

Maine Medical Center Trauma Clinical Practice Guideline (MMCT-CPG)



centered around you

Rib Fracture Management Guideline (MMC-CPG ID: # 2018-01)

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Guidelines translate best evidence into best practice. A well-crafted guideline promotes quality by reducing healthcare variations, improving diagnostic accuracy, promoting effective therapy, and discouraging ineffective – or potentially harmful – interventions.

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PURPOSE

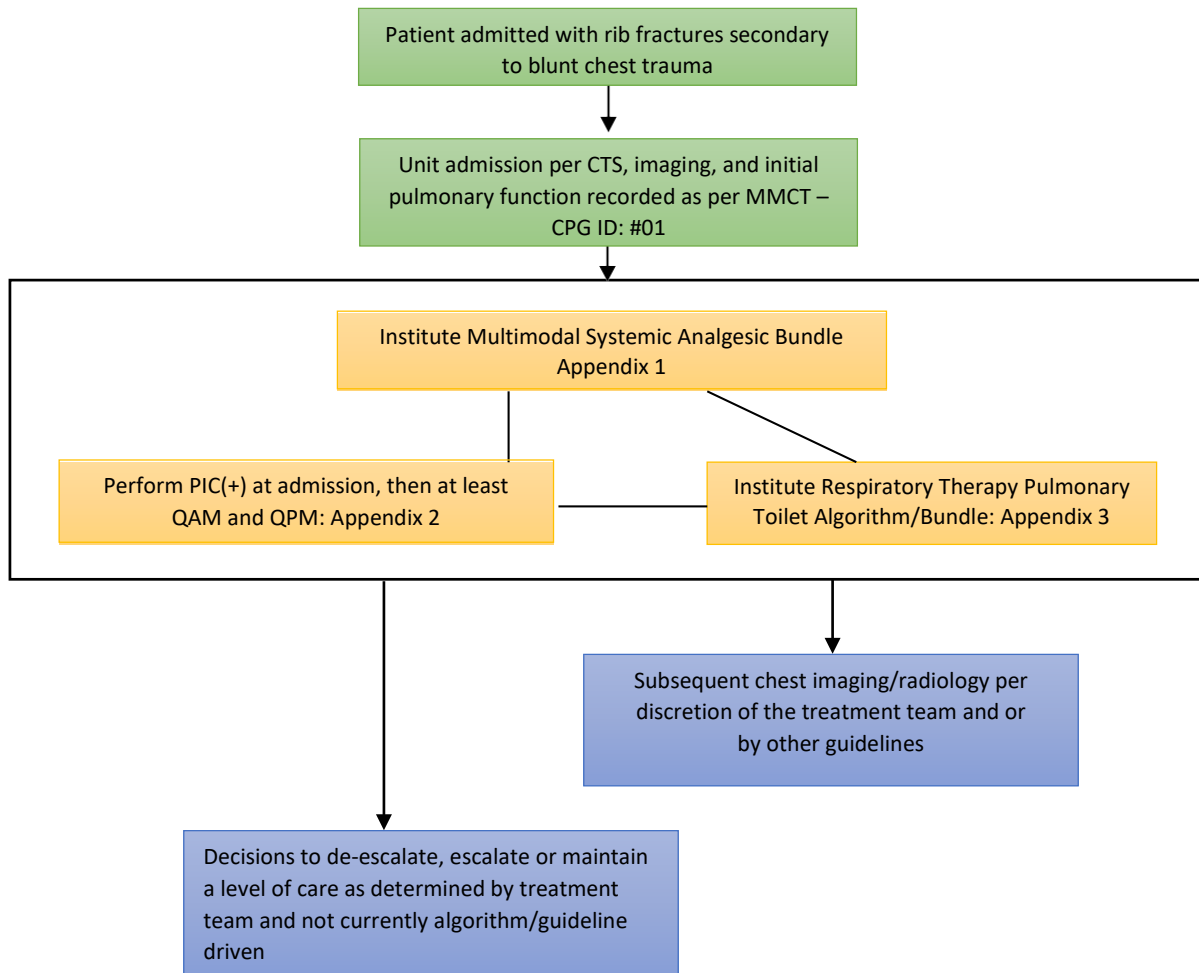
These guidelines are not intended to supplement physician/APP judgement. Rather, these guidelines are intended to provide a basic framework for the assessment and determination of chest wall injury severity, guide initial admission/disposition of patients, as well as to educate and provide insight to others regarding chest wall trauma resulting in fractured ribs.

