Pulmonary Embolism Response Team

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Disclosures

• I do not have relevant disclosures for this talk
Talk Outline

• What is a PERT?
• Who needs a PERT?
• Who should be part of a PERT?
• Can smaller hospitals have PERT?
• How is a PERT activated?
• The mechanics of a PERT call
• PERT: Measuring the success
• PERT Clinic
• PERT Consortium
• PERT Sub-Committees
What is a PERT

• PERT = Pulmonary Embolism Response Team

• PERT Objectives for your institution:
  • Coordinate care for high-risk PE patients
  • Advance PE-related care in the institution
Pulmonary Embolism Types

MASSIVE
Shock / Hypotension

LOW RISK
None of the above

SUBMASSIVE
Normotensive + RV Strain
Who needs PERT Anyway?
Zsa Zsa Gabor Suffered a ‘Massive’ Clot that ‘Could Move to Her Heart’

Los Angeles, California (CNN) -- Actress Zsa Zsa Gabor was rushed to a Los Angeles hospital Friday after her doctor diagnosed her with "a massive blood clot," her publicist said.

Gabor’s left leg was "swollen like hell" and she had an infection in her right leg, her husband, Prince Frederic Von Anhalt, said Friday evening, as his wife was being treated in the emergency room at Ronald Reagan UCLA Medical Center.

She had "no blood flow to her leg," Von Anhalt said.

Gabor "was complaining about her leg swelling and hurting her" Friday morning, so a doctor was called to her Bel Air, California, home, publicist John Blanchette said.

The doctor diagnosed Gabor with a "massive blood clot," which he feared could move from her leg to her heart, Blanchette said.

February, 2013
Who Needs PERTs Anyway?

• PE are common
• PE are a leading CV cause of death
• Many subspecialties are involved in the care of PE patients (e.g. Medicine, Hematology, Pulmonary Care etc.)
PE Therapeutic Options: All Over the Map

- Anticoagulation
- IV Thrombolysis
- IVC Filter
- Catheter Directed Thrombolysis
- Surgical Embolectomy
- Pharmaco-Mechanical Catheter Treatment
- ECMO
Open Questions in PE Management

? Can there be a standardized approach to PE?
? Which medical team and service are best equipped to treat PE?
? How should outcomes be followed?
? When should intervention be chosen?
PE Treatment Guidelines are Vague

1. Probability of PE above treatment threshold
   - Submassive without RV strain (Low risk PE)
     - Heparin Anticoagulation
   - Submassive with RV strain (Abnormal echo or biomarkers)
     - Heparin Anticoagulation
   - Systolic blood pressure < 90 mm Hg for >15 min
     - Heparin Anticoagulation

2. Assess for evidence of increased severity that suggests potential for benefit of fibrinolysis
   - 1. Evidence of Shock or Respiratory Failure:
     - Any hypotension (SBP < 90 mm Hg)
     - OR Shock Index > 1.0
     - OR Respiratory distress (SaO2 < 95% with S&G score < 8, or altered mental status, or appearance of suffering)
   - 2. Evidence of Moderate to Severe RV Strain:
     - RV dysfunction (RV hypokinesis or estimated RVSP > 40 mm Hg)
     - OR Clearly elevated biomarker values (e.g., troponin above borderline value, BNP > 100 pg/mL or pro-BNP > 600 pg/mL)

3. No contraindications to Fibrinolysis
   - Alteplase
     - 100 mg over 2 h IV

Usual PE Care vs. PERT

- MGH Unit
- Referring Hospital
- Severe PE Identified
  - Heparin/IV tPA?
  - Catheter?
  - Surgery?
- ED/Floor Team +/- Pulmonary +/- Hematology
- Vascular Medicine/Cardiology +/- IR
- Thoracic Surgery
Theoretical Benefits of a PERT

• Multidisciplinary expert opinion in the face of scarce evidence
• Effort coordination
• Complex collaborative procedures
Suction Thrombectomy: It Takes A Village...

Cath Lab Team: Anesthesia, CT surgery, Nursing, Perfusion, Echo, Vascular Medicine
PERT Member Roles

• Emergency Department
  • Early patient identification
  • Main source of referrals

• Pulmonary / Critical Care
  • Important for patient placement
  • Pulmonary HTN

• Hematology
  • Hypercoagulability
PERT Member Roles – Cont’d

• Vascular Medicine / Cardiology
  • Hypercoagulability
  • Cardiac impact
  • Intervention

• Cardio-Thoracic Surgery
  • Embolectomy
  • Thromboendarterectomy
  • ECMO

• Radiology
  • Rapid access to interpretation
  • Novel imaging techniques
PERT – Optional Members

• Vascular Interventional Radiology
• Vascular Surgery
• Administrative
• Research support
Can Smaller Hospitals Have PERT?

- The problem: Lack of resources / expertise
- PERT Communities – Smaller center referring to higher level centers
PERT: Patient Care Flowchart

**Expeditious input and clinical judgment from multiple specialties to optimize therapy**

PERT fellow:
- History
- Physical
- Labs
- EKG
- Echo
- CT-PE

- Low Risk
- Submassive
- Massive

ACTIVATE PERT MULTIDISCIPLINARY TEAM

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

Handoff to therapeutic site
- A/C
- Lytic
- CDT
- Vortex
- ECMO
- Surgery
PERT Activation

One telephone number
Answered 24/7 by the MASCO answering service

- Follows documented protocol
- Fellow receives page that includes a pre-defined set of relevant information
- Administrator simultaneously receives the same information via email
Multidisciplinary Virtual Consultation

Leveraging low- and no-cost internal and commercially available tools

- Citrix® GoToMeeting web-based HD videoconferencing
  - Allows exchange of screen control
  - Tracks meeting date, time and length
- Group email distribution lists
- Group paging
What to Get?

