

ASCO Quality Training Program

Heparin Induced Thrombocytopenia QQuality Improvement
directed at reduced Testing (HIT-QUIT)

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Team Members

- Team Leader: David Blumenthal, MD
- Team Members:
 - Jessica Lee, DO: Co-investigator
 - Jose Larios, MD: Literature Review
 - Murtaza Hussain, MS IV: Chart Review
- Project Sponsors: Ascension Providence Hospital-Graduate Medical Education
- Team Coach: Valorie Harvey

Institutional Overview

- Ascension Providence Hospital
- Founded in 1952
- 772-bed, Level One Trauma Center (Southfield, MI campus)
- 264-bed, Level Two Trauma Center (Novi, MI campus)
- More than 50 medical and surgical specialties
- 1400 physicians, 4600 nurses and associates, 900 volunteers, 180 medical residents and fellows

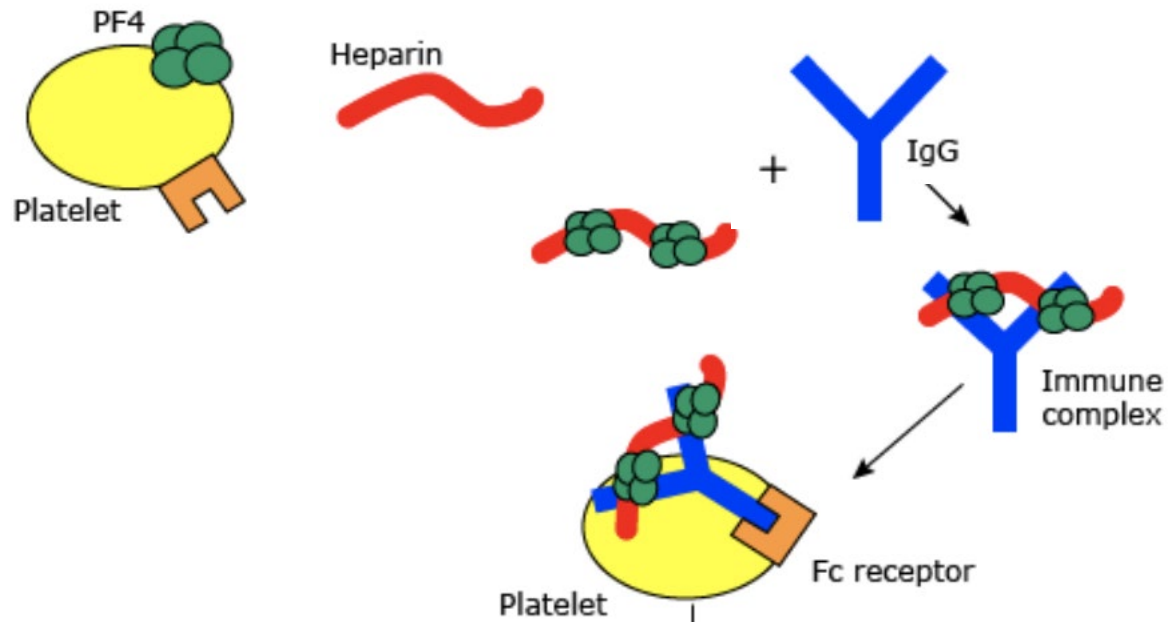


Southfield, MI



Novi, MI

Pathophysiology



Problem Statement

The Ascension Providence health system recognized unnecessary testing for heparin-induced thrombocytopenia (HIT) to be a hospital-wide issue. The underlying components to this problem include: miseducation in testing for HIT, use of heparin instead of other anticoagulants for the prevention of DVTs, assay ordering within the hospital operating system, and laboratory processing of the assays.



