JOINT TRAUMA SYSTEM CLINICAL PRACTICE GUIDELINE (JTS CPG)

Pelvic Fracture Care (CPG ID: 34)
Provides a brief review for the stabilization and treatment of pelvic fractures sustained in combat casualties.

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BACKGROUND

Historically, injuries to the bony pelvis were relatively uncommon in the combat environment. The prevalence of Improvised Explosive Device (IED) attacks seen in the Iraq and Afghanistan operations against technologically improved tactical vehicles, as well as during dismounted operations, has led to an increased incidence of blunt trauma pelvic injuries.[1] The patterns of pelvic fracture in the combat environment tend to be more complex, more difficult to classify, and more commonly open than those seen in civilian trauma.

Hemodynamically compromised patients with pelvic fractures present a complex challenge to the trauma team as sharp spikes of bone resulting from pelvic ring injuries can lacerate surrounding soft tissues and induce brisk bleeding. The most common sources of bleeding are from fracture surfaces and the retroperitoneal venous plexus, with gluteal artery injuries occurring less commonly.[2, 3] Also at risk are the hollow visceral contents of the abdomen and pelvis, L5 nerve root, and lumbar plexus.

Pelvic fractures often occur in conjunction with other life threatening injuries. Civilian mortality rates have ranged from 6-35% with higher mortality rates associated with open fractures.[4-8] Death within the first 24 hours of injury in these patients is most often a result of **acute blood loss and associated injuries**.[8]

Recent analysis of mortality with combat related pelvic fractures identified large vessel injury, head injury, and injury to solid abdominal organs as risk factors for mortality in the setting of combat related pelvic ring injuries.[9] **Open pelvic fractures** in the combat environment have become more common most likely secondary to the increased prevalence of blast mechanisms of injury, combined with better patient survivability - attributed to rapid transport to surgical stabilization, use of tourniquets, the use of enhanced body armor and more aggressive massive transfusion protocols. These open fractures are often associated with other severe injuries, including lower extremity amputations. Combat related pelvic ring injuries are commonly high-energy and unstable injuries, frequently requiring operative fixation.

EVALUATION AND TREATMENT

NOTE: *Refer to Appendix A.*

1. Key issues in management of pelvic fractures are to identify if the patient is hemodynamically stable and if the pelvic fracture is mechanically stable. If the patient is not hemodynamically stable, it is imperative to identify all site(s) of hemorrhage as pelvic fractures often occur in conjunction with other life threatening injuries. Appropriate **evaluation of the abdomen, chest, and other potential sites of injury and hemorrhage** cannot be overstressed. Additionally, a **thorough examination of the pelvis and perineum** is required to rule out associated injuries to the rectum and genitourinary/gynecologic systems. Pelvic fracture is a common component of Dismounted Complex Blast Injury.[10]

2. When pelvic fractures cause hemorrhage, the bleeding occurs from three major sources: arterial, venous, and cancellous bone. Over 70% of hemorrhage associated with blunt pelvic trauma causing pelvic fracture is venous in nature and may be controlled with maneuvers that reduce the pelvic volume and stabilize the pelvis.[11] The other nearly 30% is associated with an arterial source and often requires procedural interventions such as **surgical packing and/or embolization**.[12] **Pelvic packing** can be a valuable technique, particularly when the patient is in extremis, or when laparotomy is required for associated injuries.[13]

3. In the austere environment, if open pelvic fractures continue to bleed despite retroperitoneal packing, bilateral internal iliac artery ligation should be considered.[14] In these dire circumstances, temporary cross-clamping of the aorta may help **control life-threatening hemorrhage** prior to dissection and ligation of the internal iliac arteries.

4. For pelvic fractures, **initial stabilization** with whatever means are available (sheet, pelvic binders, bean or sand bags, or pelvic external fixation) must be promptly implemented. In the combat environment, when fracture stability is unclear and specialist expertise is not available to determine pelvic fracture stability, stabilization with a sheet or binder is recommended. When possible, taping the knees and ankles together can minimize additional external rotational movement, and help improve the pelvic reduction achieved with a sheet or binder. Pelvic binders are correctly placed by centering over the greater trochanter of the femur, applying an internal rotational force to each hemi-pelvis through the hip joints.

