ACC Reduce the Risk: PCI Bleed Campaign
Webinar
May 21, 2019
<table>
<thead>
<tr>
<th>Agenda May Webinar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome and Introductions</td>
</tr>
<tr>
<td>“How We Got Started: Two Real-World Examples to Operationalize the ACC Reduce the Risk: PCI Bleed Quality Campaign</td>
</tr>
<tr>
<td>INOVA Heart and Vascular Institute Fairfax, Va. Medical Campus</td>
</tr>
<tr>
<td>The Ohio State University, Wexner Medical Center</td>
</tr>
<tr>
<td>Questions</td>
</tr>
</tbody>
</table>
Reduction of Bleeding Complications

Marian Hartle RN; Outcomes Specialist
Julieanne George MSN RN MBA PCCN-K CCRN-K; Clinical Director ICAR
Stephen Ives BS RCIS; Clinical Director Cardiovascular Procedure Labs
Dr. Benham Tehrani- Co-Medical Director Cardiovascular Catherization Lab
Dr. Matthew Sherwood Co-Medical Director Cardiovascular Catherization Lab
Dr. Charles Murphy CPPS; Chief Patient Safety Officer
About INOVA

INOVA HEART AND VASCULAR INSTITUTE
FAIRFAX MEDICAL CAMPUS

9 Invasive Labs
4 Cath/PCI Labs 1300 PCI's/year
3 EP Labs
2 Interventional Radiology
1 Hybrid Lab
5 Cardiac OR's
39-bed Interventional Admission/Recovery Unit
6 Inpatient Units
Inova is a not-for-profit healthcare system based in Northern Virginia that serves >2 million patients/yr.

Serving the Washington, DC, metro areas and beyond.

Inova is a comprehensive network of hospitals, outpatient services and facilities, primary and specialty care practices, and health and wellness initiatives.
## Team Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Job Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Behnam Tehrani</td>
<td>Inova Medical Group; Interventional Cardiology</td>
<td>Cardiac Catherization Lab Co-Director</td>
</tr>
<tr>
<td>Dr. Matthew Sherwood</td>
<td>Inova Medical Group; Interventional Cardiology</td>
<td>Cardiac Catherization Lab Co-Director</td>
</tr>
<tr>
<td>Dr. Charles Murphy</td>
<td>Inova Administration, Chief Patient Safety Officer</td>
<td>Cardiovascular Intensive Care Unit (CVICU) Medical Director</td>
</tr>
<tr>
<td>Julieanne George MSN RN</td>
<td>ICAR</td>
<td>Clinical Director-Co-Lead for Collaborative Bleeding Initiative</td>
</tr>
<tr>
<td>Stephen Ives RCIS</td>
<td>Cardiac Catherization Lab</td>
<td>Clinical Director-Co-Lead for Collaborative Bleeding Initiative</td>
</tr>
<tr>
<td>Marian Hartle RN</td>
<td>Outcomes-National Registry for PCI</td>
<td>Outcomes Specialist</td>
</tr>
<tr>
<td>Francine DeHaan MSN RN CCRN-K</td>
<td>Professional Practice</td>
<td>Educator ICAR, CVICU- IHVI support</td>
</tr>
<tr>
<td>Jayne O’Conner RN</td>
<td>ICAR</td>
<td>Patient Navigator-ICAR</td>
</tr>
<tr>
<td>Aaron Bagnola</td>
<td>Pharmacy</td>
<td>Clinical Specialist-IHVI</td>
</tr>
<tr>
<td>Megan Rupe MSN, RN</td>
<td>CTU-S</td>
<td>Clinical Director</td>
</tr>
<tr>
<td>Rebecca Petros RN and Louisa Villanueva RN</td>
<td>CTU-N</td>
<td>RN Unit Supervisors</td>
</tr>
<tr>
<td>Stephanie and Carrie, RN</td>
<td>PCCU</td>
<td>Unit Supervisor</td>
</tr>
<tr>
<td>Shari Robinson, MSN, RN</td>
<td>CTU-N</td>
<td>Clinical Director/Senior Director IHVI</td>
</tr>
<tr>
<td>Marina Ocasio BSN RN</td>
<td>PCCU/Interim CICU</td>
<td>Clinical Director</td>
</tr>
</tbody>
</table>
Its all about the Patient Centered Care - Collaborative approach

