Clinical Practice Guideline 26:

Management of the Patient with Rib Fractures

Northern Ireland Major Trauma Network

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Authors	**1.** Dr Daniel Harbinson **2.** Dr Sean Shevlin **3.** Mr Rory Beattie **4.** Mr Peter Mandhu **5.** Ms Julie Grant	Trauma fellow Consultant Anaesthetist Consultant Thoracic Surgeon Specialty Dr Thoracics Consultant Physiotherapist
Reviewer	Dr Duncan Redmill	Lead
Approved by	NIMTN Clinical Advisory Group	
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KEY MESSAGES

- Blunt chest wall trauma with rib fractures is extremely common
- Early recognition and active management can reduce the risk of complication
- Consideration of early multi modal analgesia should be employed
- A risk stratification score (STUMBL) will guide management
- Certain patients may benefit from regional anaesthesia
- Most patient can be managed locally but pathways exist for referral to Major Trauma ward and Thoracic surgery

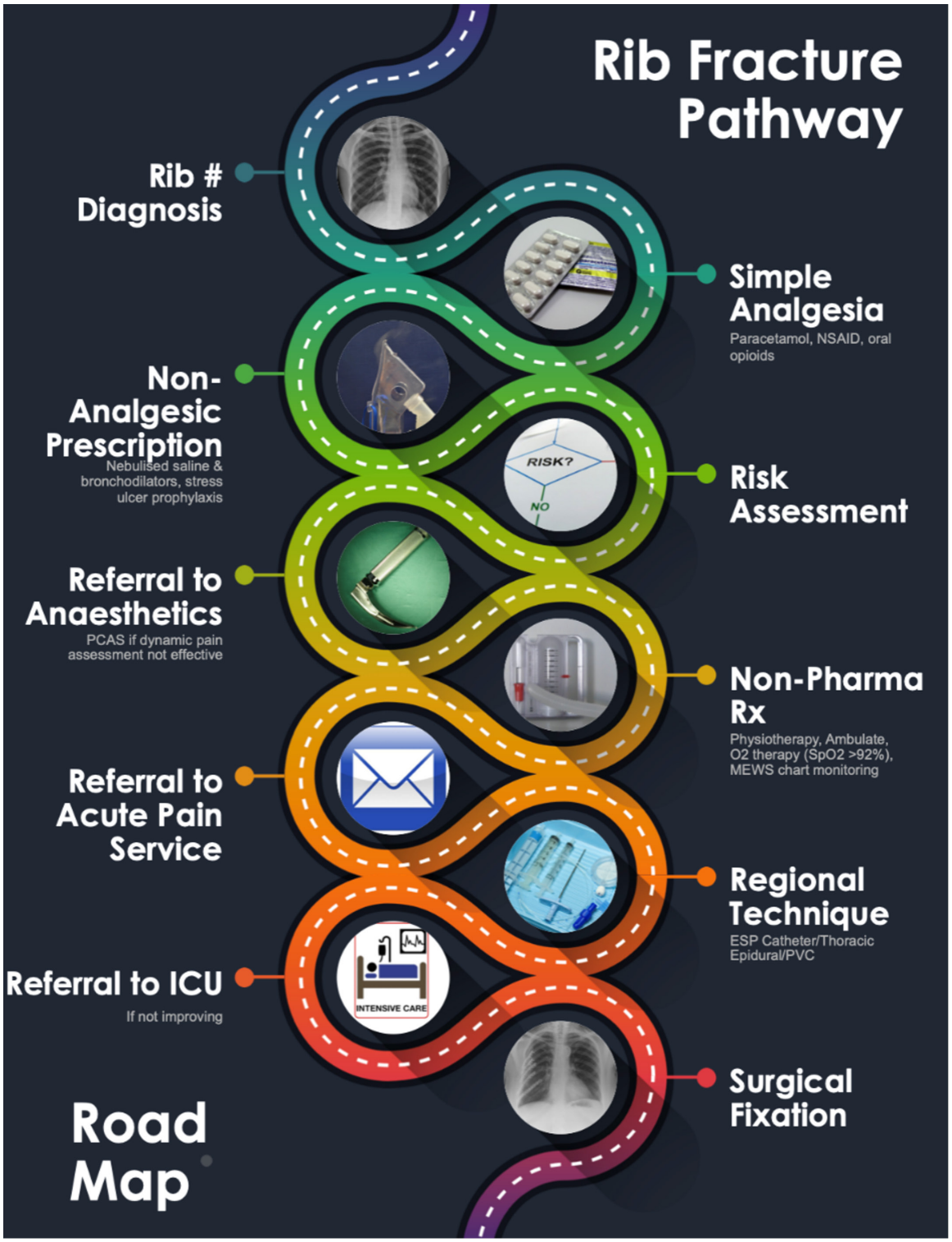
1. Introduction

Blunt Chest wall trauma accounts for 10-15% of Emergency Department presentations globally, with rib fractures complicating approximately two-thirds of cases [1].
Significant distortion of the thorax in unilateral and bilateral injuries alters pulmonary mechanics reducing lung capacity, altering dynamic compliance and ventilation-perfusion mismatching, leading to immediate adverse effects of ventilation. Evolving contusions can exacerbate respiratory failure. In addition, pain limits chest wall expansion, reducing tidal volumes and leads to ineffective cough, atelectasis and sputum retention with an increased risk of secondary chest infections.

Preventing pulmonary complications is central to limiting the morbidity and mortality associated with rib fractures. Analgesia must be optimised using multi-modal techniques, allowing adequate lung volume expansion, prevention of atelectasis and aid compliance with pulmonary hygiene techniques.

NIMTN Clinical Practice Guidelines are intended to inform standardised, best-practice care for injured patients across Northern Ireland. Although they are based on up to date evidence at the time of writing, readers should note that it remains the responsibility of individual clinicians to make final decisions regarding the most appropriate treatment for specific patients in their care.

Prehospital practitioners employed by Northern Ireland Ambulance Service (including those involved in specialist teams such as HEMS and HART) may find these guidelines informative but should continue to follow guidance contained within JRCALC, NIAS and HEMS guidelines and SOPs.



