

Peripheral Nerve Injury in Operatively Managed Pelvic Ring Injuries: Is Pelvic Angiography a Predictor of Neurologic Deficit?

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Purpose: A detailed neurologic examination can be difficult to perform in the polytraumatized patient. However, the identification of such deficits are important to recognize acutely in order to address durable medical equipment and rehabilitation needs to optimize prognosis and outcomes. The aim of the current study was to identify risk factors associated with peripheral nerve injury in patients with pelvic ring fractures.

Methods: The current study presents on 274 consecutive patients that presented to a single Level I academic trauma hospital for surgical fixation of a pelvic ring injury. Peripheral nerve injury was classified as positive when the patient was unable to perform anti-gravity motor strength (<3/5 muscle strength grading) with associated sensory deficits in the corresponding dermatome. Pelvic ring fractures were classified according to the Young and Burgess and OTA classification systems. Associated injuries and demographic information was obtained from patient records. Logistic regression analyses were performed and reported in odds ratios (ORs) and 95% confidence intervals (CIs).

Results: Of the 274 patients with pelvic ring injuries included in this study, 35 patients (13%) had an associated peripheral nerve injury. Of these patients with a nerve injury, 32 (91%) had a sciatic nerve injury and 3 (9%) had a femoral nerve injury. Patients who required pelvic angiography were significantly more likely to have an associated nerve injury; there was a 34% (14 of 41) nerve injury rate in the angiography group compared to 9% (21 of 233) in the no angiography group ($P < 0.001$). Patients who underwent angiography were over 5 times as likely to have an associated nerve injury (OR 5.2, 95% CI 2.4-11.5; $P < 0.001$). Of those who underwent angiography (N = 41), 33 patients (80%) had embolization with gel foam or a coil. Patients who underwent angiography without embolization were almost 8 times as likely to have an associated nerve injury (OR 7.6, 95% CI 1.8-31.9; $P = 0.006$). Patients with an associated acetabular fracture were almost 4 times as likely to have an associated nerve injury (OR 3.8, 95% CI 1.8-7.8; $P < 0.001$). There was no association between fracture pattern and nerve injury. There was also no association between age, sex, or body mass index between patients who did and not have an associated nerve injury.

Conclusion: We identified pelvic angiography and an associated acetabular fracture as significant factors associated with concomitant peripheral nerve injury in patients with pelvic ring fractures. Interestingly, patients who underwent pelvic angiography without embolization had the highest odds (almost 8×) of an associated nerve injury, perhaps related to venous bleeding and local compression. These data will help more acutely identify patients at high risk of nerve injury, which will both assist surgeons in counseling patients but also potentially help with earlier intervention strategies such as bracing and therapy.