5. The establishment of **standardized clinical treatment algorithms** for patients with pelvic fractures has been shown to greatly increase the probability of rapid stabilization of trauma patients.[15-18] Appendix A shows an algorithm in unstable patients.

6. A **multidisciplinary approach with early trauma surgery and orthopedic surgery coordination** is critical. The focus of the evaluation and treatment is early identification of injury with early mechanical stabilization as necessary and determination of hemodynamic instability with aggressive resuscitation for hemorrhage. When available, angiographic exploration with early embolization by skilled interventionalist for the hemodynamically unstable patient with intrapelvic hemorrhage may be beneficial-preferably in the operating room.[19]

7. Given that this capability is rarely available outside of a Role 3 facility, the next most beneficial maneuver is **retroperitoneal packing via a suprapubic incision**.[20,21] The temptation to open a retroperitoneal pelvic hematoma (as a result of a pelvic fracture) from inside the abdomen should be resisted and attempted only as a last resort although this may be necessary due to other intra-abdominal or pelvic injuries. In the casualty who remains hemodynamically compromised in spite of these efforts bilateral iliac artery ligation should be considered.[14] However, these interventions should not delay the necessary acute surgical treatment for concomitant hemorrhagic injuries.

PERFORMANCE IMPROVEMENT (PI) MONITORING

INTENT (EXPECTED OUTCOMES)

- At forward locations with providers who lack the expertise and resources for accurate placement of external pelvic fixation, pelvic stabilization is performed using sheets or binders centered over the greater trochanters.
- In patients with pelvic fractures who have negative FAST exam but remain unstable despite adequate resuscitation, DPL and/or exploratory laparotomy is performed.

PERFORMANCE/ADHERENCE MEASURES

- When expertise and resources were lacking at forward locations, pelvic stabilization was performed using sheets or binders.
- In patients with pelvic fractures who had negative FAST exam but continued hemodynamic instability despite adequate resuscitation, DPL and/or exploratory laparotomy was performed.

DATA SOURCE

- Patient Record
- Department of Defense Trauma Registry

SYSTEM REPORTING & FREQUENCY

The above constitutes the minimum criteria for PI monitoring of this 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 Joint Trauma System (JTS) Director and the JTS Performance Improvement Branch.

RESPONSIBILITIES

It is the trauma team leader's responsibility to ensure familiarity, appropriate compliance and PI monitoring at the local level with this CPG.

