EARLY NOTIFICATION and MANAGEMENT OF BLUNT CHEST INJURY
(CHIP – Chest Injury Pathway)

Cross References
(including NSW Health/ SESLHD policy directives)

Management of the Elderly Trauma Patient Service Level Agreement
Aged Care & Trauma
Trauma Triage Activation Criteria SGSHHS_CLIN_Trauma
High Flow Oxygenation SGSHHS_CLIN_187

1. What it is
Evidence based early notification mechanism and patient centred bundle of care by a multidisciplinary team to expedite evidence informed effective care for patients with isolated blunt chest wall injury

2. Risk Rating
Medium
Patients with at least three rib fractures have a significantly increased risk of in-hospital mortality\(^1,2\), an effect even more pronounced in older patients\(^3\) in whom each additional rib fracture increases the risk of mortality by 19% and of pneumonia by 27%\(^4\). Even an isolated rib fracture is associated with significant consequences, particularly in the elderly\(^5,6\). This rule is applicable to patients with or without radiologically confirmed rib fractures as 50% of rib fractures cannot be detected by plain anteroposterior chest x-rays\(^7\). Further, it highlights the importance of incorporating evidence around risk factors for complications into clinical pathways, for example underlying respiratory disease, age and cardiopulmonary disease\(^5,8,9\). Research conducted at St George Hospital in 2014 demonstrated that this protocol reduced the odds of a blunt chest injured patient at St George hospital developing pneumonia by 56%\(^11\).

3. Employees it Applies to
Emergency Department (ED) medical and nursing staff
Trauma registrars (in hours) and Surgical registrar (out of hours)
Physiotherapy
Trauma Service
Switch board
Pain service / anaesthetics

4. Process
This Clinical Business Rule (CIBR) seeks to describe the criteria for activation of the ChIP Team. Members of this team will receive a message via their page to review patients with blunt chest wall injury who meet criteria. This CIBR also describes the recommended treatments to tailor for each patient dependent on their needs.
1. All patients with isolated blunt chest injury (radiological or clinical diagnosis) are to be considered for this pathway
2. The role of the ED Doctor and/or nurse is to assess the patient for likelihood of injury, attend to their immediate analgesia (+/- opiates), respiratory support needs and likelihood of admission before the ChIP page is activated (see Appendix 1)
3. To activate the ChIP page call 777, state ChIP call, and relay the patient MRN
4. The ChIP page will alert the Trauma, Anaesthetic Registrar (out of hours) or pain team registrar, trauma nurse, ICU Liaison Nurse and Physiotherapist to enable early contact

Approved by: Clinical Governance Documents Committee Date: June 2016

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and optimal management. This should be responded to within 60 minutes of the page activation.

5. The physiotherapist should liaise with the trauma nurse prior to patient review to ensure analgesia has been administered to facilitate physiotherapy intervention.

6. The trauma or surgical registrar should arrange consultations with specialist teams such as Aged Care, Respiratory and ICU teams as needed and per the aged care service level agreement.

7. All patients 55 years and older with proven or suspected rib fractures, or a painful chest injury with underlying respiratory disease and/or requiring opioid analgesia should be admitted under the Trauma Service. A ChIP page should be activated to facilitate management.

8. All patients under 55 years with 3 or more rib fractures or a painful chest injury with evidence of deterioration (tachypnoea, decreased SaO₂, respiratory fatigue) should also be admitted under the Trauma Service. A ChIP page should be activated to facilitate management.

9. A bundle of care including the following interventions should be charted and initiated and adapted for each patient according to their analgesic and respiratory support needs.
   - Patient education on deep breathing and coughing and the following treatments
   - Chest support pillow / splint (eg folded rolled towel)
   - Chest physiotherapy
   - Incentive spirometry (triflow)
   - Supplemental Oxygen, humidified via highflow nasal prongs – should commence at 35lt/min and titrated to an SpO₂ goal in patients with pain not well controlled by oral analgesia and/or lung disease. A haemo/pneumothorax does not exclude the use of HFNP. Management of the haemo/pneumothorax should be discussed with the trauma consultant / fellow
   - Analgesic regimen: PO Paracetamol and PO Oxycodone hydrochloride with Naloxone hydrochloride (Targin) or Oxycontin regularly if no contraindications/allergies & appropriate dose. PRN Oxycodone hydrochloride (Endone). NSAIDs should be considered in patients without contraindications
   - If inadequate analgesia despite above, escalate early to pain service for PCA, intercostal blocks or epidural
   - Regional anaesthesia techniques, such as an Epidural or Paravertebral block, should be considered on a case by case basis. In particular those patients with: 3 or more rib fractures and/or age greater than 55 years. Additional consideration and factors that may infer patient benefit to those with (or without) the above factors include flail segment/s, underlying lung disease, history of smoking
   - Aperients and anti-emetics
   - Early mobilisation as clinically appropriate

10. Patient should be admitted to a ward with HFNP capability (3South, 2 East). Notify ICU2 if the patient requires an FiO₂ of .50 or greater.

11. Weaning of analgesia and HFNP should be conducted on individual patient needs. The patient should be discharged when their pain is well controlled with oral analgesia, their respiratory function has been optimised and any other factors (i.e. mobility and any medical issues that may have precipitated a fall) are resolved.

