

Bilateral VS. Unilateral Arterial Embolization for Pelvic Trauma: A Multicenter Retrospective Cohort Study

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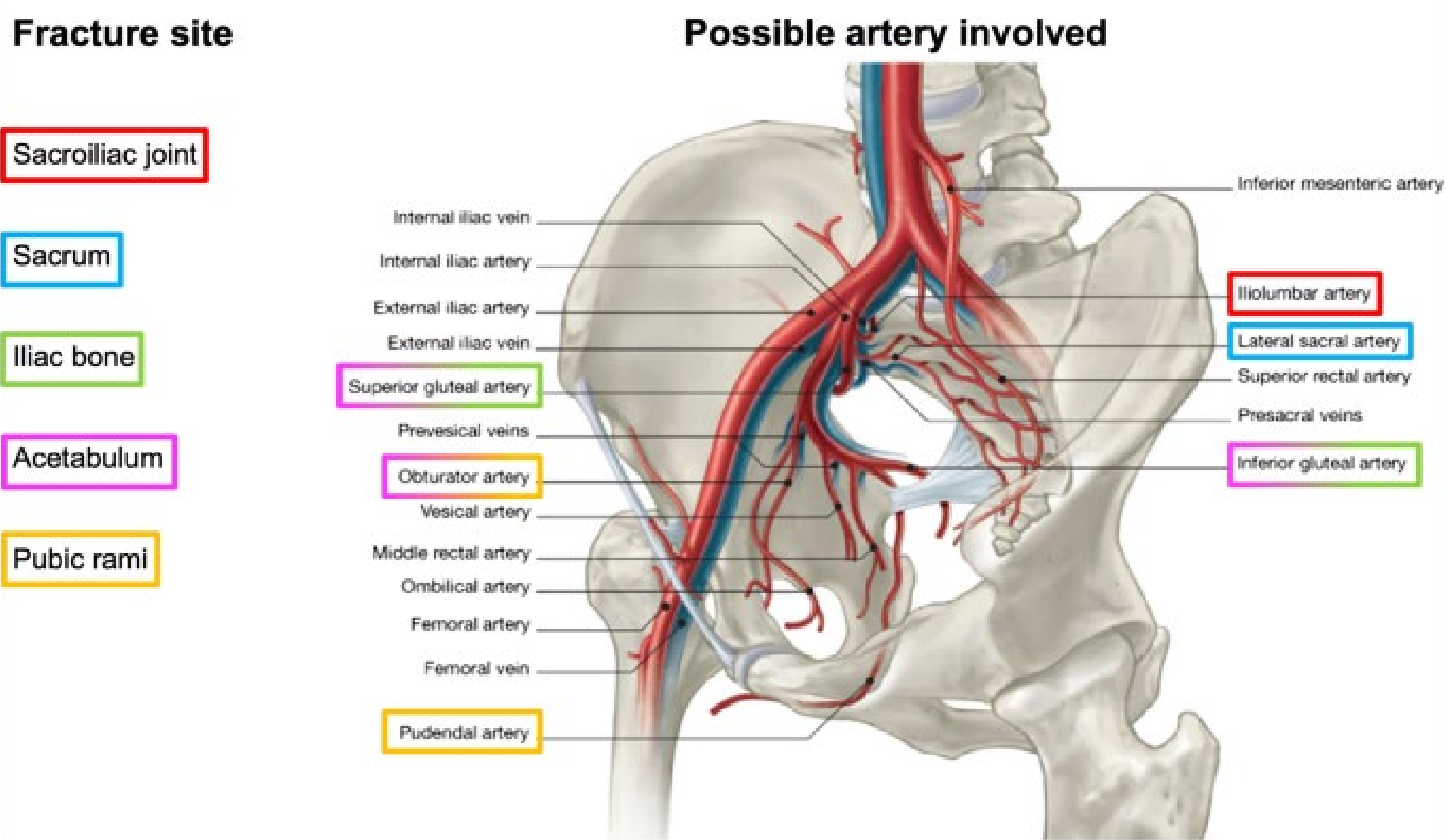


Introduction

Traumatic pelvic fractures are associated with a high rate of mortality (5-10%), and mortality can be as high as 60% in patients with hemodynamic instability. Traumatic hemorrhage from pelvic injury presents a significant challenge and pelvic artery embolization (PAE) is often utilized for bleeding control. However, the optimal approach remains unclear whether unilateral or bilateral embolization is preferred. We hypothesized that there would be no difference in 7-day mortality in patients undergoing unilateral vs. bilateral PAE for pelvic trauma.