Aim Statement

The aim of this study is to evaluate the current practice patterns of testing for heparin induced thrombocytopenia at our institution in order to decrease the overutilization and misutilization of both the HIT-Ab and serotonin release assays by 50%

Background

The 4Ts scoring system

4Ts category	2 points	1 point	0 points
Thrombocytopenia	Platelet count fall > 50% and platelet nadir \geq 20	Platelet count 30%-50% or platelet nadir 10-19	Platelet count fall < 30% or platelet nadir < 10
Timing of platelet count fall	Clear onset days 5-10 or platelet fall \leq 1 day (prior heparin exposure within 30 days)	Consistent with days 5-10 fall, but not clear (eg, missing platelet counts); onset after day 10; or fall \leq 1 day (prior heparin exposure 30-100 days ago)	Platelet count \leq 4 days without recent exposure
Thrombosis or other sequelae	New thrombosis (confirmed); skin necrosis; acute systemic reaction postintravenous unfractionated heparin bolus	Progressive or recurrent thrombosis; non-necrotizing (erythematous) skin lesions; suspected thrombosis (not proven)	None
Other causes of thrombocytopenia	None apparent	Possible	Definite

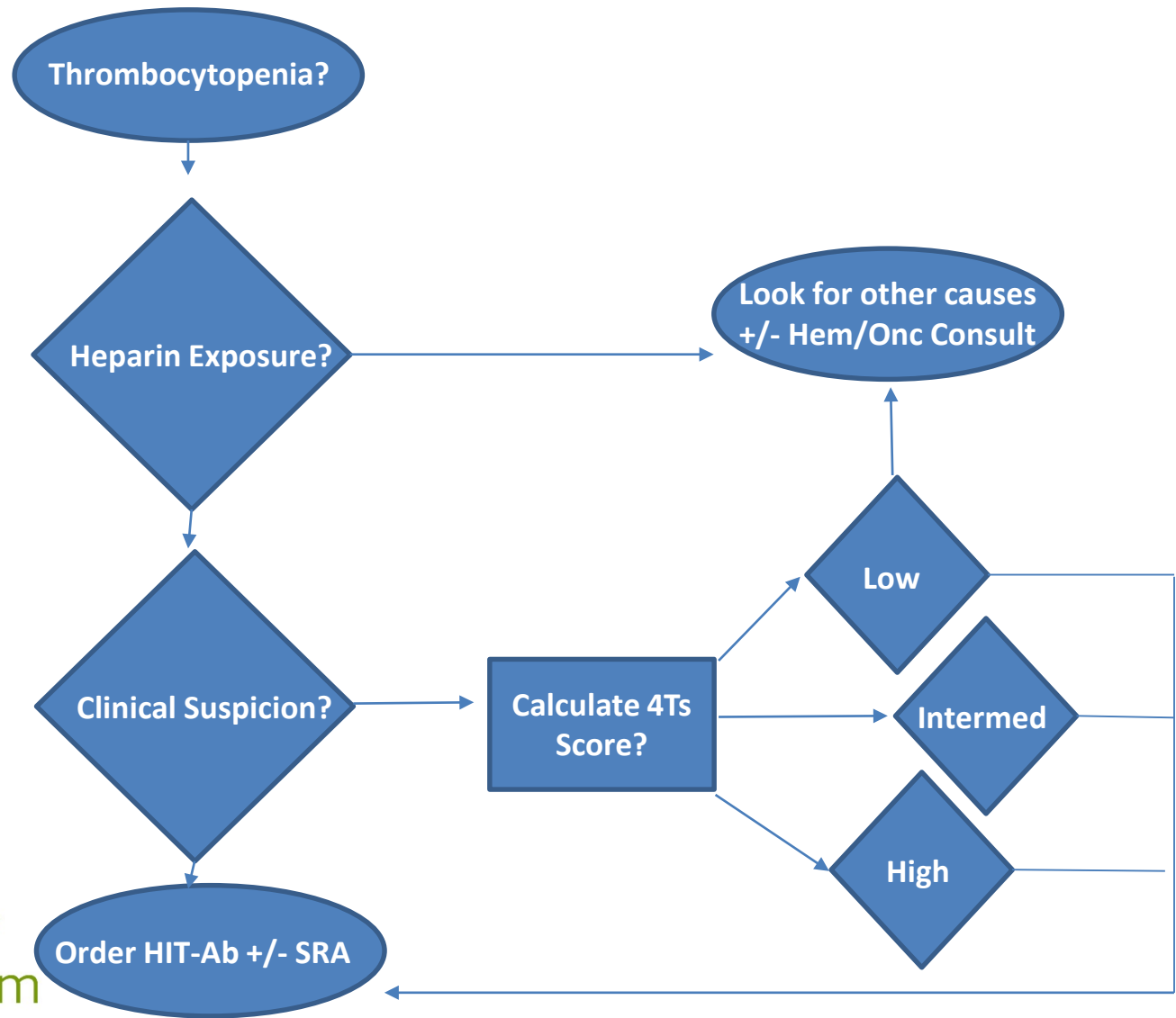
The 4Ts score is the sum of the values for each of the 4 categories. Scores of 1-3, 4-5, and 6-8 are considered to correspond to a low, intermediate, and high probability of HIT, respectively.



