Administration of Venous Thromboembolism Chemoprophylaxis Within 12 Hours of Pelvic and Acetabular Surgery Has No Effect on Estimated Blood Loss, Perioperative Change in Hemoglobin, or Need for Transfusion

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PAPER ABSTRACTS

Purpose: Pelvic and acetabular trauma predisposes patients to venous thromboembolism (VTE). However, pelvic and acetabular surgery carries a 40% to 50% rate of transfusion, and blood loss may be increased by anticoagulation. The local VTE chemoprophylaxis (PPx) protocol was changed in July 2016. Low molecular weight heparin (LMWH) 30 mg Q12H was standard pre- and post-change. Prior to July 2016, PPx would be held 12 to 24 hours preoperatively for orthopaedic surgery. After July 2016, PPx would not be held. We hypothesized that this would have no effect on estimated blood loss (EBL), perioperative change in hemoglobin (Δ Hgb), or transfusion rates following pelvic and acetabular trauma surgery.

Methods: In this retrospective cohort study at a Level I trauma center in the southeastern U.S., all pelvic and acetabular surgeries between April 2014 and February 2020 were reviewed. Outcomes were EBL, immediate and 24-hour postoperative Δ Hgb, and intra- or postoperative transfusion. Per-protocol and as-treated analyses were performed.

Results: In all, 267 surgeries were included: 97 pre- and 170 post-change. Median ISS was 17 before versus 14 after the change. One surgeon retired and two started during the study, producing differences in acetabular approaches. Median surgical duration was longer post-change. Cohorts were otherwise similar (Table 1). No differences were observed in EBL, Δ Hgb, or transfusion rates. Rates of VTE and surgical site complications were unchanged. No VTE-related deaths occurred. In the as-treated analysis (63 patients given LMWH <12 hours preop vs 190 patients not given PPx), no differences were observed.

Conclusion: Administration of VTE PPx within 12 hours of pelvic and acetabular surgery had no effect on perioperative blood loss. This study is limited by changes in faculty, but it suggests that traumatologists need not advocate for holding VTE PPx before pelvic and acetabular trauma surgery.

	Before Protocol Change (LMWH held/delayed) (n=97)	After Protocol Change (LMWH administered) (n=170)	p-value*
Age at injury (years)	39 (24)	39 (25)	0.800
Sex, n (%)			
Female	24 (25)	46 (27)	0.679
Male	73 (75)	124 (73)	
Body mass index	30 (9)	28 (7)	0.244
Mechanism of injury, n (%)			
Fall from height	6 (6)	16 (9)	
Fall from standing	6 (6)	6 (4)	
MVC	55 (57)	98 (58)	0.771
MCC	12 (12)	25 (15)	
Pedestrian vs auto	10 (10)	12 (7)	
Other	8 (8)	13 (8)	
Injury Severity Score (ISS)	17 (9)	14 (13)	**<0.001**
AO-OTA Classification, pelvic fractures, n (%)†	30	56	
61A1 - avulsion of ASIS/AIIS/ischial tub.	0 (0)	1 (2)	
61B2 - APC2 or LC2	15 (50)	29 (52)	0.783
61B3 (or 61C2) - LC3	4 (13)	4 (7)	
61C1 (or 61C3) - APC3 or VS	11 (37)	22 (39)	
AO-OTA Classification, acetabular fractures, n (%)†	70	122	
62A1 - posterior wall	25 (36)	36 (30)	
62A2 - posterior column ± posterior wall	4 (6)	11 (9)	
62A3 - anterior wall/column	4 (6)	2 (2)	0.193
62B1 - transverse ± posterior wall	20 (29)	52 (43)	
62B2 - T-type	1 (1)	4 (3)	
62B3 - anterior w/c + post. hemitransverse	3 (4)	3 (2)	
62C - associated both column	13 (19)	14 (11)	
Surgeon			
Surgeon 1	48 (49)	11 (6)	
Surgeon 2	48 (49)	62 (36)	**<0.001**
Surgeon 3	1 (1)	85 (50)	
Surgeon 4	0 (0)	12 (7)	
Surgical approach/fixation of pelvis, n (%)‡	30	56	
ORIF pubic symphysis	10 (33)	14 (25)	
Percutaneous screws	6 (20)	10 (18)	
ORIF pubic symphysis + percutaneous screws	7 (23)	13 (23)	0.949
Ex-fix + percutaneous screws	2 (7)	4 (7)	
ORIF posterior ilium	2 (7)	6 (11)	
Other	3 (10)	9 (16)	
Surgical approach(es) to acetabulum, n (%)‡	70	122	
Kocher-Langenbeck	20 (29)	92 (75)	
Ilioinguinal	16 (23)	16 (13)	**<0.001**
Modified Ollier trans-trochanteric	26 (37)	4 (3)	
Percutaneous fixation	6 (9)	4 (3)	
Other	2 (3)	6 (5)	
Duration of surgery (minutes)	133 (88)	183 (135)	**<0.001**
Estimated blood loss (mL)	250 (400)	250 (400)	0.588
Pre-op hemoglobin (g/dL)	10.2 (3.0)	9.9 (3.6)	0.167
Δ Hemoglobin immediately post-op (g/dL)	-0.5 (1.7)	0 (2.2)	0.111
Δ Hemoglobin 24 hours post-op (g/dL)	-1.1 (1.9)	-0.8 (2.2)	0.467
Blood transfusion given intra- or post-op, n (%)	31 (32)	63 (37)	0.401
Volume transfused (mL)	658 (550)	600 (650)	0.904
Any pelvic/acetabular surgical site complication, n (%)	4 (4)	12 (7)	0.427
Venous thromboembolism, n (%)			
None	90 (93)	160 (94)	0.855
DVT	4 (4)	5 (3)	
DVT + PE	3 (3)	5 (3)	
Death within 90 days postoperatively, n (%)	0 (0)	3 (2)	0.556

*Chi-squared test for categorical variables with all cell counts ≥10, Fisher's exact for categorical variables with any cell count <10, Wilcoxon rank sum (Mann-Whitney U) test for continuous variables
†Total greater than 267 due to combined acetabular/pelvic injuries
‡Total greater than 267 due to combined approaches

Table 1. Comparison of pelvic and acetabular trauma surgery before and after implementation of an institutional protocol to administer rather than hold venous thromboembolism prophylaxis within 12h preoperatively, values shown are median (IQR) unless otherwise specified

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