Comparison of Iliac Crest Versus Supra-Acetabular External Fixator in Hemodynamically Unstable Patients with a Pelvic Ring Injury

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Purpose: External fixation has been widely implemented as a resuscitation strategy in combination with pelvic packing for high-energy, hemodynamically unstable, pelvic ring injuries. The primary aim of this study is to compare urgent iliac crest (IC) versus supra-acetabular (SA) external fixation in the setting of hemodynamic instability.

Methods: This is a retrospective review of a prospectively gathered registry at an urban Level I trauma center comparing placement of pelvic external fixator by SA or IC technique. Outcomes assessed were accuracy of pin placement, duration of procedure, and the effect on true pelvic circumference depending on type of fracture by Young and Burgess classification system.

Results: 93 hemodynamically unstable patients with a pelvic fracture were included. Pin malpositioning was more common with IC than SA groups (proportional difference, –40%; 95% confidence interval [CI], –57 to –20%; P<0.0001). For APC (anterior posterior compression) injuries, there was a larger median reduction in pelvic circumference in the SA group than the IC group (median difference [MD], –12.85 cm; 95% CI, –27 to 0.1; P = 0.0485). In lateral compression (LC) injuries, the SA group had an overall increase in pelvic circumference compared to an overall decrease in IC group (MD, 6.5 cm; 95% CI, 1.5 to 16.8; P = 0.0221). There was no difference in the operating room (OR) time (mean difference, –5.4 min; 95% CI, –32 to 22; P = 0.68).

Conclusion: In this clinical setting, we recommend placement of SA external fixator (versus IC) with similar operative times, fewer pin malpositions, and improved stabilization of pelvic circumference in APC and LC injuries.

Figure 1: Comparison of median change in true pelvis circumference by YB Classification

	Type of DCO External Fixator			
Young and Burgess (YB) Classification [Median (IQR)]	**Iliac Crest (IC) (n=48)**	**Supra Acetabular (SA) (n=45)**	**Median Difference (95% CI)**	**p-value**
APC	-0.35 (-9.25 to 19.98)	-9.8 (-17.10 to -5.45)	-12.85 (-27 to 0.1)	**0.0485**
LC	-2.05 (-4.28 to 0.95)	4 (1.20 to 11.30)	6.5 (1.50 to 16.80)	**0.0221**
Combined	-6.35 (-11.20 to -0.23)	9.85 (-8.45 to 14.05)	13.35 (-9.5 to 25.3)	0.2410
VS	1.9 (-1.20 to 5.00)	-1.25 (-9.43 to 0.33)	-4.95 (-1.8 to 13.8)	0.4875
All Fractures	-0.95 (-6.00 to 2.84)	0.05 (-10.33 to 9.00)	1.00 (-5.90 to 6.80)	0.7940

(IQR – Interquartile range)
Continuous variables with non-parametric distribution, are presented as medians with associated interquartile range
P-value < 0.05 was considered statistically significant and are bolded