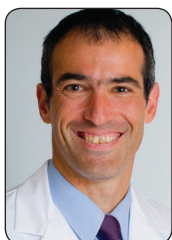


# Establishing a Pulmonary Embolism Response Team

Experts share their advice on the best approach to forming a “PERT” and discuss the benefits that they can offer.



**IDO WEINBERG, MD, AND  
MICHAEL R. JAFF, DO**

Pulmonary embolism (PE) is a leading cause of cardiovascular morbidity and mortality. Nonetheless, the treatment of PE has traditionally been fragmented, because in many health care systems, multiple providers offer care for PE patients, including general medicine teams, emergency department physicians, hematologists, cardiologists, pulmonologists, critical care physicians, and others. Although the treatment of low-risk PE is straightforward and requires relatively little collabora-

tion, the treatment of high-risk PE has the potential to be much more complex. When treating patients with high-risk PE, expertise must be implemented in diagnosis, risk stratification, and choice and implementation of treatment, as well as in coordinating care between multiple teams, including emergency medicine, cardiology, vascular medicine, interventional radiology, cardiothoracic surgery, and pulmonary/critical care medicine, among others. To achieve a high level of expertise and coordination, dedicated pulmonary embolism response teams (PERTs) have been established.

However, establishing a PERT is not always straightforward. First, the various physicians who had previously been treating PE need to be convinced that there is an advantage to managing PE by consensus. Second, team members need to be committed to working on

a team without a guarantee of additional compensation for time spent on these PERT consults. Third, a mechanism that is tailored to a specific group and to a specific hospital system needs to be implemented to allow for the much-needed coordination that is often required in the care of complex PE patients.

Of these steps included in establishing a viable PERT, the key element is convincing various specialists to collaborate over time. Many specialists with experience managing PE will not initially see the value in PERT programs. The literature is wanting, and the need for advanced therapies for patients with PE is relatively limited. Changing practice for many clinicians usually will not translate into additional compensation. Furthermore, for most physicians, the practice of medicine is a solo profession. Practicing in a group may mean that some patients will not receive the care that a particular provider believes represents the best option, especially with the lack of definitive data, as is the case for many PE patients. Conversely, for some members of the group (eg, interventional cardiologists), becoming involved in PE care can result in a new patient population, which leads to increased procedural volume (eg, inferior vena cava filters, catheter-directed lysis). It is critical for teammates to understand the benefits and disadvantages to establishing PERT programs.

In conclusion, establishing a PERT has the potential to benefit PE patients in situations when urgent/emergent care coordination is critical. However, it also requires buy-in from multiple specialists. Overcoming local politics is likely the key in establishing a viable and productive PERT.



### JAMES HOROWITZ, MD

Multidisciplinary decision making is one of the most powerful aspects of having a PERT, as it leverages multiple specialties' clinical experience with the disease and helps mitigate any bias that any one group may have in order to provide the best possible care

to the individual patient. But, honestly, it is also time consuming, messy, and one of the most difficult parts of forming a PERT. The two main issues are choosing the right team members and maintaining the day-to-day practice of shared decision making.

First, choosing your team members is key. In order to form a PERT, you really only need two things: one group to function as the first-line consultants and one group to serve as the interventionists. It is therefore important to take a good, hard, realistic look at who is available at your institution; many individuals may volunteer their services, but you need to choose the group that is able to provide 24/7 consistent service in their roles. When your team is new, you need to maintain a consistent response time and quality, or the system will fall apart.

Second, the day-to-day maintenance of multidisciplinary decision making is the key to success. There is always a tendency to rely on trainees to see patients and to simply say that the case was "discussed with an attending," but it is important to actually have the attendings see the patient and discuss the case among the interdisciplinary team. When starting a new PERT, you must focus your energy on having the entire multidisciplinary team (specifically, attendings) see the patient and discuss the case together before any documentation or plan is rendered. In my opinion, one of the most valuable features of a PERT is moving away from serial consults in which each group is free to walk away and decline to intervene, leaving the patient without a clear treatment plan. Instead, there should be a group discussion with all specialties where we leave saying, "This is what we will do for the patient," even if it's simply anticoagulation.



### OREN FRIEDMAN, MD

One of the challenges of ensuring the survival of a PERT is maintaining the enthusiasm and passion among the consultants. Many different options and iterations exist in terms of team makeup and structure, but for academic centers, trainees are frequently

the first to see the consults. In almost all systems, there is a reliance on colleagues who were not part of the original founding of the program. Interest and support will naturally vary between colleagues and trainees.

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It is possible that some may view the consults as additional work created for them by the PE team without their say. This sentiment is further fueled by the many consults for low-risk PE. As for the high-risk PEs, many (especially those with pulmonary backgrounds) will disagree with the PERT's support of a more aggressive endovascular approach. These feelings can lead colleagues and trainees to resent the program. Sometimes, they may feel forced into a new treatment paradigm that they do not support. The following list contains practical suggestions to keep fellows, residents, and colleagues interested, engaged, and supportive of the PERT:

- Conduct shared discussions of cases with positive outcomes, calling attention to excellent teamwork being central to the success of the case.
- When there is legitimate clinical equipoise, try to respect the decision of your colleague seeing the consult. Offer suggestions, but do not force the team's recommendation upon colleagues.
- Point to the success of PERTs at other local institutions, as well as at esteemed institutions.
- Discuss regular program updates and practice changes with colleagues and invite them to contribute.
- Share cutting-edge publications on PE that support the team's approach, but do so in a gentle nonpushy, nonpreachy way.
- Share internal data. Data will often point toward an improvement in patient outcomes coinciding with the creation of the PERT.
- Seek out thought leaders and respected physicians in the institution and gain their support.
- Invite non-team member colleagues to join in research projects.
- Do not abuse trainees by "scutting" them out to do basic tasks that you could handle on your own.
- When staffing a consult with a trainee, thank them for their help and take time to teach and explain the rationale for decision making.
- Lead by example. Demonstrate enthusiasm around colleagues and trainees when you are the one staffing the consult, regardless of how "interesting" the case seems.