2. Complications of Rib Fractures

- Complications from rib fracture can include pneumothorax (14-37%), haemo-pneumothorax (20-27%), and flail chest (6%) [1]
- Pulmonary contusions may continue to evolve following 48 -72 hours from injury, V/Q mismatch
- In fractures of the lower ribs, there should be suspicion of potential hepato-splenic injury
- Associated Scapula, 1st rib or sternal fracture indicated significant forces exerted onto the chest wall; and highlight consideration for injury to underlying structures – cardiac contusion, great vessel injury, mediastinal structures
- Delayed presentation, due to inadequate analgesia and altered respiratory dynamics may present with Pneumonia

3. Clinical Assessment

History / Mechanism of Injury

- Rib fractures occur, commonly as a result of blunt chest injury due to and external force.
- In younger patients, these are typically related to higher energy injuries; i.e. road traffic collision, assault and fall from height
- Within elderly populations, due to co-morbidities, frailty and osteopenia rib fracture can occur from lower energy impacts. The TARN 2017 report [5] demonstrates the increasing phenomenon of elderly trauma resultant of lower mechanisms of injury, i.e., falls from < 2 meters height, with thorax injury becoming the second most injured area, and should be considered when presenting with clinical findings in keeping with fracture

Clinical Findings

- A history of chest trauma and subsequent musculoskeletal pain is suggestive of rib fracture
- Diagnosis of a single rib fracture is clinical with localised tenderness
- Clinical assessment is aimed at identification of potential complications associated with rib fractures
  - Hypoxia, cyanosis, respiratory distress
  - Accessory muscle use
  - Bruising to chest wall/seatbelt pattern of injury
  - Obvious chest wall deformity

Rib Fracture

- Pain on movement, inspiration or palpation of torso
- Shortness of breath

Traumatic Pneumothorax

- Absent/reduced breath sounds over affected side
- Hyper-resonance over affected side
- Surgical emphysema/skin crepitus on palpation

Tension Pneumothorax (In addition to above)

- Distended neck veins
- Haemodynamic instability
- Tracheal deviation away from affected side

Haemothorax

- Dullness to percussion, reduced air entry over affected side
- +/- Clinical features of hypovolaemia

Flail Chest (Fracture of >3 or more ribs in 2 places)

- Causing paradoxical movement of affected segment of chest wall (i.e indrawn on inspiration, outward on expiration); observed clinically from bedside or on palpation

4. Investigations and Management

- To goal of initial assessment following traumatic injury is for the rapid identification and intervention for life threatening injuries. This is undertaken by the Team using an ABCD approach as described in ATLS guidance
- Procedural guidance/description of interventions in managing rib fracture and their complications are out- with the scope of this document
- Following the initial survey and stabilisation of the presenting patient, a secondary survey should be undertaken to identify any further injuries

Initial Investigations

- Bloods Tests – including FBP, U+E, coagulation screen, group and hold/cross match. (Troponin if cardiac contusion/sternal fracture suspected)
- SpO2 pulse oximetry + blood pressure monitoring, assessing for haemodynamic compromise
- Arterial Blood Gas – Assessment of hypoxia, the combination of hypoxia and acidosis (Elevated PCO2, H+ – indicating severe respiratory compromise)
- ECG – if suspected underlying blunt cardiac injury/contusion. Assessing for arrhythmia

Imaging

- **CXR –** may be undertaken initially. Useful for early identification of some complications from chest trauma i.e. pneumothorax, large haemothorax

  Note: un-displaced, simple rib fractures may be difficult to identify (up to 50% of rib fractures may be missed on CXR)
- **USS –** Point of care ultrasound undertaken by a trainer provider, is a rapid, repeatable investigation which can be undertaken at the bedside for initial assessment and identification of complications to chest injury i.e. pneumothorax, haemothorax and cardiac tamponade
- **CT Chest –** Computerised Tomography of the chest is the gold standard if there is suspicion of significant chest wall injury or injury to underlying structures. It allows identification of number/position of rib fractures, and assess for radiological flail segments, which may aid decisions on further management. The NEXUS CT Chest decision tool for blunt chest trauma is available online to help aid clinical decision of if CT imaging is required

5. Risk Stratification

Multiple risk factors for morbidity and mortality in rib fractures have been described, including increased age, the number of rib fractures and pre-existing respiratory disease.
Numerous scoring systems exist in the literature to risk-stratify patients presenting with rib fracture to predict their clinical course and determine the level of inpatient care required.
A UK-based group recently described a prognostic scoring system using critical components of pre-existing models. The (STUdy evaluating the impact of a prognostic model for Management of BLunt chest wall trauma patients) [STUMBL] score, externally validated via multicenter study, with a sensitivity of 80% and specificity of 96%, and a positive predictive value of 93% is promising [2-3].

Scoring	
Risk Factor	**Points**
Age	1 point for each 10 years of age
Number of rib fractures	3 points per rib fracture
Chronic lung disease	5 points
Preinjury anticoagulant use	4 points
Oxygen saturation levels	2 points for each 5% decrease in oxygen saturation, starting at 94%
Total Score	_____
Score Probability for Complications	
Total Risk Score	**Probability Mean ± SD**
0 to 10	13% ± 6
11 to 15	29% ± 8
16 to 20	52% ± 8
21 to 25	70% ± 6
26 to 30	80% ± 6
31+	88% ± 7
Abbreviation: SD, standard deviation	

6. Systemic Analgesia

The Eastern Association of Trauma (EAST) for blunt chest trauma advocates a multi-modal approach involving **two or more analgesics targeting differing pain pathways**
Adequate analgesia must be balanced with the increased risk of side effects due to underlying co-morbidities, frailty, alterations in pharmacodynamics and drug interactions with pre-admission prescriptions, particularly in Elderly Patients, where reliance on opioids can result in increased risk of delirium, respiratory depression and increased morbidity and length of admission. Simple analgesics should be prescribed first line, for all patients, in a step-wise fashion.

1. Regular intravenous or oral Paracetamol. We recommend that paracetamol should initially be given intravenously to all inpatients with rib fractures, and can then be stepped down. The dose is as per the BNF- 1gram QDS if above 50kgs or 15mg/kg QDS if <50kgs
2. A regular short course (3 days and then reassess) of non-steroidal anti-inflammatories if no contraindications exist. Examples include ibuprofen, diclofenac or IV Parecoxib. Contra-indications include acute kidney injury, asthma with intolerance, significant history of peptic ulcer disease etc. Regular PPI if placed on NSAIDS to prevent stress ulceration
3. Oral Morphine. Initially a short acting agent such as PO Sevredol or PO Oxynorm should be used, with consideration for a short course of a long-acting agent (MST/Longtec) if required. We propose a combination of MST (long acting) and Sevredol (short acting) in those aged <70 years, with Longtec and Shortec for those >70 years. Long-acting analgesia can be increased/decreased depending on the requirement for breakthrough analgesia. Should regular short acting breakthrough analgesia be required, referral for Patient Controlled Analgesia should be considered
4. Those prescribed regular opioids should be commenced on regular laxative
5. Lidocaine patches can be considered for off label use in adjunct to regular simple analgesia

Analgesia should be reviewed at least daily and tailored due to patient's ongoing requirements and clinical progression.

Monitoring of Patients admitted with rib fractures should include;

- Respiratory rate, oxygen saturations, oxygen demands
- Requirements for breakthrough/PRN analgesia in the preceding 24 hours
- Ability to deeply inspire/ produce an adequate cough for expectoration
- Review of patient reported pain score at rest and on movement

7. Regional Anaesthesia

There are multiple regional anaesthetic techniques available for the analgesic management of rib fractures. This choice depends on the number/location of rib fractures, whether these are bilateral or unilateral, and the coagulation status of the patient. Most Northern Ireland trusts now offer regional analgesia options for rib fractures; however, no center currently operates a 24hour service.