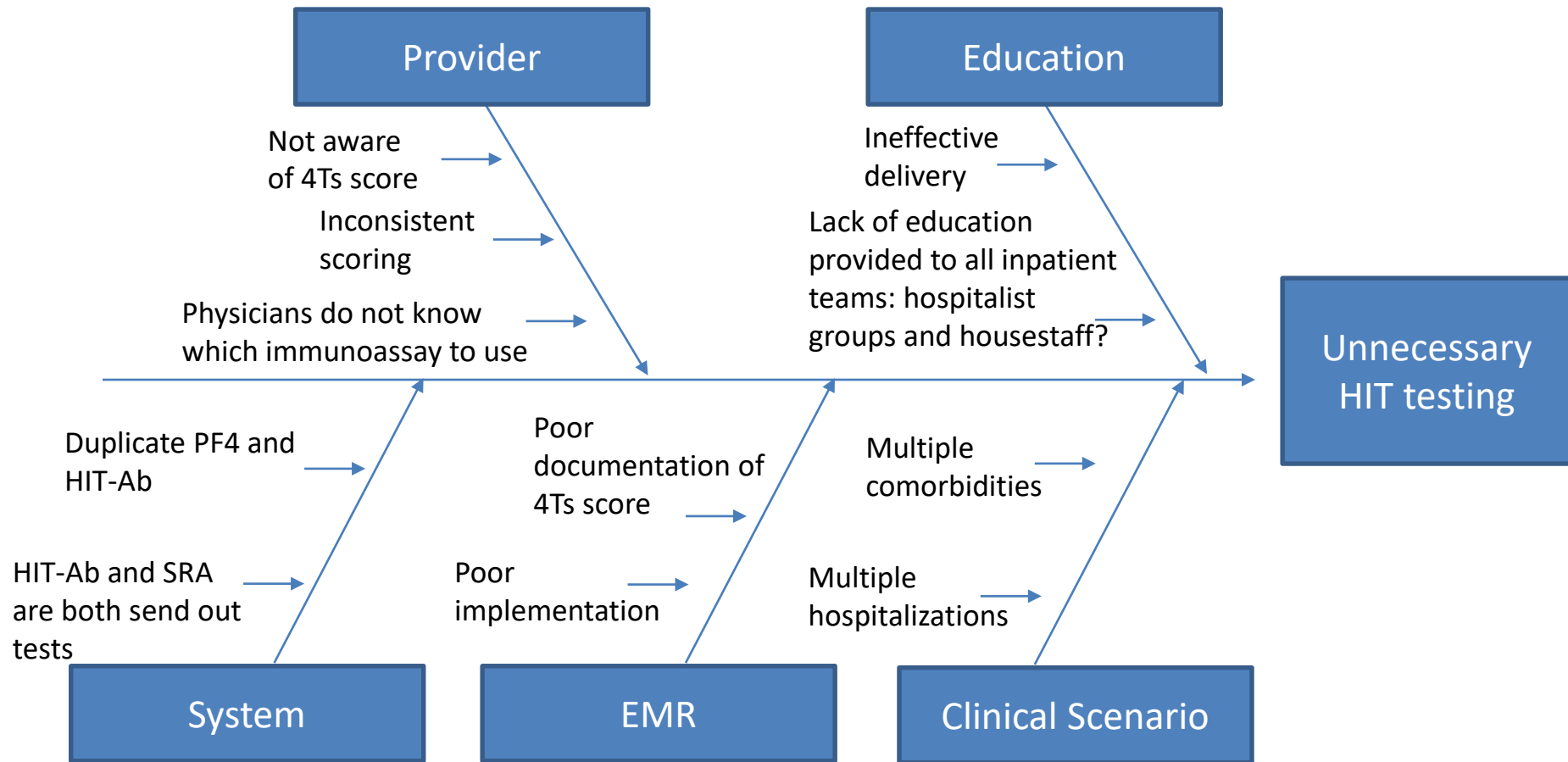
Background

- HIT antibody testing
 - Immunoassays
 - ELISA → optical density (OD) units
 - 0.4 OD
 - Frequent false-positive results
 - Functional assays
 - Washed platelet serotonin release assay (SRA) → positive or negative
 - Higher specificity
 - Send out test, higher cost, increased turnaround time

Process Map



Cause & Effect Diagram





Measures

- **Measure:** HIT-Ab/SRA testing, heparin use
- **Patient population:** Adult patients with same admission HIT-Ab/SRA testing
 - Exclusions (if any):** None
- **Data source:** Retrospective chart review
- **Data collection frequency:** September 2017-September 2018
- **Data quality (any limitations):** Single institution

Baseline Data

- September 1, 2017-September 30, 2018
 - Documented 4Ts: 0
 - Number of HIT-AB tests ordered: 142
 - <0.4: 121/142 (85.2%)
 - Low Probability HIT-AB without further testing: 86/121 (71.1%)
 - Low Probability HIT-AB followed by SRA: 35/121 (28.9%)
 - Negative SRA: 33/35 (94.2%)
 - Indeterminant SRA: 1/35 (2.9%)
 - Positive SRA: 1/35 (2.9%)
 - ≥ 0.4 : 21/142 (14.8%)
 - High Probability HIT without follow up by SRA: 9/21 (42.9%)
