The Team Approach To PE Management: Emergence Of National PERT™ Centers
Kenneth Rosenfield, MD, MHCDS
Massachusetts General Hospital

With credits also to:
Richard N. Channick, M.D.
Michael R. Jaff, D.O.
Christopher Kabrhel, M.D.
Rachel Rosovsky
Ido Weinberg, M.D.
Thor Sundt, M.D.

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Financial Disclosures
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  - Angiodynamics
  - Capture Vascular
  - Cardinal Health
  - Contego
  - Cook
  - CRILZAR Systems
  - Endospan
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• Research or Fellowship Support
  - Atrium
  - NIH
  - Lutonix-Bard

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PE (and DVT): A national crisis!

• High incidence rate
• Severely under-recognized and undertreated
• Significant immediate and long-term sequelae
• High recurrence rate
• Treatments available that reduce mortality, morbidity and sequelae

“Treatment gap” in PE

• <5% of patients with PE receive “advanced therapy”, including those with clear indications (hypotension, RV dysfunction, biomarkers, etc.)
• Many more are eligible than receive
• Impediments
  - Failure to recognize potential benefit and integrate data in “real-time”
  - Fear of complications
  - Inability to respond rapidly (“systems” issues)
  - “Paralysis” in decision-making

Therapeutic Alternatives in Acute PE

• Anticoagulation
  - Unfractionated Heparin
  - Continuous Intravenous Heparin
  - Full-Dose Subcutaneous Heparin
  - Low-Molecular-Weight Heparin
  - Direct Thrombin Inhibitors
  - Synthetic Pentasaccharide Xa Antagonist
  - Warfarin

• Thrombolytic Therapy
  - Systemic (full or half-dose)
  - Catheter Directed (CDT)
  - Pharmacomechanical Catheter-Directed Thrombolysis (P-CDT)

• Mechanical
  - Surgical Thrombectomy
  - Thrombo-aspiration
  - Clot maceration

• Adjunct Rx
  - Extracorporeal support (ECMO)
  - RVAD
  - IVC Filter

How do we decide which therapy to apply in a given patient???
Available Guidelines

Management of submassive PE crosses the zone of equipoise, requiring the clinician to use clinical judgment.

In most situations of uncertain benefit of a treatment...we took the position of primum non nocere...given the certain risks of bleeding and less-certain benefits, thrombolysis is likely to be harmful. Selected patients without hypotension may benefit..."

Decision-making Beyond the Guidelines

- Guidelines offer few class I recommendations and do not cover all scenarios
  - Paucity of data available for highest-risk pts
  - Novel devices/approaches now available
- Timely decision-making and intervention crucial (like STEMI and Stroke)
- Expert multidisciplinary consultation essential (Cancer, Stroke, TAVR, Heart teams)

Which therapy to use???

- Best treatment unknown
  - No "standard approach"
  - No "Appropriate Use Criteria" for intervention
- Strategies "all over the map"... MGH experience as example:
  - Practice variation by medical service, location, size and threat to patient, etc.
  - No standard algorithm or consistency in decision-making
  - No single "team" or "clearing-house"
  - No centralized locations for care or "centers of excellence"
  - No systematic evaluation of results

How do we decide whether to "intervene" and by what modality? Who decides? What is the endpoint?

PERT: Pulmonary Embolism Response Team

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

Goal
- Improve patient outcomes using a collaborative, multidisciplinary team-based urgent consult to treat massive and submassive PE

Functionality
- Modeled on rapid-response concept
- Multidisciplinary team of experts convened via electronic meeting
- Evaluate and offer full range of available treatments

Pulmonary Embolism – previous paradigm ... Chaos

2012 MGH Pulmonary Embolism Response Team

A Multidisciplinary Effort to Improve Care and Outcomes in Patients with PE
PERT Program Flow Map

Expeditious input and clinical judgment from multiple specialties to optimize therapy

Multidisciplinary Collaboration

Objectives

- Respond expeditiously to treat patients with massive and submassive PE
- Provide best therapeutic option(s) 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)

…Fill unmet clinical need and provide evidence base to close gap in our knowledge base…
PERT Activations (n=405)
October 2012 Launch through April 2015

NOVEMBER 10
→ 500 total PERT Activations!!

