Emergence of Multidisciplinary Pulmonary Embolism Response Teams: Potential Role of the Pharmacist

Rachel P. Rosovsky, MD, MPH and George A. Davis, PharmD, BCPS

December 2016

American Society of Health-System Pharmacists.
Learning Objectives

- Justify the rationale and background for developing a multidisciplinary Pulmonary Embolism Response Team (PERT)
- Describe the goals of the National PERT Consortium for advancing the care of patients with pulmonary embolism
- Assess the potential role of a pharmacist on a PERT.
Disclosures

Rachel P. Rosovsky, MD, MPH
- No disclosures

George A. Davis, PharmD, BCPS
- No disclosures
Pulmonary Embolism Response Team: A Comprehensive, Management Approach

Rachel P. Rosovsky, MD, MPH
Massachusetts General Hospital
December 2016
American Society of Health-System Pharmacists.
Agenda

- Pulmonary Embolism Response Team (PERT)
  - Scope of the problem
  - Description
  - Research: Advancing the science of PE care
  - National PERT Consortium
Venous Thromboembolism is Common

![Graph showing the increase in VTE cases per 100,000 adults aged 18 years and older from 2002 to 2050.]

VTE cases per 100,000:

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Williams Was Treated for Blood Clot in Lungs

By CHRISTOPHER CLAREY
Published: March 2, 2011

Serena Williams, out of action since winning Wimbledon in July, has experienced another significant health problem that could further delay her return to the game she once dominated. Williams’s representatives confirmed Wednesday that she was hospitalized last month in Los Angeles because of a pulmonary embolism and that she then required emergency treatment Monday for a hematoma, a pocket of blood that swells under the skin.

A pulmonary embolism — a clot that blocks blood flow to the lungs — can be life threatening in severe cases, but Williams’s spokeswoman, Nicole Chabat, said in a statement Wednesday that “thankfully everything was caught in time” and that Williams was resting and recovering at her home in Los Angeles.

“This has been extremely hard, scary, and disappointing,” Williams said in a statement. “I am doing better. I’m at home now and working with my doctors to keep everything under control. I know I will be O.K., but am praying and hoping this will all be behind me soon. While I can’t make
Jerome Kersey, Virginia-born NBA star, dies at 52

February 19 at 8:00 PM

Jerome Kersey, who in the 1990s helped take the Portland Trail Blazers to the National Basketball Association finals twice and won the title in 1999 with the San Antonio Spurs during a 17-year playing career, died Wednesday at a hospital in Tualatin, Ore. He was 52.

His death was reported on the Trail Blazers’ Web site. According to the Portland Oregonian, the state medical examiner’s office said a blood clot traveled from his leg and lodged in his lung, causing a pulmonary embolism. Mr. Kersey reportedly had knee surgery earlier this week. Larry Lewman, the deputy state medical examiner, said he had not yet determined whether the two events were related.
Chris Bosh in January. A few days before the All-Star Game in February, he awoke with a sore calf. He was soon found to have a recurrence of blood clots, and team doctors told him his career was probably over.
Why worry about Pulmonary Embolus?

- Fatal within 1 h after the onset of symptoms in 10% of cases
- Untreated PE mortality rate ~30%
- Early recurrent PE is closely linked to probability of mortality
Pulmonary Embolism Types

- **MASSIVE**
  - Shock / Hypotension

- **SUBMASSIVE**
  - Normotensive + Right Ventricular Strain

- **LOW RISK**
  - None of the above
  - No pressors, No O2, subseg PE
PE Mortality (ICOPER)

Overall mortality, %

Massive PE

Non-massive PE

*62.5% from recurrent PE

Therapeutic Alternatives in Acute Venous Thromboembolism

**Anticoagulation**
- Unfractionated Heparin
  - Continuous Intravenous
  - Full-Dose Subcutaneous
- Low-Molecular-Weight Heparin
- Direct Thrombin Inhibitors
- Synthetic Pentasaccharide Xa Antagonist
- Warfarin
- New oral Factor Xa inhibitors

