UCHealth University of Colorado Hospital
Clinical Practice Guideline

Rib Fracture	
Effective Date: 2/2021	**Replaces Clinical Practice Guideline:** n/a
	Clinical Practice Guideline Owner: Trauma Services

Introduction:
Rib fractures are the most common form of significant chest injury, resulting from more than half of cases of blunt trauma to the chest. The danger from rib fractures is the pain it causes leads to limited inspiratory effort and poor cough, leading to atelectasis, lung collapse, hypoxia and pneumonia.

Scope:
This guideline applies to all providers involved with the treatment of a trauma patient

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Clinical Practice Guideline Details:

I. ER Triage

A. Need CXR or Chest CT, FVC, SaO2

B. RT to assess effort on FVC." If effort is poor, or pt. unable to adequately participate in FVC, discuss with physician.

C. May be considered for home discharge from ER without trauma consultation if

- FVC > 45% predicted
- SaO2 > 90% on room air
- Pain adequately controlled

D. Consult TRAUMA to evaluate for possible admission. TRAUMA will determine disposition: Home, Floor, Step Down, ICU, or medicine with trauma consult.

II. Treatment Plans:

A. **Floor:** Appropriate for percent predicted FVC >45%

- Admit to Floor.
- Vitals q4h with pulse oximetry
- RT to measure/ record FVC q12 hrs. May stop when FVC percent predicted is stable (> 45% x 4 measurements).
- Spirometer q hour with flutter valve while awake.
- Up in chair TID and ad lib, if able
- Ambulate TID and ad lib, if able
- PT consult
- RT consult. RT to initiate flutter valve therapy q8hr and PRN.
- O2 as needed for SaO>=90%
- PCXR 24 hrs post admission to eval for PTX, HTX
- Call TRAUMA for:

  RR > 25/min x 2 consecutive checks
  SaO2 <90% on 4 L O2 NC
  FVC < 45%
  T > 38.5 C

- Pain control:

  PO analgesia: Norco 5/325: i-ii PO q4h PRN
  PO analgesia: ibuprofen 600 mg PO TID c meals, if able.
  PCA per protocol, no basal rate.
  Consider ketorolac 15 mg IV "load" x1
  Consider consulting APS for:
  - Age > 64 with 2 or more ribs fractured
  - Age <64 with 4 or more ribs fractured
  - Pre-existing chronic pain problem
  - Concern that PO/IV analgesia is not effective.

B. **Step Down Unit:** For percent predicted FVC 25-45%

- As above with the following modifications:
- Vitals q 2 hrs with pulse ox
- FVC q 8 hrs
- Call TRAUMA if FVC < 25%
- Consider APS consult for all rib fracture patients admitted to Step Down with FVC <45%

C. **ICU:** For percent predicted FVC < 25%

- RT measure and record FVC q4h.
- Call Surgical Critical Care physician if FVC < 25%.
- Guaifenesin 400 PO qid
- A&A nebs q4h prn
- BiPAP = +10 / +5 cm H2O: 4 hrs "on" :4hrs "off"
- APS consult.
- Refer to SSRF policy

III. Rib Fixation Considerations

A. Consider EARLY (within 72 hrs) operative fracture stabilization when appropriate.

Indications:

1. Flail chest
   a) Failure to wean from ventilator
   b) Paradoxical movement visualized during weaning
   c) No significant pulmonary contusion
   d) No significant brain injury
2. Reduction of pain and improvement in pulmonary function
   a) Failure of analgesia with deteriorating pulmonary function
      i. Failure to improve FVC with maximal medical treatment x at least 24 hours, with concern for impending morbidity from complications
      ii. Decreasing FVC with concern for impending morbidity from complications
3. Chest wall deformity/defect
   a) Chest wall crush injury with collapse of the structure of the chest wall and loss of thoracic volume
   b) Severely displaced, multiple rib fractures or tissue defect that may result in permanent deformity or pulmonary hernia
   c) Severely displaced fractures are significantly impeding lung expansion or rib fractures are impaling the lung
   d) Patient is expected to survive any other injuries
4. Symptomatic rib fracture non-union
   a) CT scan evidence of fracture nonunion (2 months after injury)
   b) Patient reports persistent, symptomatic fracture movement
5. Thoracotomy for other indications (i.e., ‘‘on the way out’’)

IV. Medicine admit with trauma consult:

- Appropriate for patients with multiple medical problems requiring specialized care
- Trauma occurred greater than 48 hours prior to presentation
- Decompensated acute medical problem is primary reason for admission
  - Traumatic Injuries are not the primary reason for admission
  - Trauma to complete tertiary survey and follow daily until active trauma issues are managed and resolved

