

## Multi-Institutional Evaluation of the Current Management of Severe Traumatic Pelvic Fracture

### Data Collection:

#### Demographic Data (All Mandatory) –

1. Age
2. Sex (Male/Female)
3. Date of Injury (mm-dd-yy)
4. Time of Injury (hh:mm)
5. Admission Date (mm-dd-yy)
6. Admission Time (hh:mm)

#### Mechanism of Injury (Choose One, Radio Buttons, Mandatory)

1. MVA
2. MCA
3. Pedestrian v. Auto
4. Bicycle accident
5. Fall
6. Assault
7. Other (blank text field)

#### Initial Assessment

1. Admission Vitals (All Mandatory)
  - a. SBP
  - b. HR
  - c. GCS (menu to select from – 3-15 followed by Intubated check box) If GCS>11 and intubation checked need to have warning “GCS can not exceed 11 when patient intubated. Please correct.”
  - d. Lowest recorded SBP within the first hour of arrival
2. Admission Labs
  - a. pH
  - b. Base deficit – have a check box of + or – and then the number
  - c. Lactate
  - d. Hct
  - e. INR
  - f. PTT
  - g. ROTEM (have each individual parameter show up if checked off)
  - h. TEG (have each individual parameter show up if checked off)
3. Pre-admission Anti-Coagulation/Anti-Platelet (choose all that apply, Radio buttons)
  - a. Aspirin
  - b. Plavix
  - c. Coumadin
  - d. Lovenox
  - e. Subcutaneous Heparin
  - f. Aggrenox
  - g. Fragmin
  - h. Prasugrel
  - i. Pradaxa
  - j. Other (blank text field)

If nothing is checked for this field the assumption is that the patient was not receiving any such agents and the default should be “None”.

**Injury Severity (All Mandatory)**

1. ISS – warning if ISS is outside of range (0 – 75)
2. Highest Head AIS – warning if Head AIS is outside range (0 – 6)
3. Highest Chest AIS - warning if Chest AIS is outside range (0 – 6)
4. Highest Abdomen AIS (including pelvic contents) - warning if Abd AIS is outside range (0 – 6) – NOTE that the minimum AIS here should be 1 since they should have a pelvic fracture
5. Highest Extremity AIS (including pelvic skeleton) - warning if Extremity AIS is outside range (1 – 6) – NOTE that the minimum AIS here should be 1 since they should have a pelvic fracture

**Pelvic Fracture Type (Choose one, Mandatory)**

1. Closed
2. Open
  - a. Packing of Open fracture in Trauma Bay/ED (yes/no, Mandatory if Open selected)

**Radiology**

1. Pelvis X-ray (yes/no, Mandatory)
2. CT scan (yes/no, Mandatory)
  - a. CT angio (yes/no, Mandatory)
  - b. Contrast extravasation (yes/no, Mandatory)
3. Pelvic Fracture Classification (choose all that apply, Radio Buttons)
  - a. Anteroposterior Compression I
    - i. <2.5cm Diastasis of pubic symphysis, no significant anterior or posterior ligamentous injury
  - b. Anteroposterior Compression II
    - i. >2.5cm Diastasis of pubic symphysis, disrupted anterior SI ligaments, intact posterior SI ligaments
  - c. Anteroposterior Compression III
    - i. Complete disruption of pubic symphysis, separation of hemipelvis, no vertical displacement, anterior and posterior ligaments ruptured
  - d. Lateral Compression I
    - i. Oblique pubic ramus fracture, no ligament disruption
  - e. Lateral Compression II
    - i. Oblique pubic ramus fracture with crush injury to sacrum, rupture of posterior sacroiliac ligament
  - f. Lateral Compression III
    - i. Oblique pubic ramus fracture with crush injury to sacrum, rupture of posterior sacroiliac ligament, contralateral anteroposterior (open book) injury
  - g. Vertical Shear
    - i. Vertical hemipelvis displacement, disruption of sacroiliac ligament, fracture through iliac wing or sacrum

**Method of Pelvic Bleeding Control** (Mandatory, checkbox for each method of bleeding control (Bullets). If checkbox is selected options under that heading are revealed. Can pick more than one checkbox.)