BACKGROUND

Rib fractures occur in approximately 9-10% of patients with trauma and are markers of severe bodily and solid organ injury. Thoracic complications of rib fractures are common and may include pneumonia, pulmonary effusion, aspiration, acute respiratory distress syndrome (ARDS), pulmonary emboli, and atelectasis or lobar collapse. The number of rib fractures sustained correlates with morbidity and complication risk in multiple studies (1).

There is no standardized method to assess the severity of blunt trauma immediately after the traumatic event. The Chest Trauma Scoring (CTS) system is easy to calculate by the medical provider so medical decisions and or interventions can be made in an expedited fashion. A CTS of at least 5 is associated with worse patient outcomes. Increased vigilance is needed with trauma patients who present with rib fractures and a CTS of ≥ 5 at initial presentation. This scoring system may improve early identification of vulnerable patients and expedite therapeutic interventions (2).

Rib Fracture Pathway



PERFORMANCE IMPROVEMENT MONITORING

Intent / Expected Outcomes

1. All patients with blunt trauma rib fractures will have chest CT scan, AP CXR, CTS scoring and admission based on CTS (Appendix 1).
2. At time of admission, patients will have the following ordered/instituted:
 - a. Multimodal systemic analgesic bundle (Appendix 2)
 - b. PIC(+) performed (Appendix 3)
 - c. Respiratory Therapy pulmonary toilet algorithm/bundle initiated (Appendix 4)
3. PIC(+) performed at least QAM and QPM for inpatients with blunt trauma rib fractures.

Performance / Adherence Measures

1. MMCT-CPG ID: #01 will be followed for all blunt trauma rib fractures
2. Multimodal systemic analgesic bundle, PIC(+) and respiratory pulmonary toilet algorithm/bundle will be ordered/performed at admission
3. PIC(+) will be documented QAM and QPM for inpatients with blunt trauma rib fractures
4. Escalation and de-escalations in pulmonary toilet determined by RT assessment

Data Source

Patient record
Respiratory Care Record / Flowsheets

SYSTEM REPORTING & FREQUENCY

The above constitutes the minimum criteria for PI monitoring of the MMCT-CPG. System reporting will be performed annually; additional PI monitoring and system reporting may be performed as needed.

The system review and data analysis will be performed by the MMC Trauma Service under the direction and responsibility of the MMC Trauma Medical Directory and MMC Trauma Medical Program Manager.

RESPONSIBILITIES

It is the Trauma Medical Director's responsibility to ensure familiarity, appropriate compliance, and PI monitoring with this MMCT-CPG.

REFERENCES

1. 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 Surg Acute Care Open*, 2(1), e000064. doi:10.1136/tsaco-2016-000064.
2. Chen, J., Jeremitsky, E., Philp, F., Fry W., & Smith R.S. (2014) A Chest trauma scoring system to predict outcomes. *Surgery*. Volume 156, Issue 4, October 2014, Pages 988-994.
3. Devlin JW, Skrobik Y, Gelinas C, et al. Executive Summary: Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU. *Crit Care Med* 2018;46(9):1532-1548.

Appendix 1

Bed Placement Algorithm based on the Chest Trauma Score (CTS)

Age Score	
<45	1
45-65	2
>65	3
Pulmonary Contusion Score	
None	0
Unilateral Minor	1
Bilateral Minor	2
Unilateral Major	3
Bilateral Major	4
Rib Score	
<3 Rib Fx	1
3-5 Rib Fx	2
>5 Rib Fx	3
Bilateral Rib Fx	
No	0
Yes	2

Total Score \geq 6 ADMIT TO ICU

Total Score 4-5 ADMIT TO IMC

Total Score \leq 3 ADMIT TO FLOOR vs Monitor and Dispo

Or per PROVIDER Discretion

Multimodal Systemic Analgesic Guideline:

