

Pelvic Fractures with Hemodynamic Instability

Purpose: To identify patients with pelvic fractures who require pelvic stabilization for hemorrhage control and provide a standardized, evidence based approach for treatment and ultimately patient outcome.

Background: 20% of all multiply injured trauma patients have a pelvic ring fracture. Hemodynamic instability from blood loss is common with blunt traumatic pelvic fractures. Disruption of the pelvic ring and continued movement of the fractured elements result in tears in the pelvic venous plexus and occasionally disrupt the internal iliac arterial system. The volume of the pelvis increases and reduces the tamponade effect of the retroperitoneal tissues and intrapelvic organs which leads to further bleeding. Pelvic binding address these two issues by stabilizing the pelvis (stopping movement of the fractures) and by decreasing the retroperitoneal volume.

Assessment: Initial management should follow ATLS protocol for hemorrhage control and fluid resuscitation. Hemorrhage control is restored through mechanical stabilization of the pelvic ring and external counter pressure. Application of support directly to the pelvis with a sheet, binder or other external device can apply sufficient stability to an unstable pelvis if applied at the level of the greater trochanter of the femur. This will reduce the volume of the disrupted pelvis. For patients with vertical shear fractures, (ipsilateral disruption of all ligaments restraining the hemi pelvis), longitudinal traction applied through skin or skeleton may supplement binding of the pelvis. Internal rotation of the lower limbs also reduces pelvic volume.

Recommendation: Mortality rates in patients with closed pelvic fractures and hypotension range from 10 – 42%. Evidence suggests temporary binding decrease pelvic volume with a pelvic fracture and may improve biomechanical stability, thus reducing blood loss. Pelvic Circumferential Compression Devices (PCCD) are non-invasive, easy to apply and provide controlled pressure delivery. They can be used on conscious patients resulting in pain and movement reduction during transfers and bridge the gap to definitive stabilization.

Implementation: Attached algorithm was developed by a working group from the South Central Regional Trauma Network as a suggested approach with appropriate references. Local hospital implementation will be at each facilities discretion according to available equipment and resources.

References

- 1) Heetveld, H.J et al. Guidelines for the Management of Haemodynamically Unstable Pelvic Fracture Patients. *ANZ J. Surg.* 2004; 74: 520-529
- 2) Mohanty K, et al Emergent management of pelvic ring injuries: an update. *Canadian Journal of Surgery.* 2005
- 3) Pizanis, A. et al. Emergency Stabilization of the pelvic ring: Clinical comparison between three different techniques. *Injury. Int. J. Care Injured.* 2013; 44:1760-1764
- 4) Fu, C-Y, et al. Pelvic circumferential compression devices benefit patients with pelvic fractures who need transfers. *Am. J. Emerg. Med.* 2013; online.
- 5) Management of Bleeding Pelvic Fractures. *Scand J Surg.* 2014
- 6) Pelvic ring injuries: Emergency assessment and management *J Clin Orthop Trauma.* 2015
- 7) The Royal Melbourne Hospital – Pelvic Binder Guideline – July 2012
- 8) Management of Acute Hemorrhage in Pelvic Trauma: An Overview. *Eur J Trauma Emerg Surg.* 2010
- 9) Garlapati et al, An overview of pelvic ring disruption. *Trauma.* 2012;