

Displaced Pelvic Ring Fractures are Associated with Increased Complications in Adult Patients: A Propensity-Matched Study

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Introduction: The pelvic ring is a mechanically stable structure that is primarily displaced in high energy impact traumas. Not all fractures displace the pelvic ring and can largely be managed without surgical intervention. There is a high degree of soft tissue disruption associated with pelvic ring fractures. The purpose of this study is to characterize the complications associated with pelvic fracture disruption compared to pelvic ring fractures without disruption in adult patients.

Methods:

Design: In this retrospective cohort study, the global health research network database, TriNetX, was used to evaluate de-identified patient information from 54 healthcare organizations (HCOs) and over 90 million patients on the network in the United States.

Participants: Two cohorts were evaluated for this study. Cohort A was adult patients that were 18 to 60 years old that had multiple pelvic fractures with disruption of the pelvic ring (ICD10:S32.81). Cohort B was adult patients that were 18 to 60 years old that had multiple pelvic fractures without disruption of the pelvic ring (ICD10:S32.82). Cohorts were propensity matched for nicotine dependence, alcohol disorders, type 2 diabetes, and demographic factors such as age at event, race, ethnicity, and sex.

Setting: Data was gathered from HCOs from May 24th, 2003, to May 24th, 2023. The outcomes evaluated were: death, sepsis, nonunion, hemoperitoneum, urethral injury, deep vein thrombosis (DVT), reduced mobility, injury to lumbar spinal cord, injury to sacral spinal cord, gait abnormalities, dyspareunia, hypotension, erectile dysfunction, and infection after procedure. All outcomes were evaluated between 1 day and 1 year of the pelvic ring fracture.

Results: A total of 101,018 displaced pelvic ring fractures with disruption were matched with 91,423 patients with non-displaced pelvic ring fractures. Disruption of the pelvic ring significantly increased the associated risk for being deceased (RR 1.51, 0.89% vs 0.59%, $p < 0.0001$), sepsis (RR 1.30, 0.36% vs 0.28%, $p = 0.0018$), hemoperitoneum (RR 1.76, 0.15% vs 0.09%, $p < 0.0001$), urethral injury (RR 2.63, 0.19% vs 0.07%, $p < 0.0001$), DVT (RR 1.27, 0.45% vs 0.36%, $p = 0.0011$), reduced mobility (RR 1.74, 0.68% vs 0.39%, $p < 0.0001$), hypotension (RR 1.37, 0.79% vs 0.58%, $p < 0.0001$), erectile dysfunction (RR 1.15, 0.75% vs 0.65%, $p = 0.0126$), and infection (RR 1.15, 1.06% vs 0.92%, $p = 0.0036$).

Conclusion: In the last 20 years (2003 to 2023), adult patients that were 18 to 60 years old that had multiple pelvic fractures with disruption of the pelvic ring were at a significantly higher risk for complications than their non-displaced counterpart. Patients that have a displaced pelvic fracture should be more carefully considered for associated post-traumatic complications.

Significance/Clinical Relevance: This study aids clinicians with a quantitative measurement as to the increased risk of post-traumatic complications associated with disruption of the pelvic ring. Patients and providers should be aware of the relevant associated complications and their comparatively increased associated risk when compared to non-displaced pelvic ring fractures.