The majority of patients will receive (at the discretion of the inserting anaesthetist):

1. Erector Spinae Plane (ESP) block +/- Catheter
2. Serratus Anterior Plane (SAP)block +/- Catheter
3. Epidural Catheter

It is strongly suggested that a catheter technique is used to ensure ongoing analgesia for these patients. If inserted in fully sterile fashion these can be left in-situ for up to 5 days depending on local policy.

Referral process

A STUMBL score (Figure 1, see full breakdown in Appendices) should be performed on each patient. Regional analgesia should be considered if STUMBL score is ≥16 (although clinical correlation is always warranted in those with scores <16).

Table 1 STUMBL chest scoring system. Scores: 1-10 (mild), 10-30 (moderate) and >30 (severe)

STUMBL chest scoring system
+1 per 10 yrs over 10
+2 per 5% reduction in oxygen saturations <95% breathing room air
+3 per individual fracture (two fractures on one rib=+6)
+4 anticoagulant or antiplatelet drugs
+5 chronic lung disease

Figure 1. STUMBL score. Ref: C Williams A, Bigham C, Marchbank A. Anaesthetic and surgical management of rib fractures. BJA Education 2020; 20(10): 332-340.

It is important that patients have all simple analgesics prescribed, with their effectiveness assessed prior to consideration for regional analgesia referral. Optimal systemic therapy may provide adequate analgesia, the key goals are: 1) being able to deep breath and 2) cough effectively.

The referral process will be different for each trust, and the user should follow local trust policy. The referral process for the each trust can be found in the Appendices section.

Insertion

- This guideline does not cover the insertion technique of each regional analgesic technique

Post-insertion management of catheters

- All catheters must be managed in an area with adequate staff education and governance structures in place to ensure patient safety
- Continuous infusion or intermittent bolus regimes can be used (it is the authors preference for an intermittent bolus regime)
- The regional anaesthetic infusion should be prescribed in the medicine chart and on the specific NEWS 2 chart for PCAS/Local Anaesthetic infusions
- All regular systemic analgesia can continue with regional anaesthesia infusion(s), assuming there is no fentanyl in the infusion bag, in which case systemic opioids should be discontinued
- *****If the patient has a lidocaine patch prescribed, this should be removed and discontinued on the Medication Chart *****
- A dedicated infusion pump should be setup with an appropriate local anaesthetic bag. Staff must double check settings on the infusion pump prior to commencement
- Monitor and document the patient's vital signs (HR, BP, RR and Sp02) as per NEWS2 chart including sedation level, pain score, nausea score, insertion site, symptoms of LAST (local anaesthetic systemic toxicity)
- Observations should be measured every 15mins for 1 hour, then hourly for 4 hours, then every four hours, for as long as the infusion continues (as per NEWS2 PCA/LA infusion chart)
- Staff should assess and immediately report signs and symptoms of LAST/allergic reaction/ adverse effects to the Acute Pain Team/Anaesthetic team, and consider stopping infusion

8. Non-Pharmacological Management

This includes chest physiotherapy and nebulisers to aid expectoration of chest secretions and offset the development of pneumonia. Analgesia must be optimised to allow compliance with these techniques.

We Recommend;

- Early referral to the chest physiotherapy service within 24 hours of admission
- Administration of regular saline (0.9% NaCL) nebulisers, QDS initially

Physiotherapy Management

Aims

- Adequate humidification of airways
- Optimising oxygenation and ventilation
- Mobilisation and removal of retained secretions
- Augmentation of cough effort
- Increasing lung capacity, volume, and compliance
- Prevention of joint stiffness at shoulder and thorax
- Restoring independence in functional activities

Physiotherapy referral criteria for patients with rib fractures in the Emergency Department

If considering referral to physiotherapy the patient must meet one of the below criteria

- An ineffective cough and difficulty clearing chest secretions
- Requiring supplementary oxygen to achieve target saturations
- A history of a daily productive cough due to COPD or bronchiectasis.

Please see appendices for patient discharge advice leaflet

Physiotherapy guidance for patients admitted to hospital with rib fractures

- Patients admitted are reviewed by a physiotherapist within 24hrs of admission
- Oxygen therapy
  - Titrated to meet the target saturation for each individual patient.
  - Humidification of oxygen
    - In any patients requiring supplementary oxygen for greater than 24hrs
    - In those individuals with an underlying respiratory condition
    - In those individuals at risk of sputum retention
  - Humidification should be delivered by a nebulised system, which allows a fixed fraction of inspired oxygen and heated to optimise humidification
  - Consideration for use of AIRVO early in those individuals with increasing oxygen requirements or increased work of breathing
    - ABG prior to initiating AIRVO and 30 minutes after as per local policy
  - Prescribe saline nebulisers QDS and salbutamol nebulisers PRN to assist with expectoration of chest secretions
- Assessment to incorporate the Pain Inspiratory Cough (PIC) Score
  - Indications for use of PIC score
    - 3 or more rib fractures
    - Able to rate their own pain
    - Extubated
    - Absence of TBI or high spinal cord injury
  - Serially evaluated as per frequency of nursing observations by nurse or physiotherapist [9]
  - Dynamic pain is assessed e.g. on inspiration or moving in bed
  - Physiotherapist calculates the goal inspiratory volume (80%) of patients expected inspiratory volume and alert volume on incentive spirometer as per normative values for age/height/sex or weight
  - Discontinue PIC score when
    - Pain is well controlled
    - Patient consistently exceeds inspiratory volume goal
    - Patient no longer requiring physiotherapy chest intervention

