What Does the CT For PE Actually Tell Us? Is there Any Role for MR in Acute or Chronic PE?

Brian Ghoshhajra, MD, MBA
Service-Chief, Cardiovascular Imaging Section
Assistant Professor of Radiology, Harvard Medical School
Massachusetts General Hospital, Boston, MA

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Is there Any Role for MR in Acute or Chronic PE?

Relevant Disclosures

Siemens Healthcare, unrelated consulting
Medtronic, unrelated consulting
VascCore, unrelated (Physician Interpreter)

Unknown Case

29 yo Caucasian ♂ with severe SOB, diaphoresis, ↓BP, worsening fatigue, recent subtherapeutic INR on coumadin

PMHx: Antiphospholipid antibody syndrome, + lupus anticoagulant

What test do we start with? CTA / VQ / US / MRI?
What additional tests?

CTPA Yield

Adapted from Jaff MR et. al Circ 2011

CTPA Yield

CT Pulmonary Angiography

2016 ACR Appropriateness Criteria

Axial

4-chamber

2-chamber

CTA chest without IV contrast 2 The procedure has limited sensitivity and may be suboptimal for any patient or specific clinical scenario in a specific patient. ○

CTA chest with IV contrast 1 The procedure can be an initial study prior to CTA. ○

Chest radiograph 4 ○

CTA chest with IV contrast and CT angiography 3 ○

Cardiac-gated CTA

Temporal resolution from 66-200 msec (vs. ~30 msec for echo)
Potentially increased radiation exposure (but now median ~3 mSv)
RV, LV function possible
Incremental value of venous evaluation?

Leg venography
IVC / May-Thurner

Mimics of PE
Mimics + alternative diagnoses = more common than PE!

Lung cancer patient with PE

CTA PE Protocol

Clinical Conditions:

Ausb Pts. — Suspected Pulmonary Embolism

Intermediate Probability with a positive D-dimer or high pretest probability.

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-ray chest</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>CTA chest with IV contrast</td>
<td>4</td>
<td>High; contrast should be optimized for preliminary evaluation.</td>
</tr>
<tr>
<td>CT chest with IV contrast</td>
<td>8</td>
<td>High; contrast should be optimized for preliminary evaluation. The diagnostic utility of CTA for PE should not be performed.</td>
</tr>
<tr>
<td>To-60 min V/Q scan lung</td>
<td>1</td>
<td>High; contrast should not be performed.</td>
</tr>
<tr>
<td>US lower extremity</td>
<td>4</td>
<td>This procedure may be an alternative to CTA, but both should not be performed.</td>
</tr>
<tr>
<td>CTA chest without IV contrast</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MRA chest without IV contrast</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Angiography pulmonary with right heart catheterization</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>US subclavicular thoracic aorta</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CT chest without IV contrast</td>
<td>1</td>
<td></td>
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</tr>
<tr>
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<td>2</td>
<td></td>
</tr>
<tr>
<td>Leg venography</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Reference Levels: 1: Usually not appropriate; 2: May be appropriate; 3: Usually appropriate; 4: Highly appropriate

29 yo Caucasian ♂ with severe SOB, diaphoresis, worsening fatigue, I&O, APSE and +LAC, recently subtherapeutic INR on coumadin

Incremental value of venous evaluation?

Leg venography
IVC / May-Thurner

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Lung cancer patient with PE

CTA PE Protocol

Clinical Conditions:

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Intermediate Probability with a positive D-dimer or high pretest probability.
Lung cancer patient with ? PE

10% incidental PE rate in cancer f/u CT!
29 yo Caucasian ♂ with severe SOB, diaphoresis, worsening fatigue, ↓BP, APLS and +LAC subtherapeutic INR on coumadin. No PE?

CTV Abdomen/pelvis

Today

7 days earlier

Bilateral massive adrenal hemorrhage

Summary of key points:

CTA is first line…and second line
V/Q can be useful if normal CXR (but becoming is a lost art)
MRI is not ready for prime time but occasional problem-solving
Radiology 101: Consider mimics of PE
Remember the overall low yield (~6%) of CT PA, signs of risk
All outside cases should get an official local read!

There’s no “I” in PERT… (your ‘team’ is Em Med, Gen Med, Rad, Hem/Onc, Pulm, Vasc Med, Vasc Surg, IR, CT Surg!)

V/Q Scintigraphy?

Cardiac MRI?

<table>
<thead>
<tr>
<th>Table 1. Results of MRA and Combined MRA and MIV, by Reference Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Result</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>MRA result</td>
</tr>
<tr>
<td>Positive</td>
</tr>
<tr>
<td>Negative</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>MRA and MIV result*</td>
</tr>
<tr>
<td>Positive</td>
</tr>
<tr>
<td>Negative</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

*One case was not performed.

Courtesy Suhny Abbara, MD

References


Thank you

bghoshhajra@mgh.harvard.edu

@ ghoshhajra

Mannu Kalra
Jo-Anne Stappard
Alexsi Otrakji
Shaunagh McDermott
Michael Lu
Michael Lev

MGH PERT Team
PERT Leadership

http://www.massgeneral.org/