HOW WE STARTED

TIMING IS EVERYTHING

BUILD A TEAM

MEET REGULARLY

PICK YOUR TOOLS
We had been watching our bleeding matrix/data for some time and made some changes. We switched from femoral to radial artery access, began using ultrasound guidance for femoral access, updated our radial compression band, developed a bleeding tracker and standardized use of an arm board post radial access.

Data showed little improvement.

Then I received the NCDR email about the Reduce the Risk campaign and reached out to a small group of involved cardiology leaders who agreed we should join the campaign.
3 important people stepped up and not only said “Yes” but “I will lead”:

Dr Tehrani - Cardiac Catherization Lab Co-Director
Julieanne George MSN RN - Clinical Director of ICAR
Stephen Ives - RCIS Clinical Director of Invasive Labs

We pulled together a team of Interventional Cardiologists, Senior Nursing Leadership, Physician Quality Leadership, Nursing Quality Representative, Pharmacist, Patient Navigator, Nursing Leadership from IHVI Nursing Units, IHVI Nursing Educator and the Cath/PCI Outcomes Specialist.
Julie George immediately set up an initial meeting with the team members.

We reviewed the data with Team to show where we were coming from and where we wanted to go.

I shared the tools provided by the NCDR. We reviewed and evaluated the available tools to determine what was useful in our environment.

We agreed to meet monthly, as a full team, and set up a recurrent schedule.

Assignments were made with follow up due at the next meeting.

A smaller “executive group” would meet weekly to review bleeding issues from the previous week.
Data Presentations were made to Physicians, Cath lab staff and Nursing Units to show where we currently stood and where we needed to be.

A Bleeding Tracking Tool was developed by Julie and her staff for use in ICAR. The tool was made available for all patient care areas in IHVI.

The Bleeding Risk Score, already available in EPIC, was underutilized. It was made mandatory for pre-op notes and for Cath lab handoff.

Micro puncture/Ultra sound Guidance was made the standard of practice for all femoral access.

Review of NCDR available tools to assist in updating our policies, order sets, and staff education.
Celebration

Increased the use of the Bleeding Risk score for elective PCI by making it a mandatory part of the pre op notes and hand off.

Increased the use of ultrasound guidance by making this the standard of practice.

Use of the arm board post procedure for radial access

Updated the post procedure order sets to allow for Interventionalists to order a hold on DVT prophylaxis.

Updated post procedure care policies and educated IHVI staff on the care of access site with an emphasis on bleeding.

Heightened awareness that this was a team effort here at INOVA as well as a team approach across the country to deliver best care.
Results

Bleeding Events Post PCI

- Ultrasound Guidance
- Arm Band
- Bleeding Risk Score
- Tri Band Change

Target (3%)
ICAR Bleeding Complications Tracker

*Complete for any access point that requires additional intervention to obtain hemostasis*

Procedure Information:
- IR □
- Cath □
- EP □

Procedure: ____________________________

Physician: ____________________________

Left □ Right □

Femoral □ Radial □ Brachial □ IJ □

Closure Device? Yes □ No □ What Type: ____________________________

Stent Placed? Yes □ No □ N/A □

Figure 8 Closure* Used? Yes □ No □ N/A □

*Interventions Only

Interventions Used (check all that apply):

Dressing Changed □

Manual Pressure Held □ Duration: ____________________________

Fem Stop Applied □ Duration: ____________________________

• Requiring >1 application □ How Many? ____________________________

Vasc Band Reapplication □

Additional Testing (e.g. CT, Ultrasound) □

Other (Fluids, Transfusion, etc.) □ Detail: ____________________________

Upgrade in Level of Care □

MSET or RRT Initiated □

Physician Notified □ If yes, who? ____________________________
**Physician Pre Procedural Note**

**H&P UPDATE WITH ASA/MALLAMPATTI**

Date Time: 05/17/19 10:49 AM

**PROCEDURE:**
Left and right heart cath, possible percutaneous coronary intervention

**INDICATIONS:**
Valvular heart disease

**H&P:**
The history and physical including past medical, family, and social history were reviewed and there are no significant interval changes from what is currently available in the chart from prior evaluation. He has no complaints. He was seen and examined by me prior to the procedure.

