Indications for Angiographic Embolization for Pelvic Fracture: Hypotension and Severe Fracture Pattern Are Better Predictors than CT Blush

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Purpose: Eastern Association for Surgery of Trauma guidelines recommend contrast extravasation (CE) on pelvis CT, also known as CT blush, to be an indication for angiography regardless of hemodynamic status. There is much debate whether CT blush is an accurate predictor of clinically relevant arterial bleeding.

Methods: Persistent hypotension (defined as systolic blood pressure [SBP] <90 mm Hg), Young Burgess (YB) fracture pattern, mechanism, and presence of CE on pelvic CT scan were noted. Fractures with the most displacement (anterior posterior compression [APC]3, lateral compression [LC]3, vertical shear [VS], and combined mechanical injury [CMI]) were considered severe. Patients with any embolization were compared to those without. Embolization of major (named) vessel was compared to embolization of minor (unnamed) vessel and no embolization.

Results: 189 patients (64% male) with mean age 49.3 years, mean ISS 29.3, and mean Glasgow Coma Scale (GCS) 12.1 were reviewed. 56% had embolization; 35% were of named vessels. No mechanism or pattern was associated with arterial embolization of a named vessel. Mechanisms most commonly resulting in named embolizations were motorcycle crash (47%), industrial (44%), and low-energy falls (44%). Major embolizations were APC3 (59%), LC3 (50%), and APC2 (45%). Hypotension before angiography (odds ratio [OR] 3.36, P = 0.001) was the only significant predictor of embolization. Hypotension before angiography (OR 3.47, P = 0.006), severe YB (OR 2.06, P = 0.04), male gender (OR 1.96, P <0.05), and ISS (OR 1.019, P = 0.066) were independent predictors of embolization of named vessels. In multivariate analysis hypotension (OR 4.67, P = 0.008) and severe pattern (OR 2.14, P = 0.055) were predictors of embolization of named vessels ($r^2 = 0.113$). GCS, age, and CE were not significant in any model.

Conclusion: Hypotension and severe YB fracture pattern (APC3, LC3, VS, or CMI) were predictors of named vessel embolization. Although the odds of needing embolization were significantly increased for hypotension (4.67) and severe fracture pattern (2.14), the model explained only a fraction of the variation ($R^2 = 0.113$). CE showed no relevance. Emphasis on clinical judgment of hemodynamic stability and fracture pattern rather than CT findings could reduce unnecessary angiography.

See pages 401 - 442 for financial disclosure information.