

Predictors of Instability in Lateral Compression Type 1 (LC-1) Pelvic Ring Injuries

Adeet Amin¹, Patrick Kellam², Augustine M Saiz, Jonathan G Eastman, Milton L Routt³, Stephen James Warner⁴

¹UT Houston, ²Ortho, ³Uthealth, ⁴McGovern Medical School At Uthealth

INTRODUCTION:

Lateral compression type 1 pelvic ring injuries are heterogenous in nature. To aid in the decision making of operative indications, surgeons have adopted the use of examinations under anesthesia (EUA) to determine the stability of the pelvic ring. The purpose of this study is to determine if patients with unstable pelvic ring injuries will have unique fracture characteristics compared to those with stable injuries.

METHODS:

Patients that presented to a level 1 trauma center with an LC-1 pelvic ring injury, as identified by Current Procedural Terminology and International Classification of Diseases-10 codes, over a 7-year (2015-2021) period were included. Patients over the age of 18 who underwent an exam under anesthesia of their pelvis were included. Demographics were obtained from the medical record. For each patient preoperative images were reviewed for location of sacral fracture, whether the fracture was complete or incomplete; as well as presence of superior (SR)/inferior ramus (IR) fracture and SR/IR fracture pattern and location. Instability (positive EUA) was defined as patients who had an EUA that required operative fixation. Patients were grouped based on outcome of the EUA. Comparison statistics were used to compare groups based on demographics and fracture patterns. Univariate regression was performed to identify predictors of instability.

RESULTS:

One-hundred-thirty patients underwent EUA for an LC-1 pelvic ring injury. One-hundred-one patients had positive EUAs and 29 had negative EUAs. Patients were younger in the EUA negative group versus positive group (48 vs. 58, $p=0.04$). Patients with a positive EUA were more likely to have a complete sacral fracture (30% vs. 0%, $p=0.0004$). Furthermore, patients with a positive EUA were more likely to have comminuted SR fractures ($p<0.0001$), parasymphyseal SR fractures ($p=0.0008$), comminuted IR fractures ($p=0.0002$). On univariate regression, ipsilateral SR fracture pattern ($p=0.0002$), location ($p<0.0001$), and presence of ipsilateral IR fracture ($p=0.007$) and contralateral SR fracture ($p=0.0001$) were found to be significant predictors of instability.

DISCUSSION AND CONCLUSION:

Careful review of fracture characteristics of LC-1 injuries can help guide surgeons to predict the stability of the pelvic ring. When patients present with LC-1 pelvic ring injuries, recognition of complete sacral injuries, parasymphyseal comminuted SR fractures, ipsilateral IR fractures, and contralateral SR fractures can indicate a more unstable injury as determined by EUA. Fractures containing all of these components should be evaluated with at least an EUA prior to nonsurgical treatment.