Total Risk Score: _____

Apply total risk score to appropriate column below and follow the guidance.

Apply principles of WHO analgesic ladder to provide analgesia based on rib fracture score and clinical presentation.

Assess pain on deep breathing, cough and movement using none, mild, moderate or severe.
 For patients with communication difficulties use the C&V UHB Pain Assessment Toolkit in conjunction with "Show me Where"

Risk score 0-10 13% Probability Refer to Pain Team. If pain persists/increases consider IV PCA	Risk score 11-15 29% Probability Refer to Pain Team. If pain persists consider epidural	Risk score 16-20 52% Probability Refer to Pain Team and Senior Anaesthetic Review. If pain persists consider epidural	Risk score 21-25 70% Probability Urgent referral to Pain Team & urgent Senior Anaesthetic Review Bleep 5101 or Vocera 40131 Epidural Analgesia – consider coagulation / coagulation therapies Regular NSAID – If not contraindicated Regular paracetamol	Risk score 26-30 80% Probability	Risk score 31+ 88% Probability
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WHO ANALGESIC LADDER RECOMMENDED ANALGESIA FOR ACUTE PAIN IN ADULT PATIENTS			
Pain Severity on Movement & Deep Breathing Assess the level of pain and start at the appropriate point of pain severity			
Regular Paracetamol 1g qds po/pr. Max 4g daily. Consider IV paracetamol if patient is NBM. If pt weight < 50kg dose IV at 15mg/kg every 4-6hrs (max 60mg/kg in 24hrs)	1	2	3
Regular NSAID (if not contraindicated) Ibuprofen 400mg PO TDS Naproxen is preferable to ibuprofen in patients on aspirin and with a history of cardiovascular disease. Diclofenac PR may be used for patients unable to take oral NSAIDs. *Cautions include renal disease, oral anti-coagulation, history of hypersensitivity to NSAIDs, history of gastric irritation, asthma. Refer to BNF for full list.	Mild ✓ Plus PRN oramorph ✓	Moderate ✓ Plus PRN oramorph ✓	Severe ✓
Regular Weak Opioid Either Codeine 30-60mg po qds. Or Tramadol 50-100mg qds. Consider a reduced dose in the elderly e.g. 50mg tds.			
Regular Strong Opioid or Interventional Pain Management Either: a) Regular Slow Release Morphine e.g. MST, plus prn oramorph b) Follow prn im/sc/po hourly opioid algorithm (see intranet page) Or: c) IV PCA if risk score > 11 d) Epidural if risk score > 16 ANAESTHETIC REVIEW	Co-prescribe naloxone and consider prophylactic anti-emetics and laxatives. If standard analgesic options are contraindicated e.g. when dealing with very frail elderly patients with significant co-morbidities, the use of a 5-7 day course of lidocaine 5% patches overlying the rib fractures (12 hours on 12 hours off) for inpatient use only may provide benefit.		

Acute Pain Service, Bleep 5414. Anaesthetist bleep 5101, Vocera 40131.

Appendix 2 - Example of a Rib Fracture Scoring, Pain Management and Disposition Tool

STUMBL Adult Blunt Chest Trauma Risk Tool¹



Add patient ID sticker

Age	Suspected Rib Fractures	Chronic Lung Disease	Anticoagulated Pre-injury	O2 Sats on Room Air	Total Score	
Score 1 point for every complete decade e.g. 63 = 6 points	Score 3 points for every suspected rib fracture. Score 6 for each segmental rib fracture in the flail segment	5 points for COPD or productive chest disease (not smokers)	If yes score 4	<94% = 2 <89% = 4 <85% = 6	Add each separate score to give a total risk score	
Risk Score	≤10	11-15	16-20	21-25	26-30	≥31
Patient destination	Consider discharge home with analgesia / advice sheet	D/W senior doctor in ED re admission OR discharge home If admitted:	Recommend admission to ward	Recommend admission to ward	Recommend admission to Critical Care	Recommend admission to Critical Care
Oxygen delivery		• Titrate to SATS • Nebulisers	• Titrate to SATS • Nebulisers	*Humidified oxygen titrated to SATS *Nebulisers	• Nasal high flow oxygen • Nebulisers	• Advanced ventilation support • Nebulisers
Team involvement		• Admitting team • Chest trauma support team (see below for contacts) If discharged: Give analgesia and advice sheet	• Admitting team • Chest trauma support team (see below for contacts)	• Admitting team • Chest trauma support team (see below for contacts)	*Admitting team *Chest trauma support team (see below for contacts) *ICU	• Admitting team • Chest trauma support team (see below for contacts) • ICU Consider surgical fixation

ANALGESIC LADDER:

In ED: Regular paracetamol or Cocodamol* +/- NSAIDS** prn

If admitted: MST 5-10mg BD
+/- Gabapentin 300mgs
+/- oramorph as needed

Strong opioid bolus iv titrated to pain
IV morphine / Fentanyl PCA

Contact anaesthetist to discuss regional technique

Serratus anterior / erector spinae plane block / paravertebral block / thoracic epidural

* If giving co-codamol 30/500 x 2 tablets qds: this gives an equivalent morphine dose of 24mg over 24 hours.

**Contraindications: renal disease, hypersensitivity, anti-coagulation, gastric irritation, asthma, Refer to BNF. *Precautions: haemothorax

Chest trauma support team:

Theatre general anaesthetic reg.	23488
Cardiac anaesthetic reg:	23615
Ceri Battle / ITU physio team:	23920 / switch out of hours
Acute pain team:	23997 / 23488 out of hours
Trauma fellow:	23658

NB: Additional guidance on whom to contact re regional analgesia techniques can be found in the anaesthetics dept

1) Battle CE, et al Predicting outcomes after blunt chest wall trauma: development and external validation of a new prognostic model. Crit Care. 2014, 18:R98 DOI: 10.1186/cc13873