12. ChIP patients should be followed up by their GP within 3 days and their analgesia. Discharge letter should include instruction on this for the GP.
13. Patients should attend the trauma clinic (appointments 9113 2595) within 1-2 weeks.
14. Patients and their family should be educated on the important of continuing with regular analgesia as prescribed, signs of deterioration and advice to represent if necessary.

5. Keywords
Chest injury, analgesia, rib

6. Functional Group
All clinicians who care for patients with blunt chest wall injury

7. External References
1. Testerman GM. Adverse outcomes in younger rib fracture patients. 
4. Bulger EM, Arneson MA, Mock CN, Jurkovich GJ. Rib fractures in the elderly. 
6. Elmistekawy E, Hammad AA. Isolated rib fractures in geriatric patients. 
7. Bansidhar BJ, Lagares-Garcia JA, Miller SL. Clinical rib fractures: are follow-up chest X-rays a waste of resources? 

8. Consumer Advisory Group (CAG) approval of patient information brochure (or related material)
N/A
9. Implementation and Evaluation Plan
Including education, training, clinical notes audit, knowledge evaluation audit etc

Published on the SGSHHS Clinical Business Rules page.
A variety of education modes will be used to implement this revised protocol. For example, key stakeholders of each impacted department have been engaged. Regular inservice, presentation at orientation sessions and trauma education
The activation and appropriate use of the protocol is monitored by the existing trauma service nurses quality improvement program. Regular reports are conducted, feedback is provided where appropriate

10. Knowledge Evaluation

Q1: What are the risk factors for poor outcomes in patients with blunt chest injury?
A: Age > 55yrs, Respiratory history, Respiratory compromise (eg: ↑WOB; ↑RR; ↓SpO2) ≥3 rib #s)
Q2: To what ward should patients requiring high flow nasal prongs?
A: A ward with capability such as 3S, 2E, ICU2
Q3: What is the simplest way to assess if the patient with blunt chest injury has adequate analgesia?
A: Assess for pain and ability to deep breath/cough

11. Who is Responsible
All clinicians who care for patients with blunt chest wall injury
### Approval for EARLY NOTIFICATION and MANAGEMENT OF BLUNT CHEST INJURY (CHIP – Chest Injury Pathway) * N/A where appropriate

| *Specialty/Department Committee | Committee title: Trauma  
Chairperson name/position: Christine Bowles  
Date: 07.06.16 |
|----------------------------------|--------------------------------------------------|
| *Nurse Manager                   | Name/position: Andrew Bridgeman, Nurse Manager Surgery  
Date: 07.06.16 |
| *Service Line Manager           | Name/position: Vicki Weeden, Service Line Manager, Trauma  
Date: 15.06.16 |
| *Medical Head of Department     | Name/position Dr Richard Morris, Acting Head Trauma  
Date: 07.06.16 |
| *Drug and Therapeutics Committee (SGH) | Chairperson’s Name: N/A  
Signature  
Date |
| *Drug and Therapeutics Committee (TSH) | Chairperson’s Name: N/A  
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### Revision and Approval History

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision number</th>
<th>Author (Position)</th>
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<tr>
<td>Jun 16</td>
<td>0</td>
<td>Kate Curtis, Trauma CNC</td>
<td>Jun 19</td>
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### General Manager’s Ratification

| Name | Date: 16.06.16 |
Appendix 1

**ISOLATED BLUNT CHEST INJURY FLOWCHART**

**Initial Assessment**
Assess particularly for pain and ability to deep breathe/cough/SpO2 + CXR and Analgesia

**Red Flags**
Age > 55yrs
Respiratory history
Respiratory compromise (eg: ↑WOB; ↑RR; ↓SpO2 ≥3 rib #s)

**Re-assessment**
Not able to deep breathe/cough; Ongoing pain (at least 30mins post initial analgesia)

**CALL 777 ACTIVATE CHIP**
Provide MRN
Patient to be reviewed by Trauma Team (in hours) or Surgical Registrar (after hours) to determine if admission is required.

**If patient for admission…**
AMO1= Trauma. AMO2 as appropriate (eg Orthogeris) Appropriate Bed Allocation (3S/2E – HFNP capability)

**Respiratory Adjuncts:**
Consider HFNP:
*Start at 35L Flow/ Fio2 30-40%*
(Does not exclude HTx/PTx – but discuss with Trauma consultant)

**Analgesic regime:**
- Oral: Targin, Paracetamol, NSAIDs
- PRN Endone
- IV: Consider PCA
- Consider IC Block/ Paravertebral Block/ Epidural

**Complication Prevention:**
Early Clearance to Mobilise
Patient education – DB&C, use of PRN analgesia
Triflow for appropriate patients
Support/splint pillows
Chest physio – Remember ED physio if patient not requiring admission

**Discharge Planning from ward:**
Wean HFNP/Analgesia (per patient condition)
Discharge home when pain well controlled & respiratory function optimised
Patient / family education to include return to ED if breathing or pain worsens
GP f/u within 3 days
F/U Trauma Clinic within 1-2 weeks
Trauma phone follow up by TCM

**The CHIP page will alert:**
- Trauma Team Doctors
- Trauma Case Managers
- Pain team (within hrs)/ Anaesthetics (after hrs)
- Physiotherapy (PT)
- ICU Case Manager

**Don’t forget aperients**

**Referrals to Consider Prior to Transfer:**
Low threshold for ICU2 review. Ortho/Geriatrics review if needed

**Clearly document HFNP settings as well as SpO2 goal in patient’s notes. ICU2 review if FIO2 >/= 0.50**