 - Positive SRA: 1/21 (4.8%)

Baseline Data

- September 1, 2017-September 30, 2018
 - Number of SRA ordered: 55
 - SRAs ordered without HIT-AB: 8/55 (14.5%)
 - Positive: 1/8 (12.5%)

Baseline Data

Test	Cost (\$)
HIT-AB	125
HIT-AB in house	36.73
SRA	330

Baseline Data

Examples of Change in Anticoagulation

Patient	HIT-Ab	SRA	Anticoagulation
1	N/A	Negative	Heparin drip-> fondaparinux x1 day-> argatroban drip x4 days-> heparin drip-> eliquis
2	1.16	Negative	Heparin 5k q8-> fondaparinux x8 days-> heparin 5k q8
3	0.17	Negative	Heparin 5k q8
4	0.17	N/A	Heparin 5k q8-> argatroban drip x2 days-> lovenox
5	0.5	N/A	No AC → Heparin 5k q8
6	0.32	Negative	Heparin drip-> argatroban drip x3 days-> heparin 5k q8
7	0.18	Negative	Heparin 5k q8-> No AC x3 days -> heparin 5k q8
8	0.2	Negative	Heparin gtt-> No AC x4 days-> argatroban gtt x4 days-> fondaparinux 2.5 mg SQ x6 days--> xarelto
9	0.42	N/A	No AC
10	1.9	Positive	Hep 5k q8-> fondaparinux 2.5 mg SQ x1 day-> argatroban gtt x5 days--> eliquis

Baseline Data

Medication	Purchase Cost (\$)	Cost to the Patient (\$)
Heparin subcutaneous	0.73	19
Heparin drip	8	30*
Fondaparinux	36	19
Argatroban drip	119	306**

*Usually 1-2 bags/day.