**Thrombolytic Therapy**
- Systemic
- Catheter Directed (CD)
- Pharmacomechanical CD Thrombolysis (PCDT)

**Mechanical**
- Thromboaspiration
- Surgical Thrombectomy

**Adjunctive Therapy**
- Vena Caval Filter
- Extracorporeal support

*How does one choose?*
Case 1

- 61 woman h/o provoked RLE DVT after long flight in 2001
- SOB x 4-5 weeks
- Worsened with travel
- House
- PE CTA: clot in the bilateral main pulmonary artery
- ECHO and biomarkers: Right heart strain
- Hemodynamically stable

SOB = shortness of breath
RLE DVT = right lower extremity deep vein thrombosis
Case 1

- PERT: MGH staff, OSH staff and patient.
- Management options
  - systemic anticoagulation with or without catheter-directed thrombolysis.
- Risk/benefit discussed extensively.
- VS stable, but symptoms → MGH for catheter-directed thrombolysis to decrease risk of CTEPH.

OSH = outside hospital
CTEPH = chronic thromboembolic pulmonary hypertension
Guidance in the Literature for Treatment of Massive/Submassive PE: Very Little

- Number of options: Who decides? How decide?
- Lack of guidance
Acute Massive/Submassive PE Therapy

Who warrants more aggressive therapy?

Circulation 2011;123:1788-830
Pulmonary Embolism: Which therapy to use?

- Best treatment unknown - no “standard approach”
- MGH example - strategies “all over the map”
  - Varied by medical service, location
  - No consistency in decision-making
  - No single “team”
  - No accepted algorithm
  - No centralized location for care
  - No systematic evaluation of results

We looked around country and found no coordinated way to treat PE: Impetus for PERT
Pulmonary Embolism Response Team (PERT)
Pulmonary Embolism Response Team (PERT)

Severe PE Identified

PERT Team Activated

Immediate Conference with:
- ED / ICU / Floor Team
- Pulmonary
- Vascular Medicine/Cardiology
- Cardiac Surgery

Disposition and Treatment Plan

+ pharmacy
Case 1

- 32 M s/p knee surgery, syncopized
- Hypoxic, tachycardic, tachypneic, hypotensive
- While waiting ...
Pulmonary Embolectomy
Embolic Material

- Right atrium
- Left PA
- Right PA
Pulmonary Embolism Response Team

**Mission**
To advance the diagnosis, treatment and outcomes of patients with severe pulmonary embolism (PE)

**Vision**
To become the center of excellence in the science of pulmonary embolism care through multidisciplinary collaboration in clinical care, education and research
Objectives

• Respond expeditiously to treat patients with massive and submassive PE
• Provide best therapeutic options available for each patient
• Leverage the input of a multidisciplinary team of experts
• Coordinate care among services involved in care of PE
• Develop protocols for the full range of therapies available
• Collect data on clinical presentation, treatment efficacy, and outcomes (short and long-term)
PERT Activation

One telephone number

Answered 24/7 by answering service

PULMONARY EMBOLISM RESPONSE TEAM ACTIVATION

Large Pulmonary Embolus?
For example:
- PE with abnormal vital signs (tachycardia or hypotension)
- Evidence of right heart strain (echo, EKG or positive biomarkers)
- Central or Saddle PE

CALL x4-PERT (4-7378) TO ACTIVATE THE PULMONARY EMBOLISM RESPONSE TEAM (PERT)

Please order (unless already done):
- Stat Echocardiogram
- EKG
- CBC, PT/PTT, Creatinine
- Troponin, and NT-proBNP
- Type and Screen

PERT: A Multidisciplinary Team to coordinate and expedite appropriate treatment of Pulmonary Embolus
PERT Program Flow Map

Expeditious input and clinical judgment from multiple specialties to optimize therapy

Coalition of the willing
Vibrant discussion

PERT fellow:
History
Physical Labs
EKG
Echo
CT-PE

ED
MGH floor
OSH

Low Risk
Submassive
Massive

ACTIVATE PERT MULTIDISCIPLINARY TEAM

Electronic Meeting
Vascular Medicine
Cardiac Surgery
ICU/Pulmonary
Hematology
Emergency Medicine
Rad, Echo