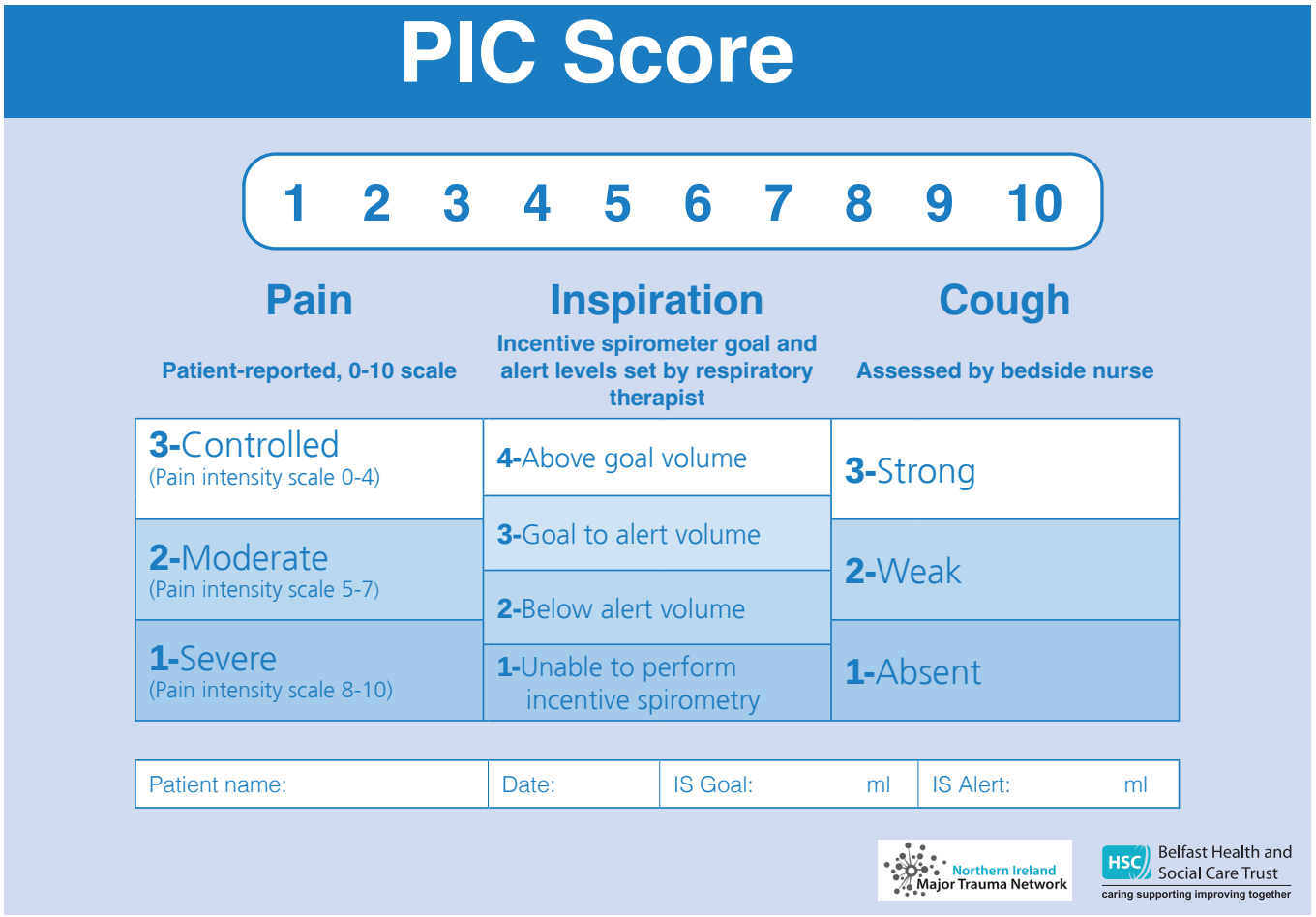


Figure 2. PIC score. Adapted Harborview Medical Center PIC Scoreboard, originally by Wellspan York Hospital, Pennsylvania USA. Ref: Witt, C.E., Bulger, E.M. 2017 Comprehensive approach to the management of the patient with multiple rib fractures: a review and introduction of a bundled rib fracture management protocol. Trauma Surgery Acute Care Open; 2, pp. 1-7.

