SMTU: Chest Injury Pathway (ChIP) for Blunt Thoracic Injury Management Clinical Guideline (RPH)

Scope

Site	Department, Division or Operational Area	Applicable to
Royal Perth Hospital (RPH) only	State Major Trauma Unit (SMTU)	Medical, Nursing, Allied Health

Links within Document

- Appendix I: ChIP Pathway

Purpose

This pathway specifies the process for early activation and implementation of timely and sufficient analgesia, physiotherapy and respiratory support for patients with blunt chest trauma, allowing for earlier intervention outside the Intensive Care setting, facilitating chest stabilisation and lung recruitment.

The Evidence Supports:

- Decreased hospital length of stay/need for endotracheal tube/Intensive Care Unit (ICU) admission/incidence of nosocomial and ventilator acquired pneumonia (VAP) [1, 5, 6, 9,]
- Improved bronchial hygiene in spontaneously breathing patients with non-invasive positive pressure ventilation (NIPPV) [3], as inflammatory process leads to increase in extravascular water [2, 7, 8]
- Pneumatic splint might aid in pain control[3]
- Increase SpO_2/PaO_2 and decrease work of breathing (WOB)
- Decreased post traumatic hypoxaemic respiratory failure. Trauma patients with pulmonary contusions carry a significantly higher mortality rate[8]
- Ease of recruitment of contused lung, reported incidence of up to 20% patients with chest trauma developing Acute Respiratory Distress Syndrome (ARDS)/Acute Lung Injury (ALI)[7,8]
- Early intervention, as reported highest % of ARDS occurs within first three days[2]
- Physiological stabilisation of chest wall in spontaneous breathing patients with flail segment

Inclusion Criteria (any of these) for High Flow Nasal Prongs (HFNP)

- Patients with flail chest (as per clinical judgement OR three or more segmental rib fractures on Chest X Ray (CXR) OR >5 rib fractures in a row on computed tomography [CT])
- Patients who require more than 4L O_2 via nasal cannula to maintain Sp02 >94%
- Body Mass Index (BMI) > 33 with associated chest injury
- Age > 65
- Signs of respiratory distress (Respiratory rate (RR) > 25 OR increased work of breathing [WOB])
- If patient warrants NIV support for other clinically relevant reasons

Exclusion Criteria / Contraindications for HFNP

- Airway patency problems
- Haemodynamic instability
- Active gastrointestinal (GI) Bleed/Obstructed bowel
- Recent upper GI Surgery
- Encephalopathy/Severe Traumatic Brain Injury/Uncooperative patients
- Multi–organ failure
- Fractures or burns to face
- Bronchopleural fistula
- Patients requiring endotracheal tube (ETT) for other reasons

**** Note: pneumothorax is NOT an absolute contraindication. Requires individual assessment****

1. Initiate HFNP

- SpO_2 monitoring (*target SpO_2 >90%) or PaO_2 >60mmHg (if arterial line is in situ) *(Arterial line is only required, if indicated on other clinical grounds)*.* Follows O2-Hb disassociation curve, to keep tissue tension of oxygen above 60mmhg (the critical threshold)
- Adult Observation and Response Chart parameters to be modified by Consultant and clinical management plan in integrated notes
- Alert Physio on SMTU
- Baseline analgesics to be prescribed (as a minimum, if no contraindication) Paracetamol/PRN Oxycodone/Celecoxib, consider Tramadol immediate release (IR) PRN
- Patient to be flagged to Acute Pain Service (APS), Regional Anaesthesia Team if above regime is deemed inadequate for pain control
- A response should be seen within four hours of treatment initiation
- First line is HFNP (better tolerated than Face Mask)
  Initial HFNP settings: Flow of 40L per minute and FiO_2 40% (40:40) and then wean.
  Refer to the Clinical Practice Standard for Oxygen Therapy Management (in Adult Patients)

Escalate for ICU review if: *Patient requires persistent FiO_2>40% OR signs of HFNP failure (e.g. SpO_2<90% despite HFNP / RR >25 / activation of respiratory accessory muscles / decreasing level of consciousness.*

- Continue treatment for 48 hours, or as clinically indicated

Facilitator

Sarah Fisher, Policy Officer, Education Centre, RPBG

Review Authors 2021

Dr Christine Grobler, HoD, Department Anaesthesia and Pain Medicine, RPH

RPH Trauma Committee

References

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Related Policy, Procedure or Guideline and or Practice Standard

RPBG Policy Hub

- Diagnosis of potential delayed haemothorax/pneumothorax in blunt thoracic trauma Clinical Guideline
- Oxygen Therapy Management (in Adult Patients) Clinical Practice Standard (CPS)

Related National Standards

ACSQHC NSQHS Standards 2nd Edition (2017)

Standard 5: Comprehensive Care

Standard 8: Recognising and Responding to Acute Deterioration

Document Version Control

Date	Version (Author)	Amendments
February 2018	v.1 (M.Burrell)	Original document for evaluation by Trauma Service
January 2021	v.2 (M.Burrell)	RPH Trauma Committee review. Review of references. Additional mandatory Peri-operative referral in ChIP (Appendix 1)

Appendix I: Chest Injury Pathway (ChIP)