+ pharmacy

On Discharge:
Multidisciplinary Follow-Up Clinic

A/C
Lytic
CDT
Aspiration
ECMO
Surgery

Coalition of the willing
Vibrant discussion
Multidisciplinary Virtual Consultation

- Web-based HIPAA compliant videoconferencing
PERT Activations at MGH
October 2012 Launch through November 2016

- Total activations: 716
  - Mostly from ED

- Multidisciplinary virtual consults: 451 / 63% of activations
  - Number of participants: 6 – 15 physicians
  - Average length of consult: 25 mins.
Case 3 ... importance of close follow up

- 48 M h/o idiopathic Guillain-Barré Syndrome 3 years prior, resolved presented to OSH with acute SOB.
- CTA showed bilateral PE. Given one dose lovenox and sent to MGH.

OSH = outside hospital
SOB = short of breath
Case 3: Importance of Close Follow Up

- At MGH:
  - 87% on RA, HR 150, RR 28, BP 140/79.
  - Had to take a breath every few words
  - ECHO: severe right heart strain
- Given his hypoxia, tachypnea, hypokinesis proceed with CDT thrombectomy and lysis (16 mg tpa).
- Discharged next day on novel oral anticoagulant.

CDT = catheter directed
Case 3: Importance of Close Follow Up

- In hospital, HCT 26.8.
- Follow up clinic one month later, HCT still 26.8.
- Work up revealed:
  - IgG 5328, IgA 22, IgM 6,
  - serum free kappa/lambda = 601/1.5 = 400 ratio
  - M spike: 4.31 IgG Kappa
PERT Multidisciplinary Follow Up Clinic

Purpose

• To continue multidisciplinary collaboration for the long term follow up and treatment.

Structure

Data

• Began August 2014
• 1-2 clinics/month depending on number of patients
• 40 clinics from August 2014 through November 2016
• Over 250 patients seen
Multidisciplinary PERT Follow Up Clinic

Unique Clinic

• True multidisciplinary effort
• We all learn from each other
• Ensures appropriate short and long term follow up and treatment
• Research
**PERT Research:**
**Advancing the Science of PE Care**

**Goals**

- PERT: unique/exciting ... but want to demonstrate impact & explain what we’ve accomplish
  - Can it change treatment/effect outcomes of PE?
- Collect data from beginning to share
- Published small case series in CHEST explaining this new concept of caring for patients with PE.
Operational Approach

A multidisciplinary pulmonary embolism response team.

- 12 weeks
- 30 patients

**Figure 1.** PE characterization and treatment. *One patient with submassive PE received both CDT and an IVC filter; **One patient with massive PE had an absolute contraindication to anticoagulation. CDT = catheter-directed thrombolysis; IVC = inferior vena cava; PE = pulmonary embolism; PERT = Pulmonary Embolism Response Team.*
The Massachusetts General Hospital Pulmonary Embolism Response Team (MGH PERT): Creation of a Multidisciplinary Program to Improve Care of Patients With Massive and Submassive Pulmonary Embolism.

Follow up paper on logistics and operations. What multidisciplinary team entails. How works, get 10-15 people.
Invited Presentations/Papers

- Hospitals, grand rounds, and local meetings all over United States
- Societies all over USA and beyond
  - American Thoracic Society
  - InternatI Society for Thrombosis and Haemostasis
  - American Heart Association
  - VEITH Symposium
  - CHEST National Meeting
  - American College of Cardiology
  - VIVA
  - **ASHP**
  - Too many to list:
    - TCT, LINC, SIR, ISET, SVS, SMACC, SVM, C3, SAEM, Paraguayan Internal Med, NATF, VTEDeblin

*Real focus: show if what we are doing makes a difference*
PERT Database

- Web-based, REDCap
- HIPAA compliant
- Piloting
• PERT launched
  • Immediate response
  • Grown 16% each time period

PERT Data

- Majority are severe,
- Recent increase in low risk: represents complex cases

**Advanced Rx**

- More National average
- National registries
  - 2% of all PE get thrombolysis (TL)
  - 9% of massive
- Underused
- Expertise/comfort
- Our data: TL
  - 16% of all
  - 23% of massive

PERT Data: Mortality

Does our approach improve outcomes?