Definitions: NA

References:

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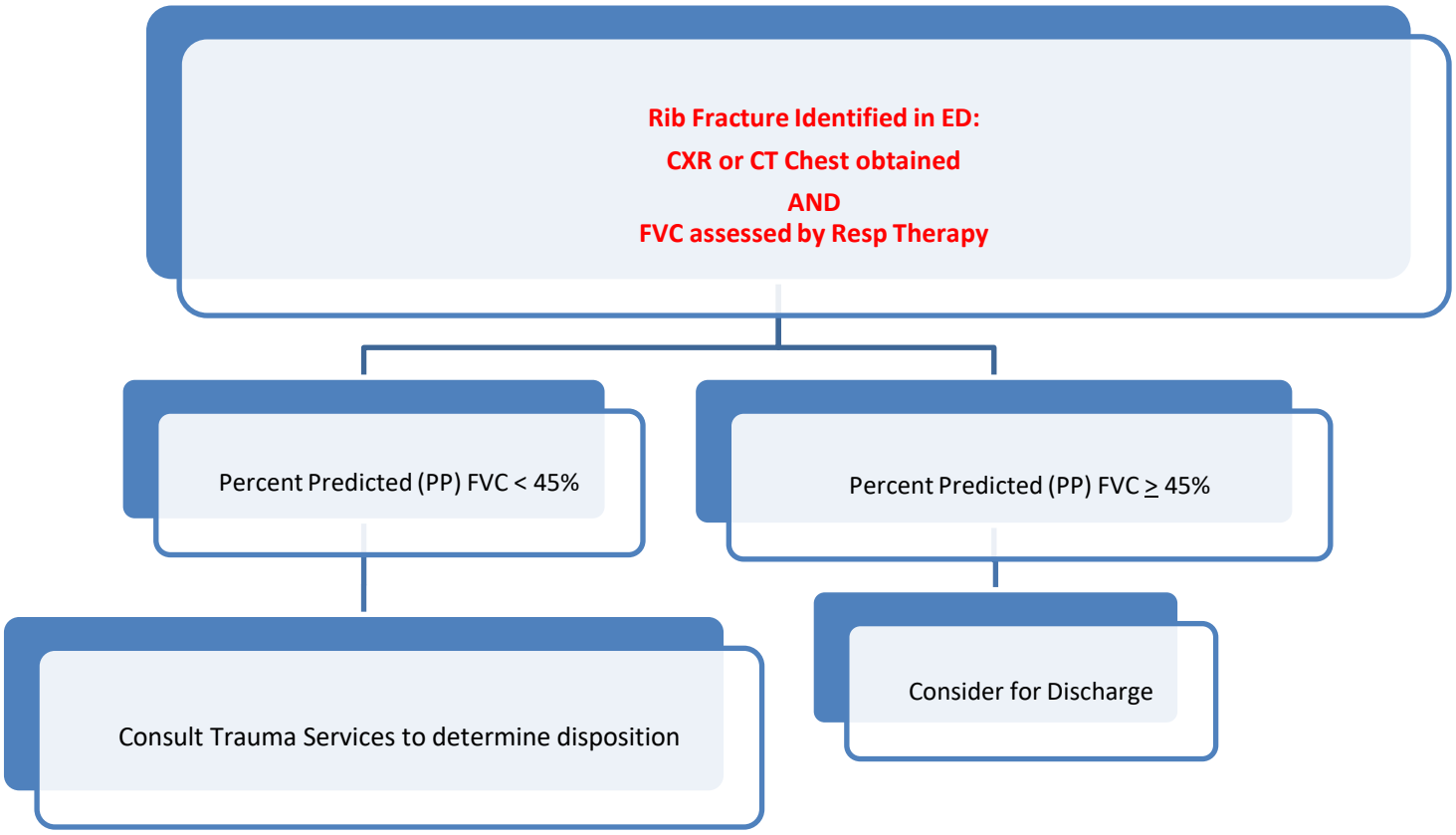
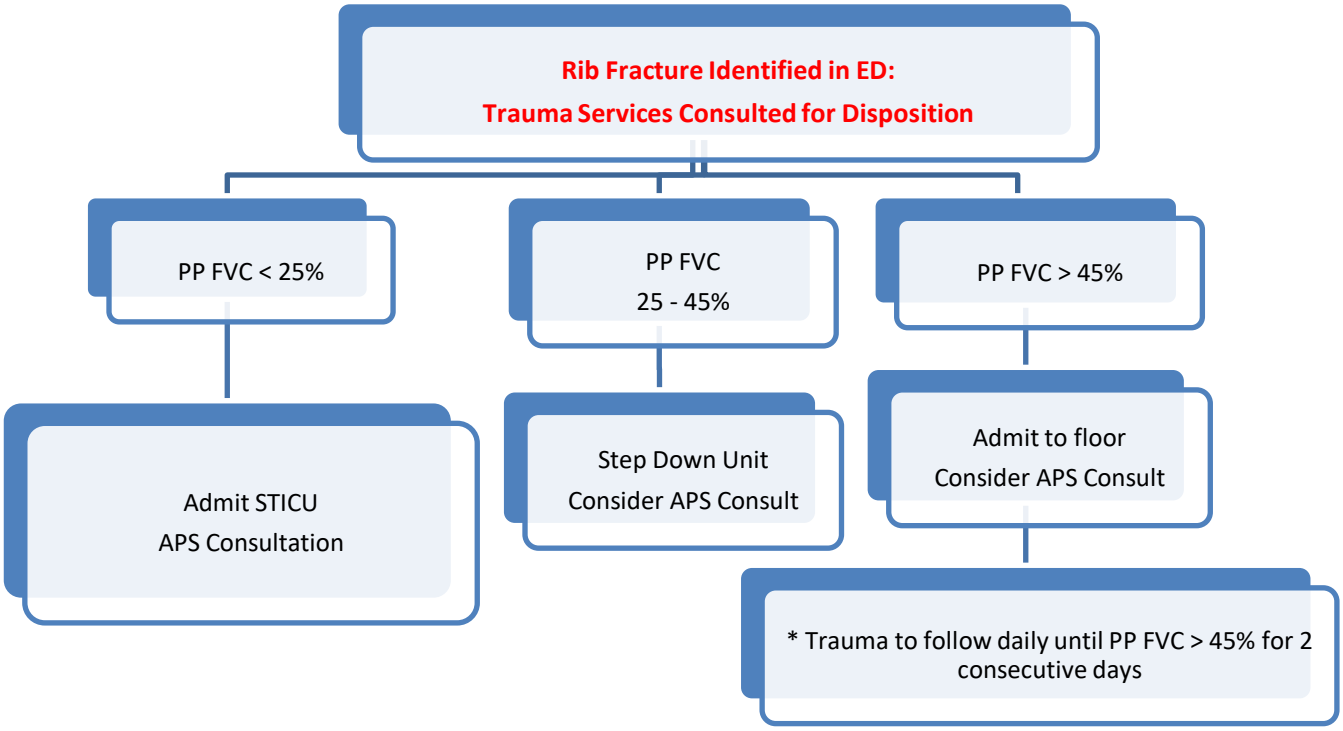
UCH Rib Fracture Clinical Practice Guideline





