

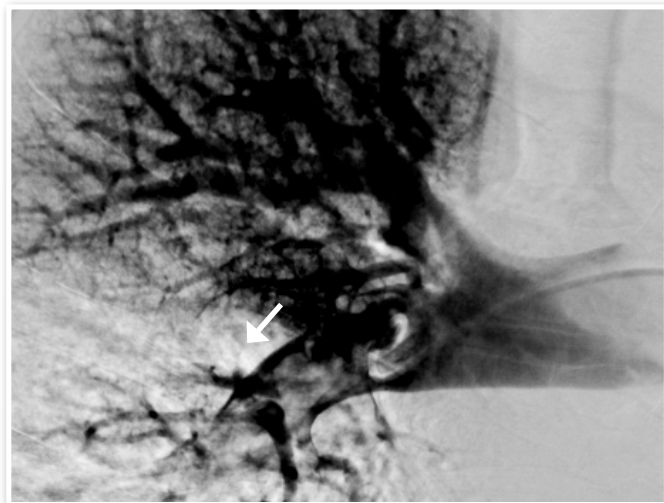
Pulmonary Embolism Response Team (PERT) for Streamlined Care of Acute Pulmonary Embolism

▶ A Pulmonary Embolism Response Team (PERT) has been established at Penn Medicine to bring rapid, comprehensive and advanced care to patients with acute pulmonary embolism (PE). Drawing upon the expertise of a multi-specialty group of physicians, the Team's objectives include prompt evaluation, risk stratification, establishment of a treatment strategy, mobilization of necessary resources when needed, and guidance on long-term care. All of this can be achieved with a PERT activation through a single phone number (215.662.8888).

The stimulus for the PERT at Penn lies with the present state of PE evaluation and management in the United States. At present, the guidelines established for PE by the American Heart Association and the American College of Chest Physicians, among others, have yet to incorporate the technological advances that have redefined PE management in the last five years. Moreover, the directives for risk stratification classifications, predictors and optimal therapy for PE vary between these guidelines and consequently, from hospital to hospital. ¹Adding to this complexity in the traditional model of care is the division of responsibility for PE management between specialties, each referring to separate guidelines and consensus reports.

The PE Response Team resolves these issues by establishing risk stratification protocols, improving access to advanced therapy, streamlining patient care, and merging the expertise of a core group of specialists. Each specialist contributes to consultation, evaluation, and treatment. Because the majority of PE patients fall into an intermediate category for which decision making and treatment are highly individualized, multidisciplinary effort is an especially significant element of the PERT mission. The Team will assist with acute care, but also work to formulate a long-term plan after discharge with the patients' primary providers.

With a full armamentarium of treatment options, the Pulmonary Embolism Response Team manages patients with all severities of PE, as well as their comorbidities (including patients who have had recent surgery, stroke, or major bleeding that traditionally have limited treatment options). The Team employs a variety of percutaneous devices, including low-dose catheter directed thrombolysis and percutaneous embolectomy for those for whom anticoagulation or thrombolysis may be too risky. For patients in shock, hybrid approaches to therapy involving extracorporeal membrane oxygenation (ECMO) and catheter based treatments are now used routinely. Lastly, surgical embolectomy can be performed in appropriate patients.



▶ **Figure 1:** (Left) Initial angiogram of the right main pulmonary artery. Note area of ischemia (arrow).

CASE STUDY

Mr. R, a 50-year-old male, had an extensive middle cerebral artery stroke that required a craniotomy and surgical evacuation in the wake of treatment-induced hemorrhagic conversion. In the week after his discharge, he developed pneumonia, but was improving slowly when he experienced a syncopal event and brief cardiac arrest during physical therapy. He was quickly resuscitated and transported to Penn Medicine, where a CT scan revealed a large bilateral central pulmonary emboli with RV strain.

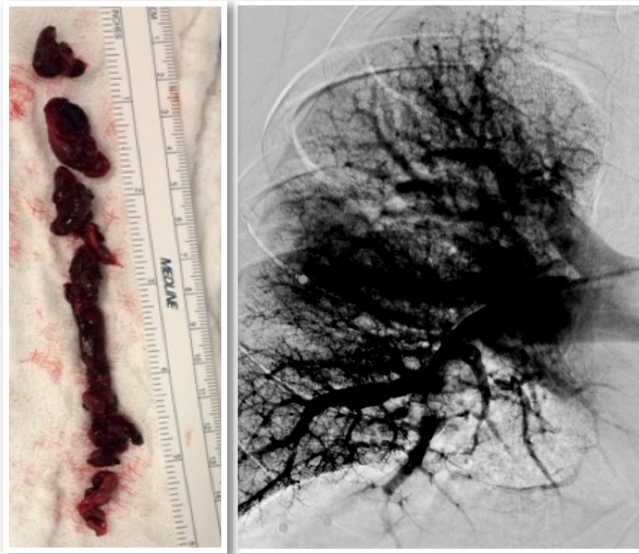
A consult was placed to the pulmonary response team (PERT), which met to consider the risks and benefits of systemic tPA, catheter directed tPA, surgical embolectomy, and percutaneous embolectomy. Because Mr. R still had areas of hemorrhage on his most recent head CT, the PERT decided that a percutaneous embolectomy would be the best option.

Before the thrombus was removed, a pulmonary angiogram (Figure 1) was performed, revealing the clot in the right pulmonary artery. A percutaneous embolectomy was subsequently performed with removal of a large amount of clot from the left and right main pulmonary arteries including the segmental levels (Figure 2, shown on the back page).

Mr. R's hemodynamics and RV function improved following embolectomy. A follow-up angiogram demonstrated restoration of blood flow into all segments (Figure 3, shown on the back page). Ultimately, he recovered and went into acute rehab, where his condition improved sufficiently to permit him to return home.

References

1. Naydenov S, Wood T, Rosovsky R, Rosenfield K, Giri J. *Chest* 2016; 150:1414-1417.



- ▶ **Figure 2:** (Left) Extensive clot removed from the right pulmonary artery during percutaneous embolectomy in the cardiac cath lab.
- ▶ **Figure 3:** (Right) Follow-up angiogram showing restoration of flow into all segments of the right lung. Similar pictures were also taken of the left pulmonary artery.

ACCESS

Penn Cardiology

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Philadelphia, PA 19104

Harron Lung Center

Penn Medicine University City
3737 Market Street, 10th Floor
Philadelphia, PA 19104

To activate the PE Response Team, call **215.662.8888** and press option 2.

FACULTY TEAM

The Pulmonary Embolism Response Team at Penn Medicine comprises specialists in cardiology, interventional cardiology, thoracic surgery, vascular surgery and endovascular medicine, anesthesiology, pulmonary medicine, cardiac and pulmonary imaging and the PennSTAR Flight Program. The PERT's mission is to provide prompt evaluation and staging of PE, the establishment of strategies for treatment, the mobilization of necessary resources for optimal care, and consultation services.

▶ Providing PERT Services at Penn Medicine

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