- Even among massive PE, mortality is still high: 25%
- Lower than National average of 52%
- Very early data.

Most exciting ... not just happening at MGH
Expand PERT Nationally and Internationally...
PERT™ Consortium

Launched May 2015
PERT™ Consortium

- Launched May 2015
  - 100 providers representing 30 PERT sites
  - Mission, goals, structure established
  - Created 5 committees
    - Governance
    - Education
    - Communication
    - Clinical practice and protocols
    - Research
PERT™ Consortium

- 2nd annual meeting June 2016
  - 150 providers, over 90 PERT sites
  - Reviewed accomplishments from each committee
    - Governance: established 501c3
    - Education
      - mentorship program (rprosovy@partners.org)
    - Communication
      - Website
    - Clinical practice and protocols
      - Algorithms
    - Research
      - Pilot study of database with 14 sites
    - Development
The PERT consortium brings together clinicians who focus on pulmonary embolism to better the treatment of these patients.
National PERT™ Consortium

We think PERT tidal wave in how treat PE in future: our vision moving forward.

We hope YOU are a part of that vision.

Next Consortium: June 22, 2017. Boston, MA

pertconsortium.org
SAVE THE DATE

June 23-24, 2017
at the Royal Sonesta Boston in Cambridge, MA

Pulmonary Embolism
What is Known, and What We Need to Know
A Scientific Symposium Dedicated to PE

Immediately following the PERT Consortium Meeting on June 22, 2017

Course Directors:
Christopher Kabrhel MD, MPH
Kenneth Rosenfield MD, MHCDS
Rachel Rosovsky MD, MPH
Samuel Goldhaber MD

Featured Speakers:
Phil Wells MD
Jeffrey Kline MD
Michael Jaff DO
Victor Tapson MD
PERT: KEY Take Away Points

- PERT: New paradigm; wave of the future
  - In real time.
    - Infrastructure immediately and simultaneously engages multiple experts to determine best course of action for PE patients. Each consultant contributes relevant and vital information about each patient’s clinical situation and perils.
  - Multidisciplinary
    - PERT members, outside hospital, other specialists
    - Patient and family members
  - Importance of follow up

- PERT National Consortium: education, clinical, research, communication

- Upcoming Events
Tesla:
Wave of the Future to treat PE patients

August 7, 2016
Tesla car drives owner to hospital after he suffers pulmonary embolism

A US driver made it to hospital while suffering a pulmonary embolism after putting his car into autopilot.
Thank you

- Questions?
Pulmonary Embolism Response Team: The Potential Role of the Pharmacist

George A. Davis, PharmD, BCPS
December 2016

American Society of Health-System Pharmacists.
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PERT Case Review

- 65yo F presented to ED on with 4-day history of left calf pain and leg swelling and difficulty catching her breath
- HPI included recent hospitalization for appendicitis requiring surgery and diagnosed with pancreatitis
- In ED, venous ultrasound showed evidence of acute left femoral DVT extending to the popliteal vein
- Patient initially started on heparin drip by ED and PERT activated
- CT-PE revealed acute PE with right heart strain (RV:LV = 1.1), elevated troponin & proNTBNP, and HR > 110; Other labs: platelets = 75,000
- PMHx: HTN, Type II DM, HLD, DVT in 2000 and was on warfarin for 2 years but discontinued
Pulmonary Embolism Response Team (PERT)

Severe PE Identified

PERT Team Activated

Immediate Conference with:
- ED / ICU / Floor Team
- Pulmonary
- Vascular Medicine/Cardiology
- Cardiac Surgery