	Floor Orders	Step Down Unit	ICU orders
Vital Signs	Vitals q4h with pulse oximetry	Vitals q 2 hrs with pulse ox	per ICU protocols
Spirometer with flutter valve	Q 2 hours while awake	Hourly, while awake	Hourly, while awake
Oxygen	O2 as needed for SaO >=90%	O2 as needed for SaO >=90%	O2 as needed for SaO >=90%
RT to measure/ record FVC	q12 hrs May stop when FVC stable x 4 measurements	q 8 hrs	q4hrs
Activity	Up in chair TID and ad lib, if able Ambulate TID and ad lib, if able PT consult RT consult	Up in chair TID and ad lib, if able Ambulate TID and ad lib, if able PT consult RT consult	Up in chair TID and ad lib, if able Ambulate TID and ad lib, if able PT consult RT consult
Pain control:	PO analgesia: Norco 5/325: i-ii PO q4h PRN Ibuprofen 600 mg PO TID c meals, if able. PCA per protocol, no basal rate. Consider ketorolac IV "load" x1 Consider APS consult for: Age > 64 with 2 or more ribs fractured Age <64 with 4 or more ribs fractured Pre-existing chronic pain problem Concern that PO/IV analgesia is not effective.	Consider APS consult for all rib fx patients admitted to Step Down with PP FVC 25 - 45%	APS consult.
Call TRAUMA for:	RR > 25/min x 2 consecutive checks SaO2 < 90% on 4 L O2 NC FVC < 45% T > 38.5 C	RR > 25/min x 2 consecutive checks SaO2 < 90% on 4 L O2 NC call if FVC < 25% T > 38.5 C	Call Surgery Critical Care Physician if PP FVC < 25%
PCXR	24 hrs post admission to eval for PTX, HTX.	PCXR 24 hrs post admission to eval for PTX, HTX.	Q 24 hours
Additional Medications			Guaifenesin 400 PO qid Albuterol & Atrovent nebs q4h prn
AdditionalOrders			BiPAP = +10 / +5 cm H2O: 4 hrs "on" : 4hrs "off"