- Physiotherapy inpatient management

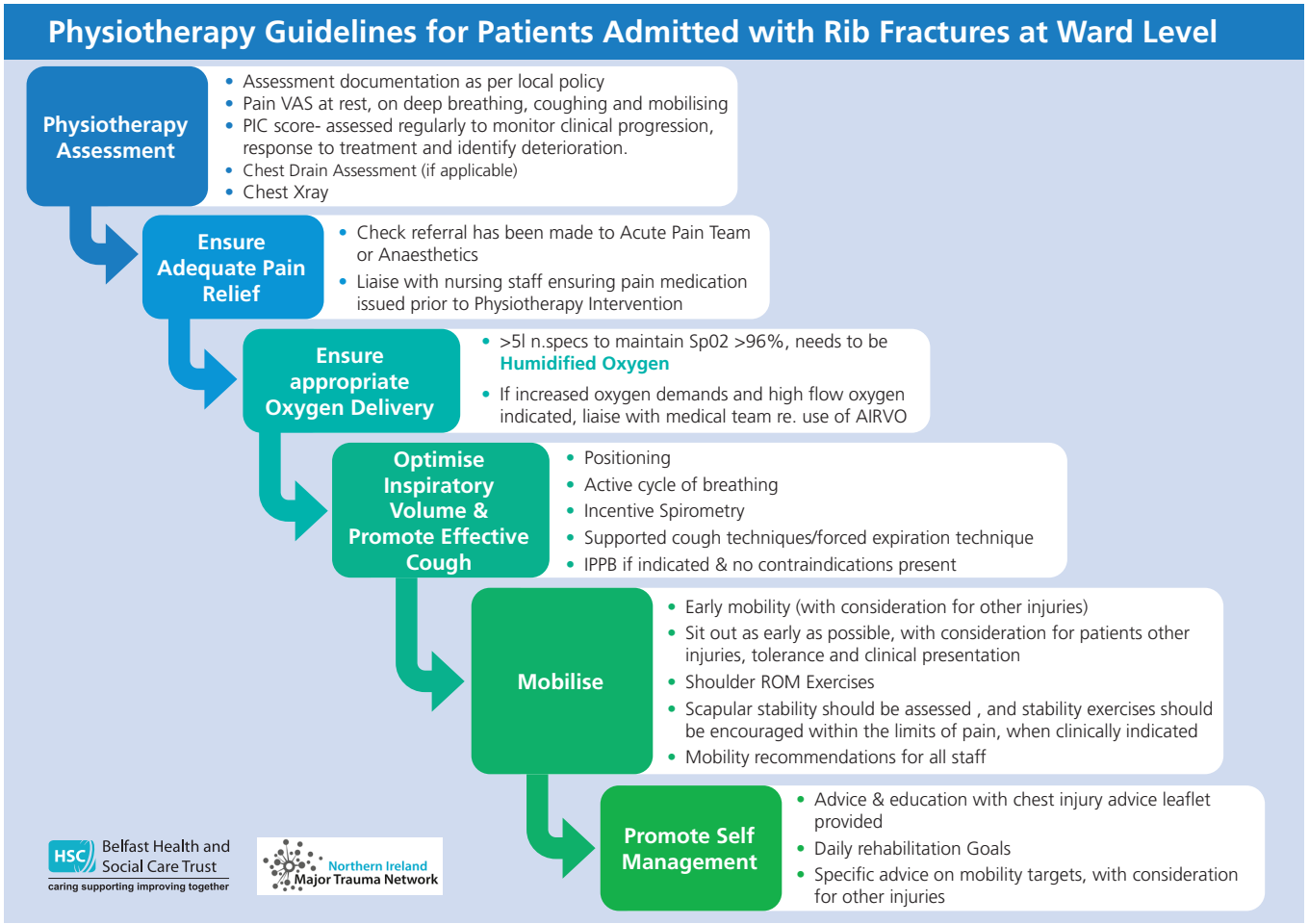


Figure 3. Inpatient physiotherapy guidance

- Active cycle of breathing technique

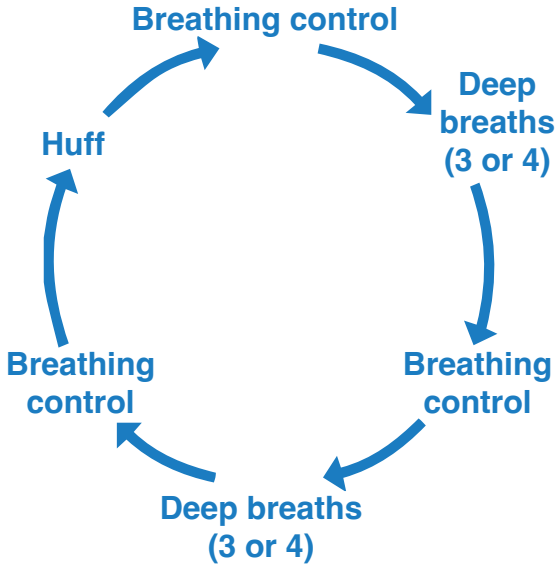


Figure 4. Active cycle of breathing technique

- Incentive spirometer provided and regular use encouraged
- IPPB device used as indicated and no contraindications present such as an undrained pneumothorax
- Supported cough, with support of a pillow or towel
- Early mobilisation out to sit and walking encouraged. This should be customised to the patient's individual injuries, tolerance and clinical presentation [4]
- Encourage active range of motion exercises of the shoulder girdle and functional use of the upper limb within limits of pain. In the presence of concurrent orthopaedic injuries of the upper limb, guidance on restrictions will be directed by the orthopaedic team [4]
- When clinically indicated scapular stability should be assessed and stability exercises commenced [4]
- Encourage self-management, with provision of education booklet including advice on return to usual activities on discharge

9. Discharge Advice from Emergency Department

- Stable patients with a small number of uncomplicated rib fractures may be considered for discharge
- An approximate guide indicates a STUMBL score <=10 may be suitable for discharge
- All patients should receive a detailed advice leaflet
- Patients should have optimised analgesia allowing deep inspiration, effective cough, and adequate supply of required medication
- Safety netting advice regarding signs of clinical deterioration i.e. developing infection, increasing shortness of breath, increasing pain and a pyrexia should be supplied with a point of contact for the patient
- Threshold for review should be low
- Please see appendices for patient discharge advice leaflet

10. Referrals to Thoracic Surgery (Regional referral)

Patients with severe multisystem trauma should be managed as per previous Regional Trauma Guidelines.

The majority of isolated thoracic trauma can be successfully managed locally, without thoracic surgical input, and does not need transferred to the Major Trauma Unit. These guidelines are to assist local hospitals with managing these patients.

Stable patients

The default is that stable patients with isolated chest injuries should be managed locally using these guidelines.
In patients with multiple rib fractures:

- If patient's pain/respiratory function fails to improve despite multimodality analgesia in the local hospital, thoracic surgery input should be sought

Thoracic surgery are available for advice for clinical situations not covered by these guidelines. In stable patient, advice should be sought during working hours (8am-6pm) from the thoracic registrar on call.

Unstable patients

Haemodynamically unstable patients can be discussed 24/7 with the thoracic registrar on call via mobile (RVH switchboard)

Managing rib fractures

Most patients with rib fractures do not need thoracic surgery input and should be managed locally using the principles below:

1. Adequate analgesia: in patients with multiple fractures early consideration should be given to regional analgesic blocks. These should be used in combination with multimodal analgesia
2. Sputum clearance: this is aided by the above, along with regular physiotherapy, incentive spirometry, sitting out of bed, regular mobilisation and consideration of humidified oxygen and nebulisers when appropriate
3. Treating any associated pneumothoraces or haemothoraces: clinically significant pneumo- or haemothoraces should be considered for chest drainage. If initial radiology is clear, follow up imaging should be performed 48-72h after admission to ensure no collections gather

The vast majority of rib fractures are managed conservatively. The flowchart overleaf highlights situations when rib fixation is considered.

Managing sternal fractures

A fractured sternum in a patient with non-osteoporotic bones is indicative of high energy trauma. Most complications come from the other injuries sustained during the trauma.
Treating a fractured sternum involves:

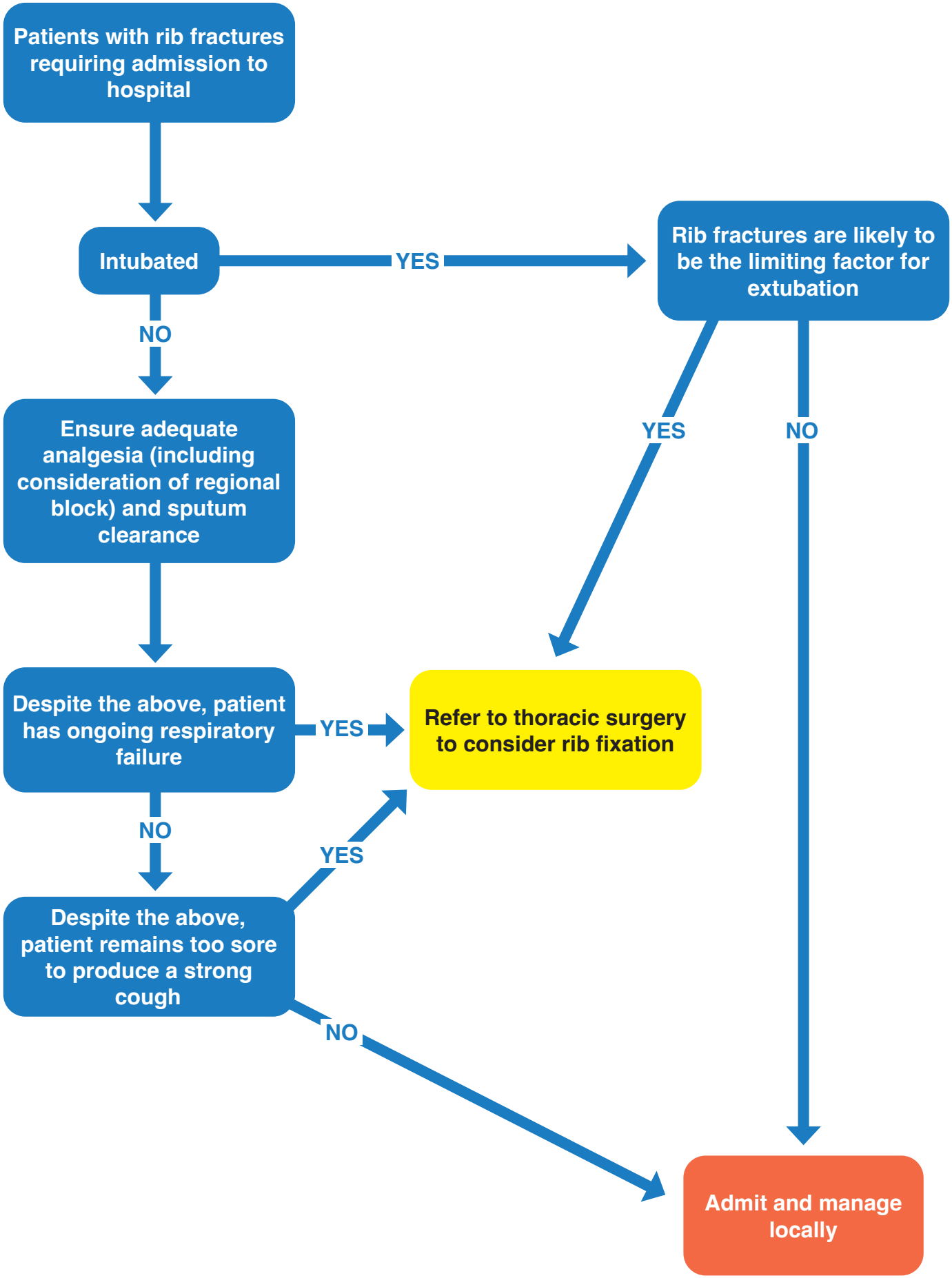
1. Adequate analgesia: to allow a good cough and ideally mobilization
2. Exclude other thoracic injuries: minimum of a chest x-ray, ideally a CT chest
3. Exclude blunt myocardial injury: ausculate for murmurs, 12 lead ECG and troponin. If any abnormalities identified, patient requires telemetry, echo and cardiology referral