PERT Multidisciplinary Follow Up Clinic

**Purpose**
To continue multidisciplinary collaboration in the long term follow up and treatment for patients with severe pulmonary embolism (PE) who were seen as PERT inpatients.

**Structure**
- All PERT activations trigger followup appointment
  - Ensures appropriate short and long term follow up and treatment
- All PERT members participate
- Pre-clinic review followed by conjoined clinic
- Timing to follow up: 4 to 6 weeks after activation
- Research agenda

PERT Research:
Advancing the Science of PE Care

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

500 Patients, October 2012 through November, 2015

PERT Data

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

National PERT™ Consortium History

- Launch meeting May 2015
  - 85 providers representing 41 member PERTs
  - Mission, Goals, Structure established

PERT Consortium

Launched May 2015
National PERT™ Consortium
Update on current status

- June 2015 to present
  - Biweekly teleconference meetings of 4 committees
    - Research, data-sharing, and publications
    - Education
    - Communications
    - Website …launch Dec, 2015
    - Expansion to over 60 sites
    - 501c3

13 sites engaged in Data-sharing!

- Published
- Expansion to over 60 sites
- 501c3
13 sites engaged in Data-sharing!

Board of Directors
- Executive Committee (Officers and Exec. Directors)
- Research, Data-sharing, Publication
- Research protocol development
- Education
- Communications
- Clinical practice, guidelines, protocol development
- Governance & Bylaws, Membership
- Fundraising Development 1
- Budget and Finance
- Nominating
- Industry Relations & Corporate sponsorship
- Philanthropy
- Website & List-serve maintenance
- Publications
- Internal Relations
- Media and Public Relations
- Advocacy & Public Awareness
- Fellowship opportunities
- Database management
- Research protocol development
- Scientific meetings (annual event, regional events)
- Fellowship opportunities
- External Relations
- Website
- Newsletter
- List-serve
- Other
- Exec Director/Operations Manager
- Industry Relations & Corporate sponsorship
- Fellowship opportunities
- PERT Org Chart (111615)

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PULMONARY EMBOLISM
What is Known, What We Need to Know
Please join us at the 2nd Annual CMG Symposium
State-of-the-Art Scientific Update
June 28-29, 2016
The Royal Sonesta Boston
40 Edwin H. Land Boulevard
Cambridge, MA 02142

To join our mailing list for early registration, please email: Pert2016@pertconsortium.org

“Game-changing Therapies” - Role of PERT

- Ultrasound facilitated lysis - More rapid clot dissolution with lower dose of lytic agent?
- VORTEX Angiovac – Perc. rapid “en bloc” thrombus vacuum
- Inari – large bore perc. thrombus extraction
- Penumbra – thrombus aspiration
- Argon Cleaner - clot macerator
- ECMO - Hemodynamic support as "bridge" to definitive Rx
- Novel anticoagulants – More effective? Better compliance?

Will these change the paradigm completely?

How should we integrate these into existing treatments?

Underscores need for integrated, TEAM approach to PE …with multi-disciplinary decision-making

Future of Vascular Intervention
Pulmonary Embolus Management

- PE still poorly understood; much to learn
- New era: heightened awareness about need for coordinated institutional approach to a complex, life-threatening problem
- OPTIMAL CARE WITH TEAM APPROACH!
- PERT: a “model” program, demonstrating the power of interdisciplinary collaboration to streamline care, optimize outcomes for our patients, and enable development of better treatment paradigms for patients with PE
- National PERT™ Consortium…the power of team-based care and collaboration across institutions
• krosenfield1@partners.org
• Cell/text  617 480-8080

THANK YOU