**ALLERGIES:**
Patient has no known allergies.

**LABS:**

<table>
<thead>
<tr>
<th>Lab Results</th>
<th>Value</th>
<th>Date</th>
</tr>
</thead>
</table>

**ASA PHYSICAL STATUS**
Class 3 - Severe systemic disease, limits normal activity but not incapacitating

**MALLAMPATTI AIRWAY CLASSIFICATION**
Class II: Visibility of hard and soft palate, upper portion of tonsils and uvula

**AGG BLEEDING RISK SCORE**
Total Score: 30 = INTERMEDIATE RISK for bleeding (1.1% to 3.1%)

**PLANNED SEDATION:**
- ( ) NO SEDATION
- (x) MODERATE SEDATION
- ( ) DEEP SEDATION WITH ANESTHESIA

**CONCLUSION:**
The risks, benefits and alternatives of the procedure have been discussed in detail and he has indicated that he understands the procedure, indications, and risks inherent to the procedure and is amenable to proceeding. All questions were answered. Informed consent was signed and verified.
Cath Lab Procedure Handoff Report

Date Time: 05/16/19 10:50 AM

INDICATIONS:
Coronary Artery Disease

PROCEDURE:
Impella assisted DES to LM and LAD

ALLERGIES:
Urechisnum and Cindamyacin

AGG BLEEDING RISK SCORE
Total Score: 30 = INTERMEDIATE RISK for bleeding (1.1% to 3.1%)

MEDICAL HISTORY:

Past Medical History:
Diagnosis
• Abnormal vision
• COPD (chronic obstructive pulmonary disease)
• CT scan in 2013 showed emphysema
• Coronary artery disease
• Stents
• HTN (hypertension) on Rx 11/17/17
• Hyperlipidemia on Rx
• Pneumonia last 4/2019

ACCESS:
8 Fr. sheath in right femoral artery
Hemostasis: Single Perclose device deployed for hemostasis
Post procedure pulses: palpable in right leg/foot
Visual appearance: clean/dry/intact with good distal pulses

14 Fr. sheath in left femoral artery
Double Perclose devices deployed for hemostasis
Post procedure pulses: palpable in left leg/foot
Visual appearance: clean/dry/intact with good distal pulses

4 Fr. sheath in left femoral vein
Sheath left in place

MEDICATIONS:
Versed: 3 mg IV
Fentanyl: 75 mcg IV
Heparin: 16,000 units IV
Adenosine: 180 mcg/kg/min IV during procedure only (d/c’d)
Nitro: 400 mcg IA
Loading Dose of: Clopidogrel 300 mg PO
IV Drips: 0.9% normal saline

VITALS:
BP: 140/80 HR: 75 Rhythm: sinus rhythm w/ PVC’s O2 SAT: 99% on 4 L/min

PROCEDURE DETAILS:
Outcomes: successful PCI

Complications: none

Final Chest Pain Assessment: 0/10
ACC-NCDR Cath/PCI Registry
Reduce the Risk of PCI Bleeding
The Ohio State Wexner Medical Center

Quinn Capers IV M.D, FACC
Danielle Blais PharmD, BCPS-AQ Cardiology
Mindy Hazlett BSN, RN, NE-BC
Patricia A. Blake RN, MSN
Julia Salinas RN, BSN
OSU Recognized as Top 25 in the U.S. in Cardiovascular Quality

Consistently recognized as one of America’s Best Hospitals by *U.S. News & World Report*
About Ohio State

• A world-class public research university
  – 59,000 undergraduate, graduate and professional students
  – 34,000 full-time employees

• One of the largest and most diverse academic medical centers in the country, the only academic medical center in central Ohio and the Midwest’s highest-ranked hospital for safety and patient care.