Stable patients needing thoracic surgery advice should be referred during working hours (9am-5pm daily).

Emergency referrals should be via the Thoracic Oncall Registrar phone (via RVH switchboard)

Patients should be followed up locally with a chest x-ray around 4 weeks after discharge.

11. When to consider rib fixation



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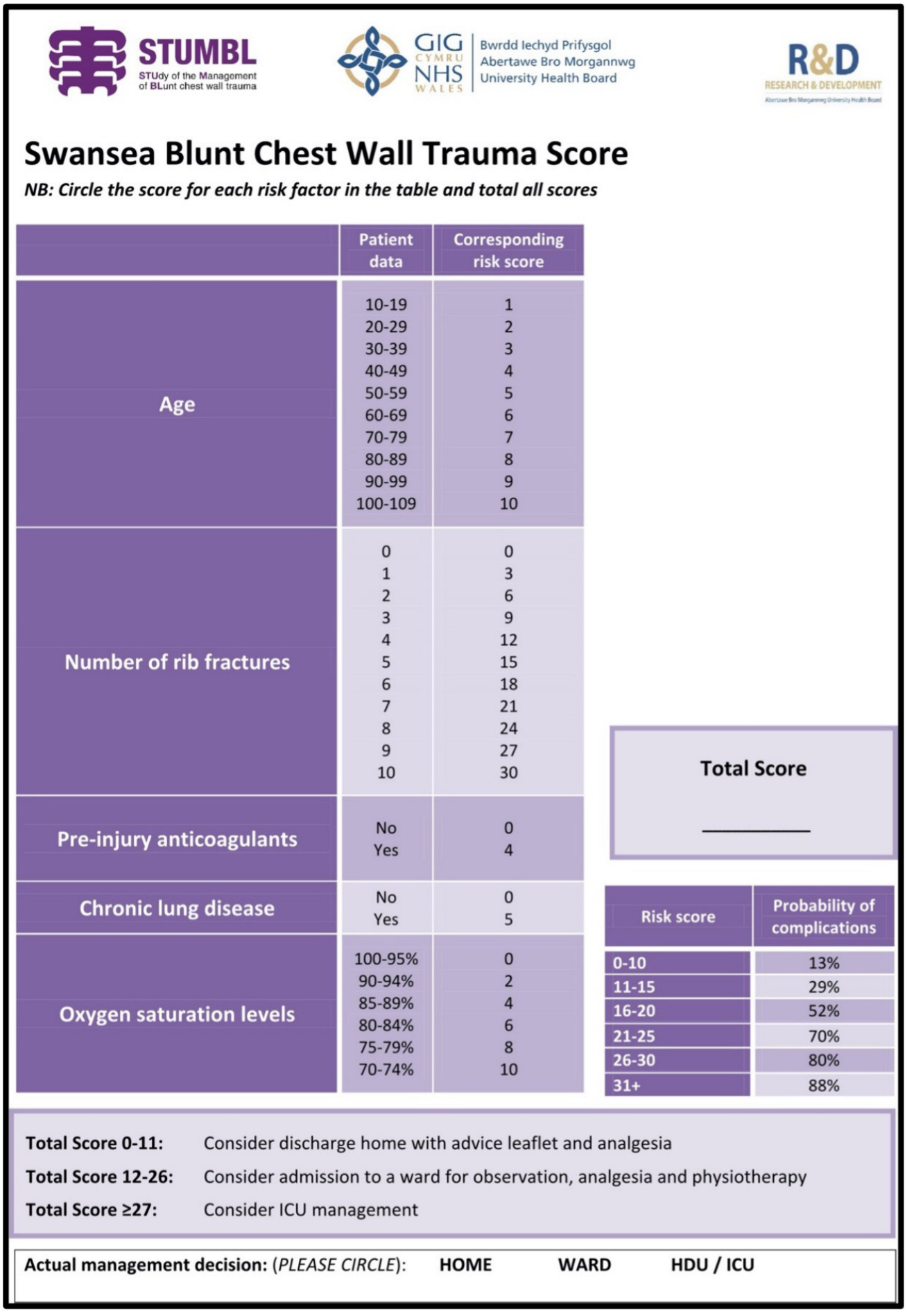
13. Appendices



STUMBL
STUdy of the Management of BLunt chest wall trauma

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Abertawe Bro Morgannwg University Health Board

R&D
RESEARCH & DEVELOPMENT

Swansea Blunt Chest Wall Trauma Score

NB: Circle the score for each risk factor in the table and total all scores

	Patient data	Corresponding risk score
Age	10-19	1
	20-29	2
	30-39	3
	40-49	4
	50-59	5
	60-69	6
	70-79	7
	80-89	8
	90-99	9
	100-109	10
Number of rib fractures	0	0
	1	3
	2	6
	3	9
	4	12
	5	15
	6	18
	7	21
	8	24
	9	27
	10	30
Pre-injury anticoagulants	No	0
	Yes	4
Chronic lung disease	No	0
	Yes	5
Oxygen saturation levels	100-95%	0
	90-94%	2
	85-89%	4
	80-84%	6
	75-79%	8
	70-74%	10

Total Score

_____

Risk score	Probability of complications
0-10	13%
11-15	29%
16-20	52%
21-25	70%
26-30	80%
31+	88%

Total Score 0-11: Consider discharge home with advice leaflet and analgesia

Total Score 12-26: Consider admission to a ward for observation, analgesia and physiotherapy