Disposition and Treatment Plan

Pharmacist
Our Approach to Developing a PERT

- Recognized there was variation in care for patients diagnosed with pulmonary embolism
- **UK HealthCare Optimal Care™ – Pulmonary Embolism Multidisciplinary Task Force** was created in April 2015.
- **GOAL**: Improvement to streamline work flow for diagnosis, risk stratification, and treatment management was recognized as area for optimization for UK HealthCare patients with PE.
- Reported to Hospital Administration, Optimal Care Steering Committee
- Pharmacist involvement from the start
# UK HealthCare Optimal Care™ - Pulmonary Embolism Team Members

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<th>Multidisciplinary Expertise Represented</th>
<th>Invited Members</th>
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<tr>
<td>*Physician, Cardiovascular Medicine, Anticoagulation Consult Service</td>
<td>Susan Smyth, MD, PhD</td>
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<tr>
<td>*Physician, Vascular and Endovascular Surgery</td>
<td>George Davis, PharmD, BCPS</td>
</tr>
<tr>
<td>Physician, Cardiovascular Medicine</td>
<td>Paul Anaya, MD</td>
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<tr>
<td>Physician, Hospital Medicine</td>
<td>Paula Bailey, MD</td>
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<tr>
<td>Physician, Hospital Medicine</td>
<td>Adam Gray, MD</td>
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<tr>
<td>Physician, UK Emergency Medicine</td>
<td>Sam Ghali, MD</td>
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<tr>
<td>Physician, Cardiovascular Medicine</td>
<td>Khaled Ziada, MD</td>
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<tr>
<td>Physician, CT Surgery</td>
<td>Hassan Reda, MD</td>
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<td>Physician, Interventional Cardiology</td>
<td>John Gurley, MD</td>
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<td>Physician, Cardiology</td>
<td>Martin Rains, MD</td>
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<td>Physician, Cardiology</td>
<td>Bennett George, MD</td>
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<tr>
<td>Physician, Pulmonary Medicine</td>
<td>Roland Berger, MD</td>
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<tr>
<td>Nurse, Quality Assurance</td>
<td>Amanda Green, DNP, RN</td>
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<tr>
<td>^Pharmacist, Emergence Medicine</td>
<td>Abby Bailey, PharmD, BCPS</td>
</tr>
<tr>
<td>^Physician, Hematology and Blood &amp; Marrow Transplantation</td>
<td>Amit Goldberg-Ray, MD</td>
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*Co-Leader; ^Newest members
Our Approach to Developing a PERT

- Committee assessed diagnosis, risk stratification, and when to appropriately use advanced therapy available at our institution for Submassive or Massive PE

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<th>Advanced Therapy</th>
<th>Considerations</th>
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| **Systemic thrombolysis**                              | • Massive or submassive PE  
• Screen for contraindications  
• Associated with up to 3% risk of intracranial hemorrhage                                                                                      |
| **Catheter-directed thrombolytic therapy**             | • Massive or submassive PE  
• Screen for contraindications  
• *May* be associated with a lower risk of intracranial hemorrhage because of lower doses of fibrinolytic therapy are employed  
• *May* be combined with ECMO in patients who need mechanical support                                                                                       |
| **Surgical or percutaneous embolectomy**               | • Massive and high-risk submassive PE  
• May be preferred if contraindications to thrombolytics exist  
• Centrally-located PE (accessible surgically)  
• Clot-in-transit (right heart thrombus)  
• Can combine with ECMO in patients who need mechanical support                                                                                          |
**UK HealthCare Optimal Care™ - Pulmonary Embolism**