- Pelvic Binder?(yes/no)
  - a. Did patient arrive with pelvic binder in place? (yes/no)
  - b. If no, was pelvic binder applied in the ED/trauma bay?
- Angiographic Embolization of Pelvis
  1. Angiogram (yes/no, Mandatory)
    - a. Date of angio (mm-dd-yy, Mandatory)
    - b. Time of angio (hh:mm, Mandatory)

If Angiogram=Yes then questions 2-6 should show up, if Angiogram=No then these questions don't show up and their default is "N/A"

2. Indication for Angiogram (choose all that apply, Mandatory if Yes to Angiogram)
  - a. Blush/Extravasation on CT (yes/no)
  - b. Large Pelvic Hematoma (yes/no)
  - c. Fracture Pattern (yes/no)
  - d. Hemodynamic Instability (yes/no)
  - e. Ongoing Hemorrhage/Need for Blood Transfusion
3. Presence of contrast extravasation on angiogram (yes/no, Mandatory if Yes to Angiogram)
4. Therapeutic angioembolization (yes/no, Mandatory if Yes to Angiogram)
5. What agent was used for angioembolization (Mandatory if Yes to Angiogram, can check more than one)
  - a. Coils
  - b. Plug
  - c. Gelfoam
  - d. More than one
  - e. Other
6. Did angioembolization definitively control the source of pelvic hemorrhage (yes/no/unsure, Mandatory if Yes to angiogram)?
7. Was additional pelvic angiogram performed during the index hospitalization?
  - a. Date of angio (mm-dd-yy, Mandatory)
  - b. Time of angio (hh:mm, Mandatory)
  - c. Was angioembolization performed?

- Placement of Pelvic Fixator –
  1. Use of External Pelvic Fixation (yes/no, Mandatory)

If Pelvic Fixator=Yes then questions 2-3 should show up, if Pelvic Fixator=No then these questions don't show up and their default is "N/A"

2. Time to Pelvic Fixation (Mandatory if Yes to External Pelvic Fixator)
  - a. Date (mm-dd-yy)
  - b. Time (hh:mm)

3. Did external fixation definitively control the source of pelvic hemorrhage (yes/no, Mandatory if yes to External Pelvic Fixator).
- **Pre-Peritoneal Pelvic Packing In OR: should only be for patients who had intra-operative pre-peritoneal packing – not just packing an open wound.**

1. Use of pre-peritoneal pelvic packing (yes/no, Mandatory)

Again, questions 2-4 show up if Pre-peritoneal Packing=Yes, otherwise they don't show up and default=N/A

2. Time to OR (Mandatory if Yes to Pre-peritoneal pelvic packing)
  - a. Date (mm-dd-yy)
  - b. Time (hh:mm)
3. When were packs removed?
  - a. Date (mm-dd-yy)
  - b. Time (hh:mm)
4. Did pre-peritoneal pelvic packing definitively control the sources of hemorrhage (yes/no, Mandatory if Yes to Pre-peritoneal pelvic packing)

- **Intra-arterial Balloon Occlusion Device (REBOA)**

1. Use of Intra-arterial balloon occlusion device (yes/no)

Again, if question 1 is answered Yes then 2-3 below show up, otherwise default =N/A

2. Time to occlusion device placement (Mandatory if Yes to occlusion device)
  - a. Date (mm-dd-yy)
  - b. Time (hh:mm)
5. Level of occlusion device placement?
  - a. Zone 1
  - b. Zone 2
  - c. Zone 3
6. Occlusion type?
  - a. Partial
  - b. Complete
  - c. Unsure
7. SBP prior to balloon occlusion
8. Time of balloon deflation
  - a. Date (mm-dd-yy)
  - b. Time (hh:mm)
9. Why was REBOA performed (mandatory)?
  - a. As a temporizing measure to other method of hemostasis
  - b. As sole method of hemostasis
  - c. After failure of other method of hemostasis (pre-peritoneal packing, angioembolization, iliac artery ligation, and/or ex-fix)
10. Did REBOA definitively control the source of pelvic hemorrhage (yes/no, Mandatory if Yes to REBOA)?