Results

Of the 117 patients included in the study (62% male, 75% White, 90% with blunt injuries, and a median age of 60 years [IQR: 50-75]), 63 (54%) had unilateral arterial hemorrhage, and 54 (46%) had no arterial hemorrhage on angiography. 68 patients underwent Unilateral PAE, and 49 patients underwent Bilateral PAE. There were no significant differences in age, sex, race, or shock index between the Unilateral and Bilateral PAE groups. However, the median injury severity score (ISS) was significantly higher in the Bilateral PAE group (29 [19-44] vs. 21 [11-30]; p = 0.002). There were no significant differences between the two groups in terms of gluteal muscle necrosis or venous thromboembolism, but the incidence of acute kidney injury was higher in the Bilateral PAE group (29% vs. 13%, p = 0.039). The groups were also similar regarding the need for repeat embolization, pelvic packing, and the number of packed red blood cells transfused. There was no significant difference in 7-day mortality between the groups (10% vs. 15%, p = 0.454). Logistic regression analysis identified ISS (OR = 1.21, 95% CI: 1.06–1.37, p = 0.004) and age (OR = 1.17, 95% CI: 1.07–1.29, p = 0.001) as significant predictors of 7-day mortality; however, no significant association was found between Bilateral versus Unilateral PAE and 7-day mortality.



Post-Procedural Outcomes of Patients Undergoing Unilateral vs. Bilateral PAE				
	Total (n=117)	Unilateral PAE (n=68)	Bilateral PAE (n=49)	p-value
No additional procedures for pelvic hemorrhage required	95 (81.2)	58 (85.3)	37 (75.5)	0.181
Repeat embolization for control of hemorrhage	2 (1.7)	1 (1.5)	1 (2.0)	1.000
Pelvic packing for control of hemorrhage	8 (6.8)	3 (4.4)	5 (10.2)	0.277
Additional exploratory laparotomy for control of hemorrhage	17 (14.5)	7 (10.3)	10 (20.4)	0.126
Gluteal muscle necrosis	2 (1.7)	1 (1.5)	1 (2.0)	1.000
Extremity ischemia requiring intervention	1 (0.9)	1 (1.5)	0 (0.0)	1.000
DVT or PE	11 (9.4)	3 (4.4)	8 (16.3)	0.050
Acute kidney injury	23 (19.7)	9 (13.2)	14 (28.6)	0.039
Packed red blood cells transfused in first 24 hours (mL)	1000 [500-2375]	725 [350-2183]	1503 [615-2750]	0.112
7-day mortality from admission	15 (12.9)	10 (14.9)	5 (10.2)	0.454
PAE, pelvic arterial embolization; DVT, deep vein thrombosis; PE, pulmonary embolism. Values are presented as median [25th-75th percentiles] or number (percentage), where applicable.				

Methods

A multicenter retrospective review was conducted on adult patients who underwent PAE for pelvic trauma at six New England trauma centers between 2018 and 2022. Patients were included if they were found to have unilateral hemorrhage or no hemorrhage on the initial pelvic angiogram. Patients were excluded due to bilateral hemorrhage or pre-hospital cardiac arrest. Next, patients were categorized into those who received Unilateral PAE vs. Bilateral PAE. The primary outcome measured was 7-day mortality. Secondary outcomes included complications and re-interventions after the index PAE. A multivariate analysis was conducted to identify predictors of 7-day mortality.

Conclusion

Although bilateral PAE may be associated with a higher incidence of acute kidney injury, unilateral and bilateral pelvic embolization for trauma has similar efficacy and 7-day mortality in this multicenter retrospective review. Our results suggest that unilateral as opposed to bilateral PAE may be the most appropriate management.