1. **Home pain medication restarted (Psychoactive and long acting opioids)**
Unless contraindication. **CONTRAINDICATIONS need to be charted.**
2. **Acetaminophen**
 - a. 975 mg Q6h scheduled IV* or PO
 - I. IV may be used if patient is NPO and cannot take oral medications
 - b. Dose reduction consideration to 975 mg Q8h for geriatric patients or for those with a history of ETOH abuse or cirrhosis
3. **Ibuprofen**
 - a. 400 mg Q6h scheduled
 - b. **Exclusions:** New GI anastomosis, acute or chronic renal dysfunction, peptic ulcer disease and recent GI bleed (last 6-12 months), TBI/Spinal fractures/ spinal cord injuries (unless approved by neurosurgery). Long bone fractures (unless approved by orthopedics).
 - c. **Concomitant use with therapeutic anticoagulation or corticosteroids should be discouraged due to increased risk of GI complications.**
 - d. Exercise caution in patients with significant cardiovascular risk factors (e.g. CAD, previous MI). If used in this population, recommend shortest duration possible. Avoid ibuprofen in patients with established cardiovascular disease on aspirin as ibuprofen interferes with antiplatelet activity.
4. **Oral Opioid options include Oxycodone OR Hydromorphone:**
 - a. Oxycodone 5-10 mg PO Q4h prn for moderate to severe pain
 - I. Lower dose requirement (2.5-5 mg) should be considered for older adults to reduce risk of delirium and sedation. It would be important to watch for adequacy of analgesia and up-titrate as needed.

OR:
 - b. Hydromorphone 2-4 mg PO Q4h prn for moderate to severe pain
 - I. May be considered especially for those with a pre-existing opioid requirement
 - II. Use with caution with older adults. Start low (1-2 mg) and increase as needed and tolerated within parameters

If already on the above agents and pain is still not controlled:
5. **Lidocaine Patches**
 - a. May be helpful in rib fracture patients with 1-2 rib fractures for mild/moderate pain as adjuvant therapy
 - b. Consider other dosing of Lidocaine prior to placement
6. **IV Opioid Boluses**
 - a. Some medication/dosing options could include:
 - I. Hydromorphone 0.5 to 1mg IV Q2h prn for severe or breakthrough pain
 - II. Morphine 2 to 4 mg IV Q3h prn for severe or breakthrough pain. ***Morphine should be avoided in patients with renal dysfunction.***

If already on the above agents and pain is still not controlled:
7. **Ketamine or Opioid PCA**
 - a. Ketamine infusion 0.1-0.4 mg/kg/hr. Consult APMS if use in non-ICU areas.
 - I. ***AVOID in patients with significant psychiatric history, including dementia***

If already on the above agents and pain is still not controlled:
8. **APMS Consult**
 - a. Consult for regional, invasive analgesia
 - b. With APMS consult, pain management is handed over to APMS

*****WITH NARCOTIC ADMINISTRATION, A SCHEDULED BOWEL REGIMEN ORDER SHOULD BE ORDERED UNLESS CONTRAINDICATED*****

1. Malchow RJ., Black IH., (2008) The evolution of pain management in the critically ill trauma patient: Emerging concepts from the global war on Terrorism. Crit Care Med Vol 36 No 7 (Suppl)S346-S357
2. Oyler, DR, Parli. SE, et al. (2015) Nonopioid management of acute pain associated with trauma: Focus on pharmacologic options. J Trauma Acute Care Surg Volume 79, Number 3. DOI: 10.1097/TA.0000000000000755
3. Devlin, JW, Skrobik, Y, et al. (2018) Executive Summary: Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU. J Critical Care Medicine Volume 46 No 9.

Appendix 3

DOI:10.1097/CCM.0000000000003259

PIC+ Score 3 - 10		
Pain <small>Patient-reported, 0 – 10 scale</small>	Inspiration <small>Inspiratory spirometer; goal & alert levels set by RT</small>	Cough <small>Assessed bedside</small>
3 – Controlled <small>(Pain Intensity scale 0 – 4)</small>	4 – Above Goal Vol	3 – Strong
	3 – Goal to Alert Vol	
	2 – Below Alert Vol	
2 – Moderate <small>(Pain Intensity scale 5 – 7)</small>		2 – Weak
1 – Severe <small>(Pain Intensity scale 8 – 10)</small>	1 – Unable to perform	1 – Absent
<small>Assessment of Pain by literature supported quantitative scale: - Wong-Baker</small>	<small>No Additional Data Collection from "PIC" obtained Incentive Spirometry</small>	<small>Peak Flow Measurement</small>

- PIC (+) is performed by Trauma Surgery providers and recorded in chart.
- The PIC(+) pain scale will be recorded via the Electronic Medical Record (EMR) in the PROGRESS NOTES.
- The PIC (+) will be performed at admission and then scheduled 2 times a day: morning and evening.
- PIC (+) may be performed more often at discretion of providers, when performed it should be documented in medical record.
- At this time, PIC (+) is not an active determiner of care; however it is an assessment of status which may be incorporated into the treatment team's assessment process.
- The PIC scoring tool is used to serially evaluate and monitor patients, referring to pain, inspiratory capacity, and cough. 1. Whereas the evaluation of cough is subjective, the use of Peak Flow measurement is an objective measurement of the amount and rate of air that can be forcefully breathed out of the lungs.