- **Internal Iliac Artery Ligation**

1. Was internal iliac ligation performed?
2. Time to procedure (mandatory)
  1. Date (mm-dd-yy)
  2. Time (hh:mm)

3. Did internal iliac artery ligation definitively control the source of pelvic hemorrhage (yes/no, Mandatory if Yes to internal iliac artery ligation)?
- How was the pelvis definitively identified as a source of hemorrhage (mandatory, pick one)?
    - a. CT angiography
    - b. Intra-operative findings
    - c. Diagnostic angiography
    - d. Other
  - If other, please state:

### **Hospital Course**

1. Was definitive fixation of pelvic fracture performed (mandatory)?
  - a. Time to Definitive Fixation of Pelvic Fracture
    - i. Date (mm-dd-yy)
    - ii. Time (hh:mm)
2. Additional operative interventions for hemorrhage control (mandatory)?
  - a. None
  - b. Laparotomy
    - i. Date/time
    - ii. What procedures were performed? Check off
      1. Liver packing/hepatorrhaphy
      2. Splenectomy
      3. Nephrectomy
      4. Major vessel repair/ligation
  - c. Thoracotomy or sternotomy
    - i. Date/time
    - ii. What procedures were performed?
      1. Lung resection/tractotomy
      2. Cardiac repair
      3. Major vessel repair/ligation
  - d. Extremity hemorrhage control
    - i. Date/time
    - ii. What procedures were performed?
      1. Arterial repair/ligation/shunt placement
      2. Venous repair/ligation/shunt placement
      3. Long bone repair
      4. Amputation
  - e. Angioembolization (not including pelvic AE)
    - i. Date/time
    - ii. What procedures were performed?
      1. Splenic
      2. Hepatic
      3. Angioembolization of other/retroperitoneal vessels (lumbar, intercostal)
3. Any neurosurgical interventions performed?

- a. EVD
- b. ICP monitor
- c. Craniectomy/craniotomy
4. Ventilator Days (Mandatory)
5. ICU LOS (Mandatory)
6. Hospital LOS (Mandatory)
7. Transfusion requirements
  - a. In first 6 hours
    - i. pRBC
    - ii. Platelets
    - iii. FFP
    - iv. Whole blood units
  - b. In first 24 hours
    - i. pRBC
    - ii. Platelets
    - iii. FFP
    - iv. Whole blood units
8. Any hemostatic agents administered in the first 6 hours? (check off)
  - a. Prothrombin Complex Concentrate
  - b. Tranexamic acid
  - c. Cryoprecipitate
  - d. Riastap (fibrinogen concentrate)
9. Stable hct x 2
  - a. Date
  - b. Time
10. Complications
  - a. Acute renal failure
    - i. If yes, was dialysis required?
  - b. Ventilator Dependent Resp Failure
    - i. If yes, was tracheostomy required?
  - c. Sepsis
  - d. Lower extremity ischemia
    - i. If yes, was amputation required?
  - e. Femoral artery dissection and/or pseudoaneurysm
    - i. If yes, was intervention required?
  - f. Gluteal necrosis
    - i. If yes, was intervention required?
  - g. Bladder injury
    - i. If yes, was repair required?
  - h. Iliac/femoral vein DVT?
11. Discharge Disposition (Mandatory, Radio Buttons, Select One)
  - a. Home
  - b. Acute Care facility
  - c. Skilled nursing facility
  - d. Rehabilitation facility
  - e. Jail/Prison

- f. Morgue
  - g. Other (blank text field)
12. In-hospital Mortality (yes/no, Mandatory)
- If yes,
- a. Date of death
  - b. What was the time of death? HH:MM
  - c. Location of death
    - i. ED/trauma bay
    - ii. Operating room
    - iii. ICU
    - iv. Ward
  - d. Did ongoing pelvic bleeding contribute to the death (yes/no)?
  - e. What was the cause of death based on your chart review/knowledge of the case?
    - i. Pelvic hemorrhage
    - ii. Hemorrhage at other location
    - iii. TBI
    - iv. Sepsis
    - v. Multifactorial
    - vi. Other \_\_\_\_\_