### RONALD WINOKUR, MD

Although the management of critically ill patients has become routine for interventionists, it is usually for clear indications, such as bleeding or sepsis. PE is the third most common cardiovascular cause of death in the United States, but there are little

robust clinical trial data to support therapeutic strategies. The PERT model allows for multidisciplinary input to create superior clinical gestalt for risk stratification and decisions regarding escalation of care. Because PE can occur at any time of day, the entire interventional group needs to feel comfortable with the workup, risk stratification, and procedural aspects of care. This can present a major challenge, as many new devices and procedural techniques are becoming available. Additionally, many junior interventional radiologists may not have a great deal of experience with pulmonary artery catheterization and its procedural nuances.

If you try to initiate a PERT without informing your colleagues, it will likely lead to resistance. In order to garner support and interest, education is paramount. In addition to creating a culture of knowledge, support is necessary to gain the ability to perform multidisciplinary decision making and define each member's role in that process.

A mentoring program with secondary call by the "PE experts" in a group may benefit the entire group in feeling more comfortable with their decisions. Many interventionists join the field for the opportunity to help save critically ill patients, and this is another opportunity for us to improve patient outcomes in a critically ill patient population.



### AKHILESH SISTA, MD

As Dr. Winokur points out, PE is the third most common cause of cardiovascular death in the United States, which means that patients presenting with PE will die, unfortunately, even if multidisciplinary consensus and best practices are achieved and fol-

lowed. When a patient dies despite a dedicated effort to stratify, triage, and treat, it is disheartening to the PERT members and those who consulted the PERT. Given that most PERTs are new, there will be intense scrutiny upon this group of "experts." The team's formation inherently puts a spotlight on PE, so there is a heightened awareness of outcomes. Whereas before it was acknowledged and even accepted that death from

PE was part of the disease's natural course, there is now an expectation that the PERT will save all patients.

There are several ways to mitigate the criticism directed towards a PERT following a death or serious adverse event. First, conduct a root-cause analysis and identify the factor(s) that led to the event. Second, engage the group of physicians who were taking care of the patient outside of the PERT and ask for their thoughts on how they would have handled the case and what changes they would suggest. Next, be sure to acknowledge the limitations of current PE therapy, and remind skeptics of the national statistics and the historical mortality rates. Finally, perform an internal analysis of the motivations and tendencies of the PERT group; for example, is the default an aggressive therapy that is not always warranted based on existing data?

Overall, PE is a humbling disease, and an accordingly humble, introspective, and inclusive approach will allow PERTs to improve their process and gain the trust of referring physicians.



### KEITH M. STERLING, MD

There are several important factors that contribute to the establishment of a successful PERT. First and foremost is the recognition that patients with massive or submassive PE will benefit from a multidisciplinary collaborative approach for their care.

Upon acceptance of this fact, it is important to determine the medical, interventional, and surgical specialties that will jointly form the PERT at your hospital. Although the treatment of low-risk PE is well established and accepted, the treatment of both massive and submassive PE are not, and with the increasing number of technologies and procedures, developing a PERT at your institution will promote best practice.

Successful PERTs have been established at both small community hospitals and large academic medical centers with widely varying specialty involvement. One key to success is to have consistent commitment, regardless of specialty. Creation of a PERT is the next wave in improving the outcomes for patients with acute PE, similar to the treatment of ST-elevation myocardial infarctions and acute strokes.

Not all PERTs need to be the exactly same. I liken the difference in complexity of PERTs to what has evolved in treating acute stroke. You can have a very successful acute stroke program if activation and accurate diagnosis is fast and consistent and the only intervention you can perform is administration of intravenous tissue plasminogen activator. These

same programs develop algorithms for the transfer of patients who might require advanced endovascular and/or neurosurgical treatment.

In our community hospital setting, we have developed protocols with our emergency department, intensivists, and interventional radiologists to initiate dialogue and collaboration on any acute massive or submassive PE. Additional specialties are frequently called upon to assist in the care of these patients when the clinical scenario dictates, such as cardiac surgery for patients who might require extracorporeal membrane oxygenation or possible surgical embolectomy and hematologists for the complex coagulopathic patient.

There are many resources to assist hospitals of all sizes in developing a PERT. After the key stakeholders at your institution have been identified, protocols should be established. Going through this process helped us determine when we rely on the CT angiography for diagnosis and treatment and when we need to perform echocardiography. We have also added new endovascular approaches for treating patients that were not available when we started 5 years ago. This has allowed us to treat high-risk patients who had limited options in the past. Providing feedback on outcomes at multidisciplinary conferences will also provide opportunities for continued improvement. ■

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