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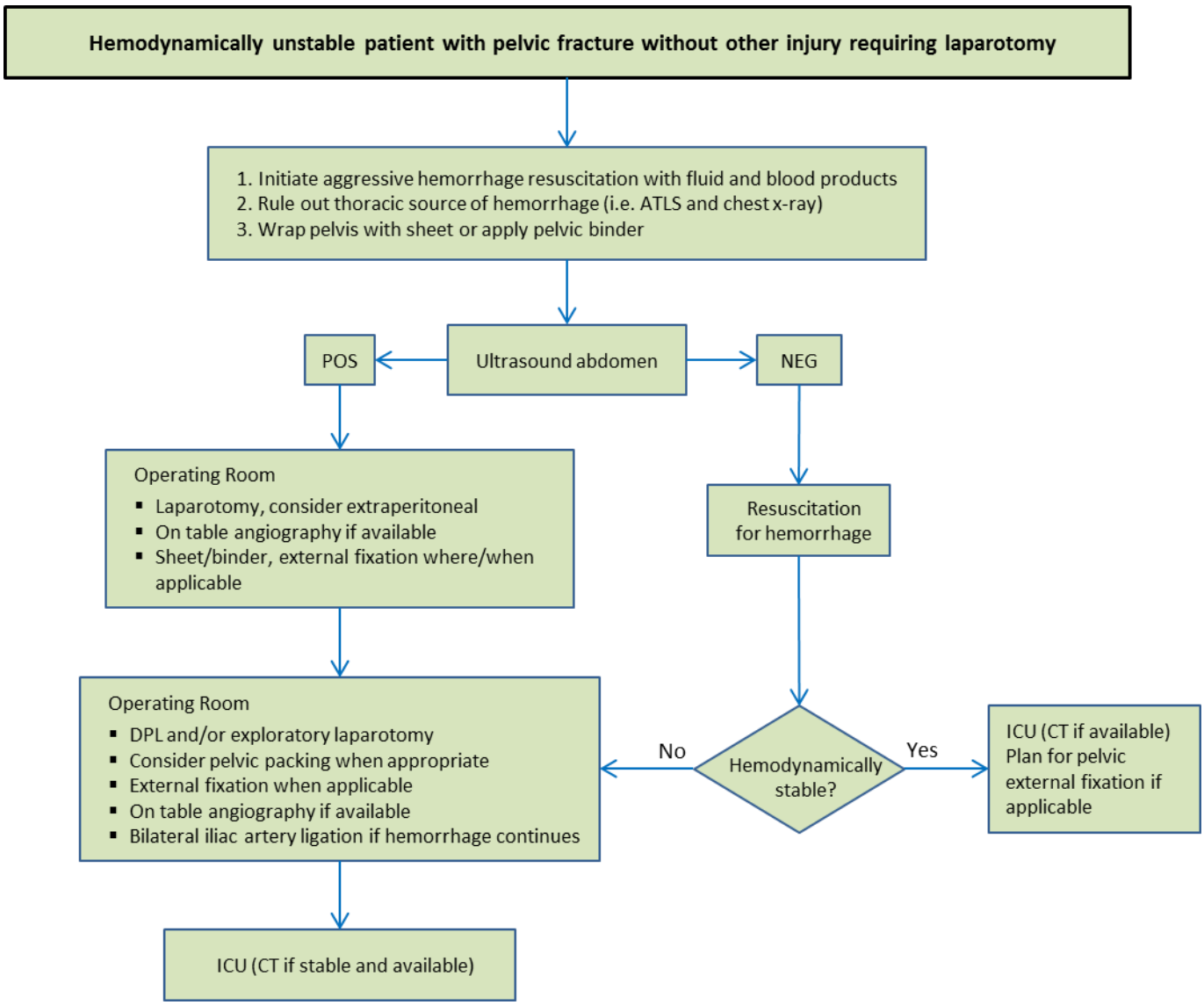
APPENDIX A: PELVIC FRACTURE CLINICAL PATHWAY



APPENDIX B: ADDITIONAL INFORMATION REGARDING OFF-LABEL USES IN CPGS

PURPOSE

The purpose of this Appendix is to ensure an understanding of DoD policy and practice regarding inclusion in CPGs of "off-label" uses of U.S. Food and Drug Administration (FDA)–approved products. This applies to off-label uses with patients who are armed forces members.

BACKGROUND

Unapproved (i.e., "off-label") uses of FDA-approved products are extremely common in American medicine and are usually not subject to any special regulations. However, under Federal law, in some circumstances, unapproved uses of approved drugs are subject to FDA regulations governing "investigational new drugs." These circumstances include such uses as part of clinical trials, and in the military context, command required, unapproved uses. Some command requested unapproved uses may also be subject to special regulations.

ADDITIONAL INFORMATION REGARDING OFF-LABEL USES IN CPGS

The inclusion in CPGs of off-label uses is not a clinical trial, nor is it a command request or requirement. Further, it does not imply that the Military Health System requires that use by DoD health care practitioners or considers it to be the "standard of care." Rather, the inclusion in CPGs of off-label uses is to inform the clinical judgment of the responsible health care practitioner by providing information regarding potential risks and benefits of treatment alternatives. The decision is for the clinical judgment of the responsible health care practitioner within the practitioner-patient relationship.

ADDITIONAL PROCEDURES

Balanced Discussion

Consistent with this purpose, CPG discussions of off-label uses specifically state that they are uses not approved by the FDA. Further, such discussions are balanced in the presentation of appropriate clinical study data, including any such data that suggest caution in the use of the product and specifically including any FDA-issued warnings.

Quality Assurance Monitoring

With respect to such off-label uses, DoD procedure is to maintain a regular system of quality assurance monitoring of outcomes and known potential adverse events. For this reason, the importance of accurate clinical records is underscored.

Information to Patients

Good clinical practice includes the provision of appropriate information to patients. Each CPG discussing an unusual off-label use will address the issue of information to patients. When practicable, consideration will be given to including in an appendix an appropriate information sheet for distribution to patients, whether before or after use of the product. Information to patients should address in plain language: a) that the use is not approved by the FDA; b) the reasons why a DoD health care practitioner would decide to use the product for this purpose; and c) the potential risks associated with such use.