• Our seven hospitals and our network of community-based offices and care centers manage more than 1.7 million patient visits each year.

• The University Hospital - 900 beds
  – Ross Heart Hospital - 150 bed hospital

• High volume center - diagnostic cath’s- ~ 5000, PCI’s ~1800 per year
  – Cath labs - 8
  – Interventional Cardiologists - 8
  – Fellowship Program
Team

Dean Boudoulas MD, FACC Medical Director Cath Lab

Quinn Capers MD, FACC-Director of Interventional Cardiology Fellowship Program

Eric Ballinger- Director Cardiac Catherization Lab

Danielle Blais- PharmD, BCPS-AQ Cardiology

Mindy Hazlett- Manager Cardiac Catherization Lab

Patty Blake- Senior Cardiovascular Quality Manager

Julia Salinas- Cath/PCI Program Manager
Cath/PCI Volumes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic Cath</td>
<td>760</td>
<td>783</td>
<td>832</td>
<td>784</td>
<td>784</td>
<td>666</td>
<td>723</td>
<td>752</td>
</tr>
<tr>
<td>PCI</td>
<td>264</td>
<td>267</td>
<td>281</td>
<td>278</td>
<td>283</td>
<td>202</td>
<td>237</td>
<td>220</td>
</tr>
</tbody>
</table>
Bleed Reduction
Two Pronged Approach- Radial, Blood Use

• How did our facility decide to work on bleeding rates? How did you get your team engaged in radial first approach?
  – ACUITY Trial indicated patients receiving blood fared worse outcomes
  – Radial approach had less vascular complications, less blood transfusions
  – Physician education and commitment
  – Physician reports comparing radial approach to their peers
  – Patients preferred radial approach

• Are you using any tools that have been helpful?
  – Bleeding risk calculator
  – Protocols for Heparin Dosing, Transfusions and Sheath Pulling

Rao SV, et al. JACC. 2013; 6(9); 897-904
Bleeding/Vascular Complication Reduction Task Force

• Originated in March of 2013

• Review of RP bleeds and mortalities

• Missions of the task force
  – Increase use of radial approach to a goal of 70%
  – Reduction in blood usage
  – Engaged front line staff to improve the process
  – Reporting of quality metrics to evaluate the process
  – Improve patient satisfaction and safety as well as staff satisfaction
Example of physician report

Radial Access By Operator
July 2012 - March 2013

Target = 70 % Radial

Percent Radial Access

Radial

The Ohio State University
Wexner Medical Center
Bleeding/Vascular Complications Task Force

Radial First go live on October 1\textsuperscript{st}, 2013

- Revised order sets
- Specific communication plan when complication occurs
- Extensive training for nurses pulling sheaths using the simulation lab

Transfusions- Stringent Approach

- Protocol driven transfusion, standardize transfusion threshold (i.e. below Hg 8 or only if patient symptomatic)
- MD to MD discussion prior to ordering blood
- Resident/Fellow mandated to call interventionalist prior to ordering blood
Reduction of Bleeding Quality Initiatives

- Radial first approach (2011)
- Sheath pulling team to standardize process (2013)
- Transfusion protocol (2013)
- Bleeding risk calculator (2014)
- Ticagrelor preferred P2Y₁₂ inhibitor/Reduce GP IIb/IIIa use (2016)
- Heparin dosing protocol (Start 2017/Revised April 2018)
- ACC definition Access site change (3 gram drop to 4 gram drop) (2018)
- Mandatory Comorbidities documented in post op EMR note (2018)
- Reduce the Risk: ACC PCI Bleed Quality Campaign (2018)
Heparin Dosing and ACT Goals for PCI

(Round Heparin doses UP to the nearest 1,000 units)

