

## High-Energy Blunt Pelvic Ring Injuries and Intrapelvic Arterial Lesions

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**Purpose:** The aim of the study was to determine the rate and topography of intrapelvic arterial lesions (IPALs) associated with high-energy blunt pelvic ring injuries (HEBPRI). Their association with pelvic fracture types and epidemiologic, clinical, therapeutic, and outcome factors was also evaluated.

**Methods:** This retrospective cohort study was conducted in a Level-I trauma center serving 500,000 inhabitants. All consecutive HEBPRI patients admitted between January 1, 2014 and December 31, 2017 were included. Pelvic vascular images (injected CT with arterial sequences and angiography) were reviewed by a board-certified radiologist, and IPALs were described. Three board-certified orthopaedic surgeons with experience in HEBPRI management consensually classified pelvic ring injuries using the Young and Burgess (YB) and the OTA classifications. Epidemiologic (age, sex), clinical (hemodynamic instability), therapeutic (need for and number of packed red blood cells [PRBCs] during the first 24 hours), and outcome (death, major complication, need for ICU stay, total hospital stay duration) data were recorded. Hemodynamic instability was defined by prehospital systolic blood pressure <90 mm Hg or prehospital heart rate >100 bpm or need for PRBCs in the emergency department. A major complication consisted of surgical wound complication, compartment syndrome, infection, pressure sore, thromboembolic event, organ failure, stroke, myocardial infarction, or cardiopulmonary arrest.

**Results:** There were 127 patients included in the study (mean age  $45.3 \pm 18.4$  years; 58.3% male). 15 (11.8%) had a total of 21 IPALs: 7 lesions of the obturator artery, 4 of the superior gluteal artery, 3 of the inferior gluteal artery, 2 of the vesical artery, and 1 each of internal iliac, internal pudendal, fifth lumbar, lateral sacral, and iliolumbar arteries. According to the YB classification, IPALs occurred in 8.6% of lateral compression injuries, 33.3% of anteroposterior compression injuries, and 23.5% of vertical shear and combined mechanism injuries ( $P = 0.003$ ). According to the OTA classification, IPALs occurred in 0% of type A injuries, 9.9% of type B injuries, and 35% of type C injuries ( $P = 0.001$ ). The presence of IPALs was associated with hemodynamic instability (odds ratio [OR] 6.00, 95% confidence interval [CI] 1.93-18.64,  $P = 0.002$ ) and with the need for PRBC transfusion (OR 5.81, 95% CI 1.73-19.49,  $P = 0.004$ ). Patients with IPALs received a mean number of  $7.53 \pm 11.5$  PRBCs during the first 24 hours while those without IPALs  $1.88 \pm 4.33$  ( $P = 0.0016$ ). The presence of IPALs was not associated with age, sex, death, major complication, need for ICU stay, or total hospital stay duration.

**Conclusion:** IPALs occurred in 11.8% of HEBPRIs, especially in YB anteroposterior compression, vertical shear, and combined mechanism types and in OTA type-C injuries. Patients with IPALs were more likely to present with hemodynamic instability and they needed more PRBC transfusion during the first 24 hours.