Wong-Baker FACES® Pain Rating Scale



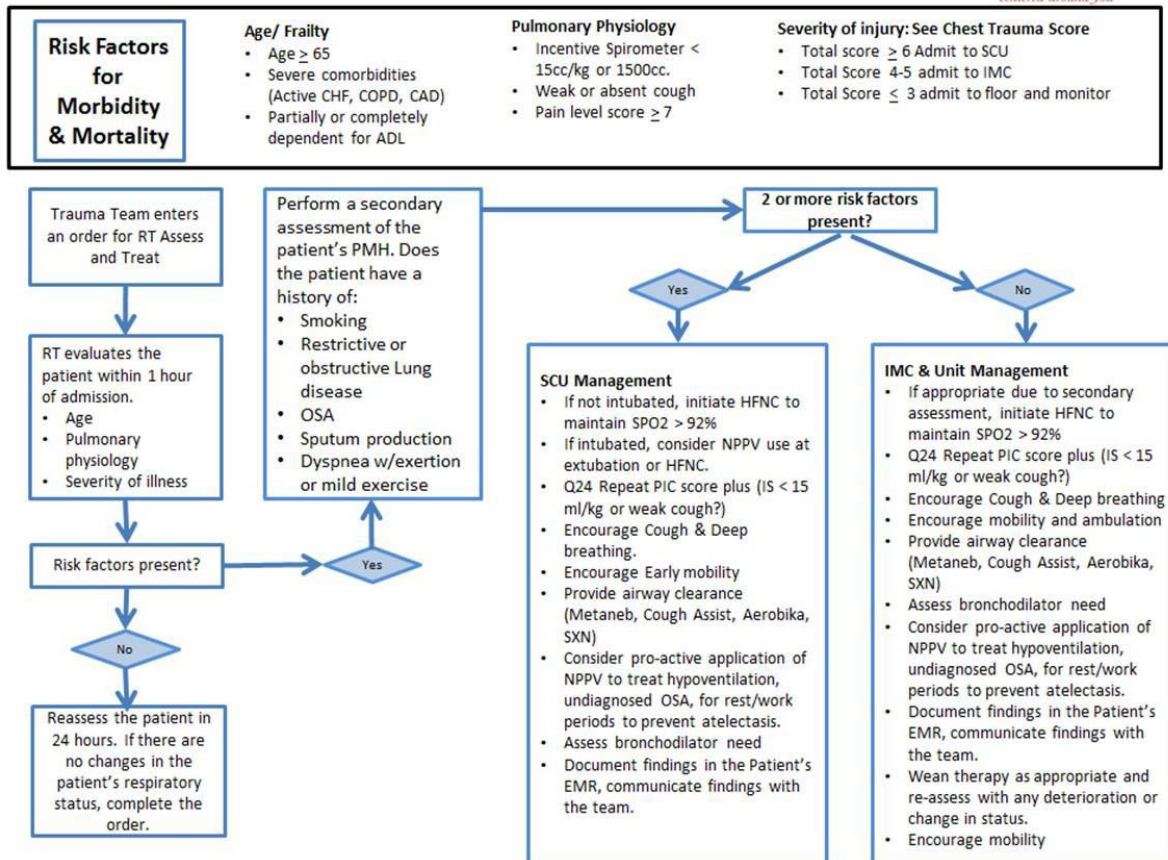
Reference:

- 1) Wong-Baker FACES Pain Rating Scale <http://wongbakerfaces.org/>

Appendix 4

Respiratory Care Assess and Treatment Guidelines

Respiratory Therapy Rib Fracture Airway Management Guidelines



References:

- Lamb, K., Spilman, S., Oetting, T., Jackson, J., Trump, M., & Sahr, S. (2018). Proactive use of high-flow nasal cannula with critically ill subjects. *Respiratory Care*, 63(3), 259-266.
- Nyland, B., Spilman, S., Halub, M., Lamb, K., Jackson, J., Oetting, T., & Sahr, S. (2016). A preventative respiratory protocol to identify trauma subjects at risk for respiratory compromise on a general in-patient ward. *Respiratory Care*, 61(12), 1580-1587.
- Masaji, N. (2016). High-flow nasal cannula oxygen therapy in adults: Physiological benefits, clinical benefits, and adverse effects. *Respiratory Care*, 61(4), 529-541.