**Not on heparin drip** - give Heparin 70 units/kg

**Received heparin in the past 2 hours or recent DOAC* or Warfarin Use** - Check baseline ACT prior to starting PCI and give heparin according to the following nomogram

*DOAC: Direct Oral Anticoagulant e.g. Apixaban (Eliquis®), Betrixaban (Bevyxxa®), Dabigatran (Pradaxa®), Edoxaban (Savaysa®), Rivaroxaban (Xarelto®)

### Heparin + GP IIb/IIIa or Thrombolytics Target ACT 200 – 250 seconds

<table>
<thead>
<tr>
<th>ACT</th>
<th>Weight Based Heparin Dose (units/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 150</td>
<td>50</td>
</tr>
<tr>
<td>151 – 175</td>
<td>25</td>
</tr>
<tr>
<td>176 – 199</td>
<td>12.5</td>
</tr>
</tbody>
</table>

### Heparin Only Target ACT 300 – 350 seconds

<table>
<thead>
<tr>
<th>ACT</th>
<th>Weight Based Heparin Dose (units/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 150</td>
<td>70</td>
</tr>
<tr>
<td>151 – 175</td>
<td>62.5</td>
</tr>
<tr>
<td>176 – 200</td>
<td>50</td>
</tr>
<tr>
<td>201 – 225</td>
<td>37.5</td>
</tr>
<tr>
<td>226 – 250</td>
<td>25</td>
</tr>
<tr>
<td>251 – 299</td>
<td>12.5</td>
</tr>
</tbody>
</table>

**Check ACT**

- ✓ 3 - 5 minutes after initial bolus to confirm heparin went into the patient
- ✓ 10 - 15 minutes after first bolus and then every 10 - 15 minutes to adjust

Re-dose heparin according to above nomogram
OSUWMC Cardiac Cath Lab Team Safety Checklist

Sign-In / Time-Out

☐ Team Introduction

☐ Patient Identification (Name, D.O.B & MRN)

☐ Procedure with Consent Completed (attending name, date, time, & signed)

☐ Medical History and Indication for Procedure

☐ ASA Last Dose

☐ P2Y12 Load and Last Dose

☐ Anti-coagulation Last Given (day, time, dose)

☐ Candidate DES vs. BMS (e.g., bl

☐ Chemistry, CBC and PT/INR lab

☐ Contrast Threshold/Timeout

☐ Bleeding Risk

☐ Access Site and Equipment

☐ Allergies

☐ Sedation Order

☐ Questions/Concerns
OSUWMC Cardiac Cath Lab Team Safety Checklist

Sign-Out / Debrief

- Assess Access Site
- P2Y12 Management for PCI
- If Anti-Coagulation Needs to be Reinitiated use Post-Cath Order Set and Notify Team
- Assess Total Contrast Used / Volume Status (LVEDP) and Hydrate Accordingly
- Complete Brief Procedure Note
- Assign Family and Referral Team Communication
- Questions/Concerns
Radial vs Femoral Evolution
RBC/Transfusions Excluding CABG

- 2011: 4.1%
- 2012: 3.3%
- 2013: 3.2%
- 2014: 2.7%
- 2015: 3.5%
- 2016: 1.5%
- 2017: 1.7%
- 2018: 1.5%
ACC-NCDR
PCI Risk Adjusted Bleeding
Moving in the Right Direction

Currently no data after Q2 2018 - Q3 2018 due to registry update

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter</th>
<th>My Hospital</th>
<th>US Hospitals 50th Pctl</th>
<th>US Hospitals 90th Pctl</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>Q1</td>
<td>2.33</td>
<td>2.82</td>
<td>1.72</td>
</tr>
<tr>
<td>2017</td>
<td>Q1</td>
<td>3.38</td>
<td>4.00</td>
<td>1.56</td>
</tr>
<tr>
<td>2016</td>
<td>Q1</td>
<td>4.69</td>
<td>4.14</td>
<td>1.75</td>
</tr>
</tbody>
</table>
You have Questions
We have Answers