Total Score ≥27: Consider ICU management

Actual management decision: (*PLEASE CIRCLE*): **HOME** **WARD** **HDU / ICU**

Regional Analgesia Referral Process

1. Altnagelvin Hospital

- Referral for ongoing analgesia management is on a case-by-case basis. Initially all simple analgesics should be prescribed at the time of assessment. Referral will be required for PCA erection, consideration of a regional anaesthetic technique, and assessment of the higher risk patient
- Referral should be made via the Acute Pain Team (Bleep 8443) in-hours, and the 1st on-call anaesthetist (Bleep 8019) during Out of Hours sessions [Evening, Weekends, Nights]. Any regional anaesthesia catheter will need to be booked on the emergency theatre list, and discussed with the consultant anaesthetist in charge of the list

2. Causeway Hospital

- Contact the emergency/on-call anaesthetist via switchboard to refer a patient for consideration of a regional analgesic catheter

3. Craigavon Area Hospital

- Awaited. Will add to document once available

4. Royal Victoria Hospital

*****NOTE: Patient's with major trauma/multiple injuries should follow the major trauma analgesic pathway (see online on Belfast Hub)*****

Patients can have a regional analgesic catheter inserted and maintained for rib fractures if they have a ward bed. Previously this was only in the major trauma ward or cardiothoracic (5A) ward in the Royal Victoria Hospital due to the intermittent bolus nature of the pump.

However work is ongoing to ensure patients can be managed in any ward which looks after LA infusion pumps (continuous infusion or intermittent bolus).

Currently referrals are made through the "Trauma Regional Analgesia Referral Form". This can be accessed via the Hub, must be filled in fully, and then both:

1. Emailed to traumablockroom@belfasttrust.hscni.net
2. Added to the Level 3 emergency theatre list via the nurse in charge AND discussed with the consultant Anaesthetist in charge

All parts of the form should be filled out fully, and a STUMBL score assessed for each patient. Regional analgesia should be considered if STUMBL score is ≥16 (although clinical correlation is always warranted in those with scores ≥16).

5. Ulster Hospital

- In hours referral, via pain team (Vocera "acute pain nurse")
- Out of hours via 1st On-Call Anaesthetist Bleep 1628
- Ensure basic analgesia bundle in situ
- STUMBL score trigger 16
- Needs to be added to emergency list, and will be performed as a daytime procedure

Blunt Chest wall trauma accounts for 10-15% of Emergency Department presentations with Rib Fractures complicating approximately 2/3rds of cases. Significant distortion can alter respiratory mechanics with evolving contusion exacerbating ventilation failure. Pain may limit chest wall expansion, reduce tidal volumes and ineffective cough leading to atelectasis, sputum retention and an increased risk of pneumonia.

Preventing pulmonary complications is central to limiting the morbidity and mortality associated with rib fractures

Assessment

A-E assessment for identification and management of any life threatening injuries (As per ATLS guidance). Identification of any complications secondary to Rib Fractures

Further Imaging as required; CT = gold standard if suspicion of significant chest wall injury or injury to underlying structures

Complications associated with Rib Fractures

- Pneumothorax (14-37%)
- Haemo-pneumothorax (20-27%)
- Flail chest (6%)
- Pulmonary contusions may continue to evolve following 48 -72 hours from injury, V/Q mismatch
- Fracture of Lower ribs; consider hepato-splenic injury
- Scapula, 1st rib of sternal # - consideration for injury to underlying structures

Prompt Multi-Modal Analgesic Management

1. Regular Intravenous or Oral Paracetamol
2. Consider short course of Non-steroidal anti-inflammatories (if no contraindications exist)
3. Oral Morphine (Long and short acting as required)

(In patients requiring opioids consider regular laxatives and anti-emetics)

Risk Stratification

1. Calculate STUMBL Score; Total Score _____

Age	+1 for each completed decade
Chronic Lung Disease	Yes - +5 No - 0
Anticoagulation Pre-Injury	Yes - +4 No - 0
No. Rib Fractures	+3 per rib fracture
02 sats on RA at initial assessment	<94% - +2 < 89% - +4 <85% - +6 <80% - +8 <75% - +10

2. Interpretation

Total Score	Probability of Complications	Recommendation
0 – 10	13%	Consider discharge from ED
11 – 25	29 – 70%	Consider ward admission, observation, analgesia and physiotherapy
>= 26	> 80%	Consider higher level care management.

Discharge Advice for Emergency Department

Consider discharge for Patients;

- Uncomplicated Rib Fractures
- STUMBL Score <= 10
- Adequate analgesia allowing deep inspiration and effective expectoration

Patients for discharge should receive;

- Detailed Patient advice leaflet
- Safety-netting advice for signs of clinical deterioration

Patients requiring Inpatient Admission;

1. Ensure Regular Multimodal Analgesia
2. Regular Chest Physiotherapy input (within 24 hours of admission)
3. Consider Humified O2 Therapy (where required)
4. Regular Review Analgesia Requirements and Clinical Status (O2 requirements, RR, ability for deep inspiration and expectoration)

Sternal Fracture Management

Cardiothoracic advice for Sternal Fractures;

1. Adequate analgesia: to allow a good cough and ideally mobilisation
2. Exclude other thoracic injuries: minimum of a chest x-ray, ideally a CT chest
3. Exclude blunt myocardial injury: auscultate for murmurs, 12 lead ECG and troponin. If any abnormalities identified, patient requires telemetry, echo and cardiology referral

Regional Analgesia

- Consideration for referral in patients with STUMBL Score >15
- Patients STUMBL <15 consider if, inadequately managed with regular multimodal analgesia , inability to engage with chest physiotherapy or clinical deterioration

Thoracic Referrals

Stable patients needing thoracic surgery advice should be referred during working hours (9am-5pm daily).