- **Acute PE**
  - Patient in shock? (Table 1)
    - Systolic SBP < 90 and/or use of vaspressors, cardiac arrest, or bradycardia
    - MASSIVE PE
      - Call UKMDs and Activate PERT
      - Heparin IV bolus (80 units/kg to max. 8000 units) if no contraindication (Table 1)
  - CT with RV/LV ratio ≥1 OR troponin T >0.1
    - NO
    - YES
    - **LOW RISK PE**
      - ANTICOAGULATION ALONE
      - Assess for home management
      - Anticoagulation options
        - apixaban
        - rivaroxaban
        - enoxaparin + warfarin
        - UFH + warfarin
    - YES
      - SUBMASSIVE PE
        - Call UKMDs and Activate PERT
        - PERT: Risk Assessment Across Continuum
        - LOWER RISK
          - RV dysfunction OR troponin T >0.1
          - Anticoagulation, if no contraindication, and close observation
        - HIGHER RISK
          - RV dysfunction AND troponin T >0.1 AND HR >110
          - Contraindication to thrombolytics? (Table 2)
        - NO
          - Systemic tPA (Table 3)
        - YES
          - ECMO and definitive therapy
          - Consider embolectomy (catheter or surgical)
      - YES
        - PERT: Is patient a candidate for ECMO?
        - NO
        - YES
      - Contraindication to thrombolytics? (Table 2)
    - YES
      - Consider embolectomy (catheter or surgical)

Simplified PESI risk factors:
- HR>110;
- O2 sat <90%
- SBP <100;
- age >80;
- cancer;
- chronic cardiopulmonary disease
UK HealthCare Optimal Care™ - Pulmonary Embolism

Table 1. Absolute contraindications to enoxaparin or heparin bolus as initial therapy for confirmed PE.
- Already received therapeutic enoxaparin within last 8 hours (e.g., outside hospital)
- Known or suspected active major bleeding
- Thrombocytopenia with confirmed history of heparin induced thrombocytopenia (HIT)
- Hypersensitive to enoxaparin or heparin products
- Neuraxial anesthesia or undergoing spinal puncture

Table 2. Absolute contraindications to thrombolysis therapy for confirmed PE.
- Active internal bleeding
- Bleeding diathesis
- History of recent stroke (within three months)
- Presence of intracranial conditions that may increase the risk of bleeding (e.g. some neoplasms, arteriovenous malformations, or aneurysms)
- Recent intracranial or intraspinal surgery or serious head trauma (within 3 months)
- Suspected aortic dissection

Relative contraindications to thrombolysis therapy for confirmed PE.
- History of chronic, severe, poorly controlled hypertension
- Current severe uncontrolled hypertension (SBP >180 mmHg or DBP >110 mmHg)
- History of ischemic stroke more than three months prior
- Traumatic or prolonged (>10 minute) CPR or major surgery less than three weeks
- Recent internal bleeding (within two to four weeks)
- Noncompressible vascular punctures
- Pregnancy
- Active peptic ulcer
- Pericarditis or pericardial fluid
- Current use of anticoagulant (eg, warfarin sodium) that has produced an elevated international normalized ratio (INR) >1.7 or prothrombin time (PT) >15 seconds
- Age >75 years

Table 3. Dosing strategies for systemic thrombolysis therapy using tissue plasminogen activator (also known as tPA; alteplase or Activase®) for confirmed pulmonary embolism:
- Standard dosing (FDA approved): 100mg IV infusion over 2 hours
- Accelerated dosing (non-FDA approved): 0.6 mg/kg with maximum dose of 50mg IV infusion over 10 minutes; may consider additional 50mg IV infusion over 1 hour for total dose of 100mg over 2 hours.
PERT Activation Team Members at UK HealthCare

- Group text page from central paging
  - Cardiology Fellow – ED/New Admissions
    - Triages patient and involves other members of PE Committee based on protocol
  - Cardiology Attending – ED/New Admissions
  - Cardiology Attending – PE Committee Co-Lead / Anticoagulation Consult Team
  - Pharmacist, Anticoagulation Consult Team
  - Pharmacist, Pharmacy Resident on Call (“PDOC”)
  - Cardiology Nurse Practitioner
- Quality Assurance nurse receives email at time of PERT activation
Pharmacist Resources for PERT Involvement – Our Model

- Anticoagulation Program Coordinator – dedicated FTE
  - Leads protocol development for anticoagulation
  - Formulary management
  - Quality assurance
  - PERT member

