Evaluation of the Appropriateness of Bivalirudin Prescribing and Monitoring at an Academic Medical Center

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Background

- Bivalirudin is a direct thrombin inhibitor (DTI) used in patients experiencing heparin-induced thrombocytopenia (HIT) or undergoing percutaneous coronary intervention (PCI)
- DTIs are narrow therapeutic index drugs that require frequent monitoring of aPTT values and dose adjustments to maintain efficacy and safety
- University of Maryland Medical Center (UMMC) institution-specific dosing and monitoring guideline differs by indication:
  - HIT:
    - 0.015 mg/kg/hr (CrCl >60 mL/min)
    - 0.01 mg/kg/hr (renal or combined renal/hepatic dysfunction)
  - PCI:
    - 0.75 mg/kg IV bolus, followed by infusion rate based on weight and renal function
- A prior medication use evaluation indicated that argatroban, another intravenous DTI, was not optimally managed at UMMC based on the institution-specific guideline

Objectives

Primary Objective:
- Evaluate compliance with UMMC bivalirudin prescribing guidelines for: indication, dose, monitoring

Secondary Objectives:
- Frequency and duration of use of bivalirudin
- Time to therapeutic aPTT
- Services and patient population utilizing bivalirudin
- Pharmacist involvement in monitoring

Methods

Study Design:
- Retrospective chart review

Figure 1: Patient Population

All patients ordered bivalirudin at UMMC from November 2015 to August 2017 (n = 63)

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Exclusion Criteria:
- Age < 18 (n = 1)
- Bivalirudin ordered, but dose not administered (n = 13)
- Received bivalirudin for reason other than HIT or PCI (n = 7)

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Patients for analysis (n = 42)

This study has been approved by the University of Maryland Medical Center (UMMC) Institutional review board (IRB).

Results

Table 1: Baseline Characteristics

Characteristic	Total Patients (n = 42)
Age (years) – median (range)	60.5 (23 – 89)
Male sex – n (%)	24 (57)
Weight (kg) – median (range)	87.5 (48.4 – 180)
CrCl (mL/min) – median (range)	53.55 (18.2 – 163.8)
CrCl ≤ 60 mL/min – n (%)	25 (60)
Dialysis – n (%)	
CRRT	11 (26)
IHD	1 (2)
Admitting Services – n (%)	
Cardiac Surgery	16 (38)
Cardiology	15 (36)
Medical intensive Care Unit	4 (10)
Critical Care Resuscitation Unit	4 (10)
Internal medicine	1 (2)
Emergency Department	1 (2)
Infectious Diseases	1 (2)
Indications – n (%)	
Suspicion of HIT	28 (67)
Diagnosed HIT	6 (14)
PCI	8 (19)
Elevated baseline aPTT (>40s) – n (%)	21 (50)
Received therapeutic heparin within 12 hours prior to bivalirudin administration – n (%)	22 (52)
Initial dose of bivalirudin – n (%)	
0.01 mg/kg/min	19 (45)
0.15 mg/kg/min	10 (24)
Other	13 (31)
Initial dose appropriate per UMMC guideline – n (%)	25 (51)

CRRT = Continuous renal replacement therapy, IHD = Intermittent hemodialysis, aPTT = activated partial thromboplastin time

Table 2: Bivalirudin therapy in those requiring infusion and monitoring

	(n = 34)
Presence of Pharmacist Monitoring – n (%)	10 (30)
Mean time to initial aPTT (hr)	2.5
Time to initial aPTT ≤ 2.5 hours – n (%)	24 (70)
Time to initial aPTT > 2.5 hours – n (%)	10 (30)
Mean time to therapeutic aPTT (hr)	16.0
Number of patients that did not reach therapeutic range – n (%)	13 (32)
Mean duration of infusion (hr)	72.3
Total dose adjustments made	206
Adjusted correctly – n (%)	163 (79)
Adjusted incorrectly – n (%)	43 (21)

Results

Figure 2: Appropriateness of Initial Bivalirudin Dose

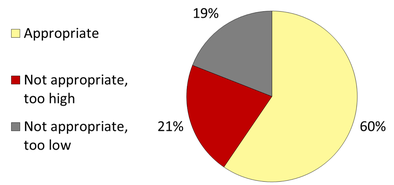


Figure 3: Appropriateness of Dose Adjustments per UMMC Guideline

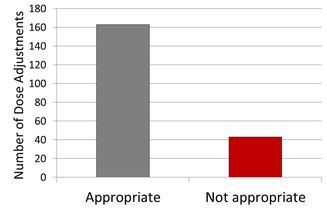
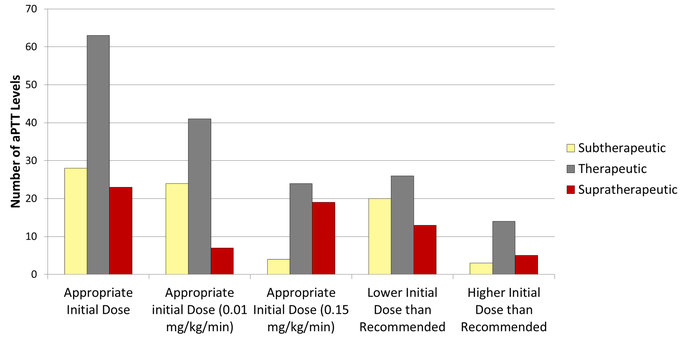


Figure 4: All aPTT Levels by Initial Dose Appropriateness



Conclusions

- Bivalirudin was initiated at an appropriate dose 60% of the time based on the UMMC guideline
- Though doses were adjusted appropriately the majority of the time (79%), the mean time to therapeutic aPTT was 16.0 hours and 32% of patients never achieved stable, therapeutic aPTT levels

References

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Disclosures

Authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.