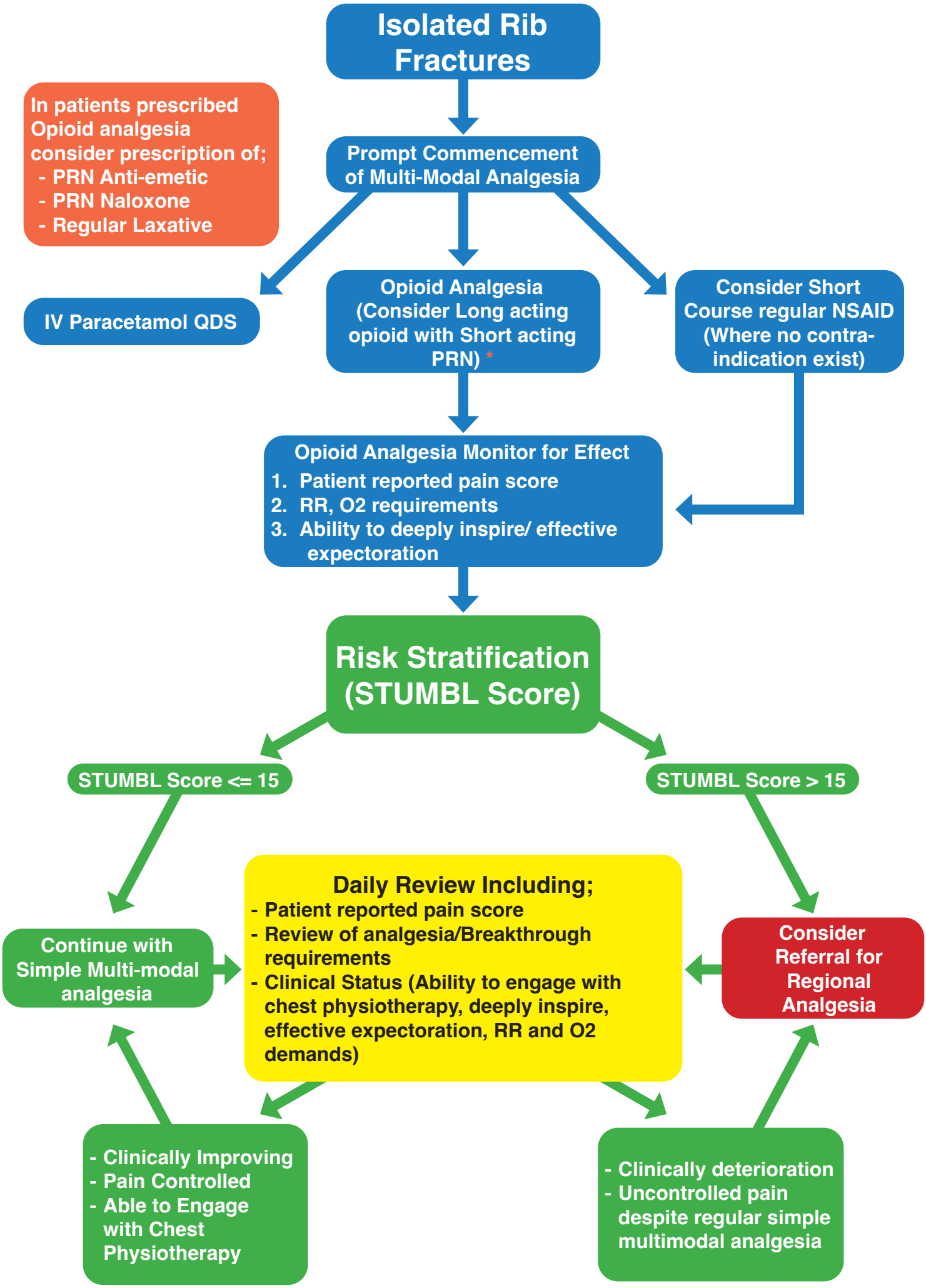
Emergency referrals should be via the Thoracic On-call Registrar phone on

Follow Up Imaging

- If Initial Radiology is clear; follow up CXR in 48-72 hours
- At Point of discharge; patients should be followed up locally with a CXR in 4 weeks

Considerations for Major Trauma Referral

Polysystem Trauma which would likely benefit from MDT input or specialist regional anaesthesia


Isolated Rib Fractures
In patients prescribed Opioid analgesia consider prescription of;
- PRN Anti-emetic
- PRN Naloxone
- Regular Laxative
Prompt Commencement of Multi-Modal Analgesia
IV Paracetamol QDS
Opioid Analgesia (Consider Long acting opioid with Short acting PRN) *
Consider Short Course regular NSAID (Where no contra-indication exist)
Opioid Analgesia Monitor for Effect
1. Patient reported pain score
2. RR, O2 requirements
3. Ability to deeply inspire/ effective expectoration
Risk Stratification (STUMBL Score)
STUMBL Score <= 15
STUMBL Score > 15
Daily Review Including;
- Patient reported pain score
- Review of analgesia/Breakthrough requirements
- Clinical Status (Ability to engage with chest physiotherapy, deeply inspire, effective expectoration, RR and O2 demands)
Continue with Simple Multi-modal analgesia
Consider Referral for Regional Analgesia
- Clinically Improving
- Pain Controlled
- Able to Engage with Chest Physiotherapy
- Clinically deterioration
- Uncontrolled pain despite regular simple multimodal analgesia

Emergency Department Rib Fracture Discharge Advice

Northern Ireland Major Trauma Network

HSC Belfast Health and Social Care Trust
caring supporting improving together

What is a rib fracture?

A rib fracture is a break or a crack to one or more of the bones in your ribcage. Rib fractures do not always show up on a chest x-ray. It is one of the most common chest injuries and can result from a fall, a traffic accident, contact sport or prolonged bouts of coughing.

How will having a rib fracture affect me?

Rib fractures can be very painful, which is often made worse by laughing, coughing, moving, and deep breathing. Unlike other parts of the body, it is difficult to rest your chest, as you use it constantly as you breathe, sit up or lie down.

What is the treatment for rib fractures?

Most rib fractures will heal by themselves within 4-6 weeks, so no dressings or support are needed, though it sometimes takes longer to totally become pain-free. The pain will be worse when deep breathing, coughing, and moving such as getting into and out of bed. It is important to follow advice below as avoiding activities which are uncomfortable risks complications such as chest infections.

The following advice will help you recover and prevent complications.

DO:

- Take regular painkillers (following the instructions on the packet).
- Keep active and walking around – this is the best way to help you breathe deeply and clear any phlegm.
- Try to maintain a good posture when sitting, standing or walking.
- Take regular deep breaths when you are sitting up or moving around
- Take a slow deep breath, hold for 5 seconds, then let it out slowly. Repeat 5 times several times per day.
- Cough when you need to and support your chest with a pillow, towel or your hand.
- Keep hydrated with fluids to as this will ensure phlegm is easier to clear
- Keep your shoulders moving with light everyday activities.
- Consider sleeping in a more upright position using pillows or a wedge to achieve a comfortable position
- Keep an eye on your symptoms for signs that they are getting worse.

DON'T:

- Do not smoke
- Do not suppress the urge to cough
- Do not lift, pull or push anything which makes the pain worse
- Do not strap your chest/ribs
- Do not engage in strenuous exercise for 4 weeks
- Do not return to contact sports until your symptoms have recovered.

What should I do if I feel unwell when I go home?

Please seek further medical advice from your GP if you experience any of the following:

- Your phlegm becomes discoloured
- Your pain gets worse and is not controlled with your pain medication
- You become unwell with an elevated temperature

If you need help outside GP normal surgery hours, contact the out of hours GP service in your area.

If you experience any of the following symptoms, seek medical review at your local emergency department:

- Ongoing or worsening shortness of breath
- Difficulty breathing
- Cough up blood
- Develop abdominal pain
- New chest pain

Returning to work

If your job involves a lot of handling and lifting, you should discuss with your employer whether you can do other duties while your injury heals. If you have any concerns about your return to work, it may be helpful to discuss these with your GP.

This leaflet is a general guide to chest injuries. If you have any further queries about your current injuries, please contact your GP.

Useful links

Broken or bruised ribs https://www.nhs.uk/conditions/broken-or-bruised-ribs/

Rib injuries https://patient.info/bones-joints-muscles/rib-injuries