- ED Pharmacist presence 16 hours per weekday and 12 hours on weekends

- Pharmacy resident on-call ("PDOC") – 24/7/365 in house on-call program where pharmacist responds to emergency situations
  - PERT added to PDOC responsibilities starting November 2016
Pharmacist Role in PERT

- Work with multidisciplinary team to assist with risk stratification, treatment options, and optimizing pharmacologic management/advanced therapy
  - Anticoagulation protocols
  - Thrombolysis
    - Systemic
    - Catheter directed
  - Transition of Care planning for anticoagulation
Pharmacist Role in PERT

- Review EMR and any additional OSH records as needed to identify any potential issues in regard to use of anticoagulation or thrombolysis
  - If patient is potential candidate for systemic or catheter directed thrombolysis, are there any absolute or relative contraindications to thrombolysis with PERT members
  - Optimize anticoagulation choice (e.g., LMWH and UFH), facilitate appropriate dosing and monitoring per anticoagulation protocols.
  - Help facilitate timely order verification, delivery, and administration of anticoagulants and thrombolytic as warranted
  - Help facilitate appropriate oral anticoagulation plan for transition of care
Pharmacist Role in PERT

- Documentation
  - Documentation of assessment and recommendations (similar model at our institution: Stroke Alert)
  - Developed note template for pharmacists
  - Provide handoff to pharmacist on primary team (standard handoff process)
PERT Activations to Date

- N = 50 since initiation (November 2015 – October 2016)
  - Increasing with awareness - average 4-6 per month in last 6 months
  - Potential to continue to expand with average submassive (~10/mo) and massive (n=1-2/mo) PE patients at our institution
65yo F presented to ED on with 4-day history of left calf pain and leg swelling and difficulty catching her breath

HPI included recent hospitalization for appendicitis requiring surgery and diagnosed with pancreatitis

In ED, venous ultrasound showed evidence of acute left femoral DVT extending to the popliteal vein

Patient initially started on heparin drip by ED and PERT activated

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PMHx: HTN, Type II DM, HLD, DVT in 2000 and was on warfarin for 2 years but discontinued
PERT Case Review – Pharmacist Role

- PE Risk Stratification – High Risk Submassive PE
  - Initially assessed as candidate for catheter directed thrombolysis
  - Contraindications to thrombolysis included recent surgery and thrombocytopenia
  - Assessment for heparin induced thrombocytopenia
    - Alternative to unfractionated heparin pending HIT Antibody
    - HIT antibody and serotonin release assay were both positive confirming HIT diagnosis
  - Optimization of anticoagulation plan based on recurrent VTE, acute provoked submassive PE, and diagnosis of HIT
Becoming involved in PERT Consortium

- Approached hospital administration about applying for institution membership to National PERT Consortium
  - Participating in PERT Registry
  - Increasing local, regional awareness of VTE and PE
  - Resources
- PERT Consortium meeting beneficial to pharmacist education and involvement
National PERT Consortium – Membership
Institution Benefits

- Recognition as member of the National PERT Consortium on website and other relevant publications and announcements
- Access to data
  - Participation in National PERT Consortium database and registry
- Access to protocols and algorithms
- Educational materials and programming
- Hospital recognition for achievement of benchmarked standards (to be determined)
- Competitive advantage to local and regional marketplace
  - Permission for institutional members to publicize their participation in the National PERT Consortium
- Advocacy
  - From endorsing societies (e.g. ACC, AHA, SVM, SCAI, SIR, etc.)
  - At local and national government agencies
Pharmacist Role in PERT: KEY Take Away Points

- **HOPEFULLY WAVE OF THE FUTURE**
  - Infrastructure which immediately and simultaneously engages multiple experts to determine best course of action for PE patients.
  - Each consultant contributes relevant and vital information about each patient’s clinical situation and perils.
- **Multidisciplinary including a role for pharmacy**
  - PERT members, outside hospital, other specialists
  - Patient and family members
- **Importance of follow up**
- **PERT National Consortium: education, clinical, research, communication – increasing pharmacist involvement and excellent professional opportunity for pharmacy profession**
Thank you

- Questions?