**Price per vial. Dosing is dependent on weight and most patients requires 2-3 vials/day.

Prioritized List of Changes (Priority/Pay –Off Matrix)

High Impact	Education of 4Ts calculator	Education to use LMWH instead of heparin for DVT prophylaxis	Implementation of 4Ts calculator in EMR	4Ts score populates in documentation
			Documentation of 4Ts score	Change of send out HIT-AB to in-house testing
Low Impact				
	Easy		Difficult	
	Ease of Implementation			

PDSA Plan (Test of Change)

Date of PDSA Cycle	Description of Intervention	Results	Action Steps
July 1, 2018- August 30, 2018	<ul style="list-style-type: none"> -Obtain IRB and complete modules -Identify problem and aim statements -Identify team members -Research/Literature review 	<ul style="list-style-type: none"> -IRB approval obtained and modules completed -Team members identified, fluid roles based on availability -Literature reviewed 	<ul style="list-style-type: none"> -QTP training 7/11-7/12 -Compilation and review of SRA/HIT-AB lists -Design/Methods
September 1, 2018- October 31, 2018	<ul style="list-style-type: none"> -Chart review to determine baseline data -Meet with IT -Meet with lab director/personnel -Meet with pharmacy -Meet with research coordinator -Identify administration 	<ul style="list-style-type: none"> -SRA/HIT-Ab lists compiled and charts reviewed -Baseline data obtained -Testing methods (in-house vs sendout) 	<ul style="list-style-type: none"> -QTP training 9/20-9/21 -Identify administration

PDSA Plan (Test of Change)

Date of PDSA Cycle	Description of Intervention	Results	Action Steps
November 1, 2018- November 20, 2018	<ul style="list-style-type: none"> -Met with lab director/personnel to discuss change of HIT-AB testing to in-house -Met with research coordinator 	<ul style="list-style-type: none"> -Changes to laboratory processing in-house vs send out to take about 1 year -4T calculator implementation challenging 	<ul style="list-style-type: none"> -Rethink approach to problem -Focus on what has biggest impact to patients
November 20, 2018- Present	<ul style="list-style-type: none"> -Educational efforts to reduce the amount of heparin use for prophylaxis 	<ul style="list-style-type: none"> -Reduced use of heparin for prophylaxis -Will require about 3 months of data to confirm reduction in HIT testing 	<ul style="list-style-type: none"> -Determine best possible DVT prophylaxis medication algorithm based on cost, outcomes, patient experience -Expand educational efforts -Modify DVT prophylaxis algorithm in EHR

Change Data

Number of SRAs ordered hospital wide over a 13 month period pre-intervention	Number of HIT antibody tests ordered hospital wide over a 13 month period pre-intervention
55	142

Will require about 3 months of follow-up data for adequate power to determine whether or not HIT testing was reduced

Conclusions

- Aim: to evaluate the current practice patterns of HIT-Ab assay testing at our institution in order to decrease overutilization and misutilization.
 - No documentation of 4Ts score
 - Difficult to determine if the HIT-Ab was correctly ordered based off the 4Ts score
 - 85% of the 142 HIT-Ab tests ordered in the last year resulted in low probability (<0.4)
 - Of these, 30% were followed up by SRA
 - 14.5% of SRAs were ordered without preceding HIT-Ab
- Identifying the problem
 - Electronic (national)
 - Laboratory: send out vs in-house testing
- Reducing the use of heparin use will reduce HIT testing, improve patient experiences, and save money

Next Steps/Plan for Sustainability

- Provide education to admitting PAs, hospitalists and housestaff
- Shift the default order set in the EMR from a heparin weighted preference to a better agent
- Finalize data collection proving improvement metrics were met



References

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