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Pelvic ring fractures range from low-energy falls in the elderly to high-energy mechanisms in young patients. These injuries can be a significant cause of morbidity and mortality and are frequently associated with additional injuries. Hemorrhage and resultant hemodynamic instability are often associated with high-energy injuries and require prompt management. Circumferential pelvic antishock sheeting is an effective and readily available tool for reducing pelvic volume at the accident scene or in the emergency department, while still allowing access to the abdomen and lower extremities for ongoing resuscitation. This article, and the associated instructional video, reviews the indications and proper technique for placing a pelvic sheet.

Key Words: circumferential pelvic antishock sheet, pelvic ring instability, hemodynamic instability

Video available at: https://otaonline.org/video-library/45036/procedures-and-techniques/multimedia/18849826/circumferential-pelvic-antishock-sheeting.

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INTRODUCTION

Pelvic ring injuries have been reported to occur at an incidence of 0.82 per 100,000 people and are often associated with visceral, vascular, and additional bony injuries because of the higher energy required to disrupt the pelvic ring.[1] Initial management of patients presenting with pelvic ring injuries involves the steps outlined in the Advanced Trauma Life Support protocol to identify any life-threatening injuries. Circumferential pelvic antishock sheeting (CPAS), as described by Routt et al, serves to decrease pelvic volume, allow for stable clot formation, and decrease patient discomfort.[2,3] Indications for CPAS include hemodynamically unstable patients presenting with anteroposterior compression type pelvic ring injuries and some vertical sheer patterns, often in association with the placement of a traction pin.[3] Pelvic degloving injuries are a contraindication to CPAS. Although there is concern of accentuating the deformity of an lateral compression fracture pattern with sheet application, Bottlang et al[4] demonstrated in a cadaveric study that application of a pelvic sling does not cause significant over-reduction of unstable lateral compression injuries. Therefore, they concluded that it is safe to place pelvic sheets at the accident scene where the specific injury pattern may not be known.

CASE TECHNIQUE

Pelvic sheets are a valuable tool in the management of unstable pelvic ring injuries because they are readily available, inexpensive, and can be applied virtually anywhere.[3,5] Supplies needed for application include a bedsheet and 4 clamps. Additional sheets, foam rings, and tape may be useful if additional internal rotation of uninjured lower extremities is needed to aid in further reduction of the pelvic ring.[6] A minimum of 2 providers is required for proper CPAS application.[3]

The patient's clothing should be removed before sheet application.[3] This allows for the provider to assess for any skin compromise that would preclude CPAS and identify any additional injuries. While maintaining spinal precautions, the patient is rolled and the longitudinally folded bedsheet is placed under the patient. The sheet should be centered over the greater trochanters to achieve appropriate reduction of the pelvic ring.[3,7] It is important that the sheet remains smooth because wrinkles may lead to skin breakdown.[3] The sheet ends are then wrapped anteriorly and crossed in an overlapping manner.[3] After the sheet ends are pulled taut, the 4 clamps are placed. It is often helpful to have a third provider place the clamps, allowing the 2 providers to maintain appropriate tension across the sheet.

Multiple methods are available to provide additional internal rotation. Gardner et al[6] described taping the lower extremities to supplement the reduction of the pelvic ring. At our institution, we frequently use the foam rings found in the operating room around the feet to avoid some of the complications seen with taping.

DISCUSSION

CPAS is a noninvasive tool used in the initial management of patients with unstable pelvic ring injuries. It serves to decrease pelvic volume, allow for clot formation, and provide temporary bony stability.[3,7]

Advantages of CPAS include the accessibility and low cost of sheets, continued access to the abdomen and extremities for ongoing evaluation, access to the groin through the creation of working portals, and the option to maintain reduction with the sheet during definitive fixation of the pelvic ring.[2,3,8] Working portals are created by cutting a hole in the sheet in the area overlying the intended incision or access site. If iliosacral screws are being placed, fluoroscopy is used to mark the appropriate landmarks on the sheet to aid in determining the appropriate portal location before cutting the sheet and prepping the skin.[8]

Potential complications of CPAS include skin breakdown, underestimation of injury severity, and worsening of neurovascular injuries with aggressive application.[3,9,10]

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Schaller et al[9] described a case in which a patient developed bullae around the pubic symphysis and greater trochanters because of pressure from the sheet, delaying definitive surgical intervention. Therefore, it is recommended that additional stabilization of the pelvic ring be pursued as soon as it is medically safe for the patient.

In summary, CPAS is a valuable and inexpensive method to provide initial stability in patients with pelvic ring injuries. Careful attention must be paid to the skin and neurovascular status to avoid complications.

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