Evaluation of Heparin Anticoagulation Protocols in Post-Renal Transplant Recipients (EHAP-PoRT)

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Background

- End-stage renal disease patients have disturbances in hemostasis secondary to platelet dysfunction and hypercoagulability
- Due to the risk of thromboembolism and renal allograft loss post-renal transplant, a prophylactic heparin protocol was implemented at St. Paul's Hospital (SPH), Providence Health Care in 2011
- Therapeutic heparin infusions were prescribed for select patients with various indications
- Anecdotally, transplant nephrologists at SPH have observed frequent bleeding in transplant patients
- The purpose of this study is to provide institution-specific guidance regarding the use of therapeutic and prophylactic anticoagulation in post-renal transplant recipients in the early postoperative period

Objectives

- Primary Objective:
  - To compare the incidences of major bleeding and thrombosis in the early postoperative period (defined as postoperative days 0 to 7, inclusive) in post-renal transplant patients receiving no heparin, prophylactic heparin, or therapeutic heparin
- Secondary Objectives:
  - To determine the outcomes of the major bleeding and thrombosis complications
  - To compare the risk factors and coagulation parameters around the bleeding and thrombosis episodes

Methods

- Retrospective cohort study
- Inclusion:
  - At least 19 years of age
  - Received kidney transplant at SPH between January 1st, 2008 and July 31st, 2013, inclusive
- From GE Centricity Pharmacy software:
  - No heparin, prophylactic heparin, or therapeutic heparin use in the early postoperative period
- From BC Provincial Renal Agency PROMIS database, Centricity, and archived health records in Sunrise Clinical Manager:
  - Major bleeding and thrombosis events
  - Patient demographics, coagulation parameters, event details
- Descriptive statistics and Fisher's exact test for primary outcomes

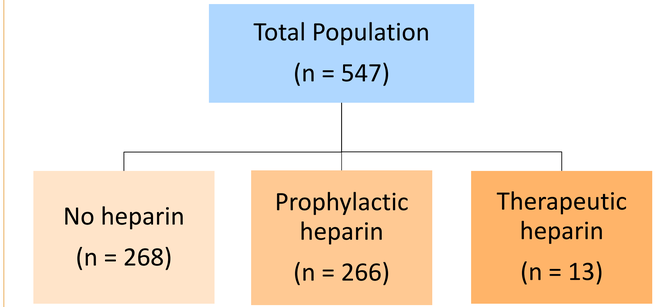

Figure 1: Flow Diagram of Included Patients

Characteristic	No heparin (n = 268)	Prophylactic heparin (n = 266)	Therapeutic heparin (n = 13)
Male, n (%)	158 (58.9)	162 (60.9)	8 (61.5)
Age, y (mean ± SD)	50.4 ± 13.1	52.4 ± 13.2	57.5 ± 16.3
BMI, kg/m^2 (mean ± SD)	25.7 ± 5.3	26.4 ± 4.7	26.9 ± 5.5
Living Donor Transplant, n (%)	148 (55.2)	134 (50.4)	5 (38.5)
Cadaveric Transplant, n (%)	120 (44.8)	132 (49.6)	8 (61.5)

Table 1: Baseline Patient Demographics

Results

- Mean time to major bleed 2.3 days; thrombosis 4.2 days
- Majority of major bleeds were retroperitoneal (n = 14)
- Mean HGB drop associated with bleed: 40.0 ± 8.4 g/L
- 3 out of the 4 thromboses resulted in nephrectomy

Limitations

- Retrospective study
- Small number of events
- Reliance on discharge summaries to identify and verify major events
- No verification as to whether heparin orders entered in pharmacy database were administered
- Subjectivity in determining start of major bleeding or thrombosis event

	No heparin (n = 268)	Prophylactic (n = 266)	Therapeutic (n = 13)	P-value (Fisher's exact test)
Major bleeding (n = 23)	9	8	6	< 0.0001
Thrombosis (n = 4)	3	1	0	0.0015

Table 2: Incidences of Major Bleeding and Thrombosis

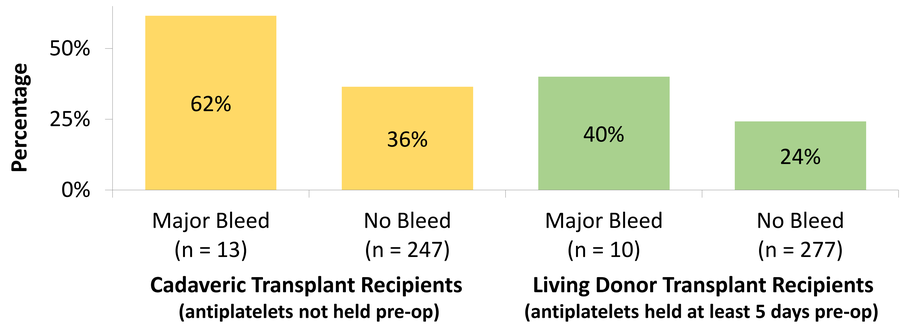

Figure 2: Percentage of Patients on Antiplatelet Agents Preoperatively

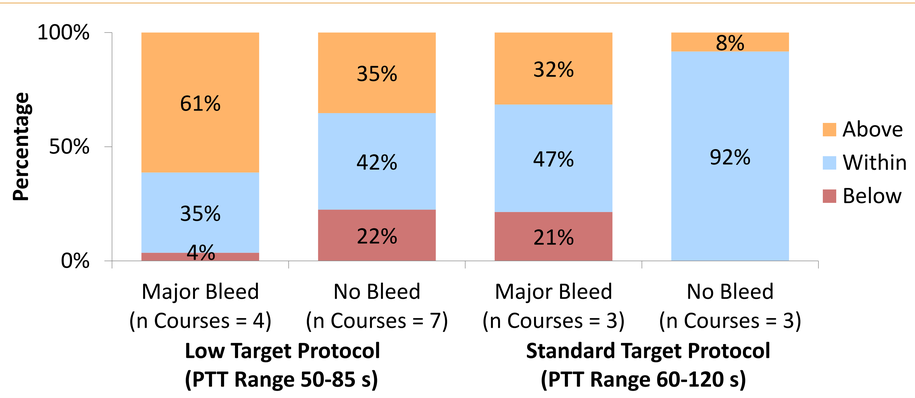

Figure 3: Therapeutic Heparin Courses – Percentage of PTT above, within, or below target

Conclusions

- Prophylactic heparin did not increase bleeding risk compared to no heparin
- Therapeutic heparin use increased bleeding risk, but there were no thromboses in both low and standard target therapeutic heparin groups
- No clear signal explaining major bleeding or thrombosis occurrence
- Hypothesis-generating for opportunity to improve low target heparin protocol

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