• Blood Work
  • CBC
  • Chem 7
  • PT / PTT
  • Troponin and BNP
  • Type and Cross
  • Hypercoagulable testing?

• ECG

• Echocardiogram – When?
PERT Multidisciplinary Follow Up Clinic

• Participants:
  • All PERT members are invited to attend the pre conference and the clinic as observer or participant

• Disciplines represented:
  • Vascular Medicine and Intervention, Pulmonary and Critical Care, Hematology, Emergency Medicine, Cardiothoracic Surgery, and Radiology

• Timing to follow up:
  • 4 to 6 weeks after the PE
PERT Follow-up Clinic – Cont’d

- 8 a.m. – 9 a.m.: Review all patients
  - Hospital course, scans, echo, labs
  - Determine short and long term follow up course
    - IVC filter removal
    - Further imaging
    - Additional labs
    - Age specific cancer screening
    - Length of anticoagulation
    - Who will follow the patient
- 9 a.m. – 12 noon: Clinic
  - Each participant sees 3-4 patients
PERT Follow-up Clinic – Preliminary Data

• First follow up clinic in August 2014
• 1-2 clinics per month depending on the number of identified patients
• 9 clinics from August through December
  • 84 patients met criteria (initial GoToMeeting multidisciplinary consult)
  • 48 patients in follow up clinic
  • 11 patients to be scheduled
  • 10 patients died
  • 15 patients did not follow up in our clinic
# MGH Proposed Surveillance Protocol: Asymptomatic Patients

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<thead>
<tr>
<th>Table 1: Asymptomatic person*</th>
<th>6-8 weeks</th>
<th>6 months</th>
<th>12 months</th>
<th>Annually</th>
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<td>+</td>
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<td>+</td>
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<tr>
<td>Focused physical examination***</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Transthoracic echocardiogram(\d)</td>
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<td>CT-PE**</td>
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<td>V/Q Scan(\times)</td>
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<td>D-dimer</td>
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<td>Stop anticoagulation</td>
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<tr>
<td>Hypercoagulable panel</td>
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<td>Cancer-related health maintenance(\d)</td>
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### MGH Proposed Surveillance Protocol: Symptomatic patients

#### Table 2: Symptomatic person*

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<th>4-6 weeks</th>
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*Note: + indicates recommended, - indicates not recommended.
PERT: Measuring the Success

• What data should you collect?
• How should data be collected?
PERT RedCap Database

- Web-based
- HIPAA compliant
- 16 forms
- Up to 347 variables
- Prospective data entry
- Scalable

350+ Patients, October 2012 – February 2015
PERT Research: Collected Data-points

- Administrative patient information
- Demographics
- Past Medical History
- Presenting symptoms and vitals
- Other active medical conditions contributing to PE
- Symptoms
- PE diagnosis
- Pre-PERT therapeutic interventions

- Information obtained following PERT consult
- Follow-up: 24 hours
- Follow-up: 2-3 days
- Follow-up: 4-7 days
- Follow-up: 8-30 days
- Follow-up: 31-90 days
- Follow-up: 91-365 days
PERT Activations
October 2012 Launch through June 30, 2015

• Total activations: 424
  – Activations by hospital location
    – ED: 57.1%
    – ICUs: 20.5%
    – Floors: 22.4%

• Multidisciplinary virtual consults: 199 / 58.2% of activations
  – Median time to virtual consult: 107 mins.
  – Number of participants: 8 – 15 physicians
  – Average length of consult: 25 mins.
PERT Activations
October 2012 Launch through June 30, 2015

• Male: 53.3%   Female: 46.7%
• Age range: 10 – 98 yrs
  – Median age: 62 yrs.
• Survival to discharge: 86.8%
• 359 Interventions:
  63.0%  Anticoagulation only
  18.1%  IVC Filters
  8.4%  Catheter-direct thrombolysis
  4.5%  Surgery
  2.8%  IV Lysis
  2.5%  ECMO
  0.8%  Vortex
PERT Sub-Committees

• Executive committee
• Clinical committee
• Research committee
• Education committee
• Governance committee
PERT Consortium

• Two day national meeting:
  • Day 1 – PERT related
  • Day 2 – Scientific sessions

• Research coordination
PULMONARY EMBOLISM
NEW APPROACH TO ADDRESS A NATIONAL CRISIS

CONSORTIUM OF MULTIDISCIPLINARY PULMONARY RESPONSE TEAMS (PERT)

PERT Consortium - May 21st

CME Scientific Sessions about Pulmonary Embolism - May 22nd

The Wyndham Boston Beacon Hill

Admission to the CME Scientific Sessions $99/$49
(Physicians $99, residents & fellows $49)
PERT Consortium

19+ interested centers
Launch Meeting – Spring 2015
First Publications


A multidisciplinary pulmonary embolism response team.
Kabrhel C, Jaff MR, Channick RN, Baker JN, Rosenfield K.

- 12 weeks
- 30 patients
  - 25 confirmed PE
- Median time to PERT meeting = 57 minutes
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.

Thank You

www.PERTCONSORTIUM.org