

Open Fixation after Preperitoneal Pelvic Packing is Associated with a High Surgical Site Infection Rate

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INTRODUCTION:

The rate of pelvic space surgical site infection (SSI) after preperitoneal pelvic packing (PPP) varies in the literature, ranging from 8% to 34%, with most studies not reporting a minimum follow-up time. The purpose of this study was to determine the pelvic space SSI rate in operative pelvic fractures managed with and without PPP in patients with a minimum of 90 days of follow up. We hypothesized that the incidence of pelvic space SSIs after PPP is higher than that of a matched cohort of patients who underwent open reduction/internal fixation (ORIF) of the anterior pelvic ring fixation and did not receive PPP.

METHODS: A retrospective review of a prospectively gathered operative registry identified 743 severely injured (Injury Severity Score (ISS) >15) patients with pelvic ring injuries caused by blunt mechanisms. The final cohort included 138 patients with >90 days of follow up: 83 patients who received PPP and 55 patients in the control group who received open reduction and internal fixation through an anterior intrapelvic approach (AIP) without PPP. The primary outcome was pelvic space SSI. Both univariate and multivariate analyses were performed to identify variables associated with postoperative pelvic space SSI. Propensity score matching using a 1:1 ratio was performed to adjust for differences in baseline ISS and American Society of Anesthesiologist (ASA) scores between the two cohorts. A logistic regression model was used to generate a propensity score with PPP as the response variable for each patient. Subsequently a nearest neighbor model match, using a caliper width of .20, was performed to identify patients for inclusion in our post-match analysis.

RESULTS: The SSI rate in the PPP group was 31.3% (26/83) compared to 10.9% (6/55) in the control group (proportional difference (PD) 20.4%, confidence interval (CI) 6.4 to 32.5%, p=0.007). Patients in the PPP group (n=43) were 1:1 propensity score matched with patients in the control group to account for differences in ISS and American Society of Anesthesiologists (ASA) score. In this matched cohort, the rate of pelvic space SSI remained higher in the PPP group compared to that in the control group (30.2% vs. 9.3%; PD 20.9%, CI 3.7 to 36.3%; p=0.02). On multivariate analysis of a subgroup containing only patients receiving PPP, anterior ORIF (Odds Ratio (OR) 6.56, CI 2.00 to 21.47, p=0.002) was found to be independently associated with SSI.

DISCUSSION AND CONCLUSION: PPP is an independent risk factor for space SSI. The likelihood of SSI after PPP is increased with anterior ORIF. The morbidity of SSI after PPP must be weighed against the risk of exsanguination.

Table 1: Variables Associated with SSI in the PPP Group

	Pelvic Space SSI (n=26)	None (n=57)	Difference [95% CI]	p-value	Multivariate OR [95% CI]	p-value
Age	38.5 (25.75 to 55.5)	39.0 (25.5 to 56.0)	0.0 [-8.0 to 9.0]	0.92	–	–
Female	8 (30.8%)	14 (24.6%)	6.2% [-13.8 to -27.3%]	0.60	–	–
BMI	29.1 (23.9 to 33.1)	26.1 (22.6 to 31.4)	1.7 [-2.1 to 5.8]	0.35	–	–
ISS	36.0 (29.0 to 48.0)	41.0 (29.0 to 43.0)	0.0 [-5.0 to 7.0]	0.76	–	–
Blood products (ml)	4705.0 (1736.0 to 7173.5)	2520.5 (1172.5 to 4701.0)	1062.5 [-179.0 to 2814.0]	0.10	–	–
OTA/AO Type C	15 (57.7%)	25 (43.9%)	-13.8% [-35.3 to 9.2%]	0.34	–	–
Acetabular Fracture	3 (11.5%)	12 (21.0%)	-9.5% [-24.5 to 9.0%]	0.37	–	–
Open Pelvis Fracture	2 (7.7%)	2 (3.5%)	4.2% [-7.1 to 18.4%]	0.59	–	–
Method of Definitive Fixation				0.0038	–	–
ORIF	22 (84.6%)	26 (45.6%)				
Ex-fix	2 (7.7%)	16 (28.1%)				
Percutaneous	2 (7.7%)	15 (26.3%)				
Anterior ORIF	22 (84.6%)	26 (45.6%)	39.0% [17.3 to 55.4%]	<0.0001	6.56 [2.00 to 21.47]	0.002
Bladder/urethral Injury	8 (30.8%)	8 (14.0%)	16.7% [-2.7 to 36.5%]	0.13	–	–
Time to bladder repair (hours)	3.4 (0.0 to 71.9)	8.1 (0.0 to 22.9)	0.0 [-16.78 to 58.7]	0.81	–	–
Time to PPP removal (hours)=	36.5 ±14.4	31.4 ± 12.1	5.1 ±3.3	0.13	–	–
Angiography	5 (19.2%)	9 (15.8%)	3.4% [-13.5 to 22.4%]	0.76	–	–
REBOA	10 (38.5%)	17 (29.8%)	8.6% [-12.8 to 30.3%]	0.46	–	–

ISS: Injury Severity Score; CI: confidence interval; ORIF: open reduction internal fixation

–Parametric data and is presented as mean with standard deviation. All other continuous data is nonparametric and presented as median (interquartile range)

–Median and proportional difference for continuous and categorical data, respectively

–Bold font signifies statistically significant P-values (<0.05)