

Critical Review Form Meta-analysis

PGY-3

Magsood MH, Zhang RS, Rosenfeld K, Moriarty JM, Rosovsky RP, Horowitz JM, Alviar CL, Bangalore S. Do Pulmonary Embolism Response Teams for Acute Pulmonary Embolism Improve Outcomes? Insights from a Meta-analysis. Am J Cardiol. 2025;249:71-82.

Objectives: A comprehensive assessment of PERTs' impact on clinical outcomes is essential to determine their overall utility. To address this gap, we conducted a meta-analysis to evaluate the impact of PERT on PE related outcomes." (p. 71)

Methods: This meta-analysis and systematic review was conducted using the PubMed and EMBASE databases from inception until November 10, 2024, as well as clinicaltrials.gov and the grey literature. References of eligible studies were reviewed to identify further studies. Randomized controlled trials and observational studies comparing outcomes of PERT versus no PERT in patients admitted with acute PE were eligible for inclusion. Editorials, letters, case reports, review articles, and studies without a comparison arm were excluded. Relevant outcomes included all-cause mortality, major or clinically relevant bleeding, advanced therapy utilization, 30-day readmission, hospital length of stay, and ICU length of stay. Study quality was assessed using the [Newcastle-Ottawa Quality Assessment Scale](#), classifying studies as high quality (≥ 7), intermediate quality (6 points), or low quality (≤ 5).

The initial search yielded 498 reports, from which 24 observational studies were included in the final meta-analysis after title and abstract screening. A total of 15,809 patients were included, with 6,228 treated by PERT (PERT group) and 9,581 not treated by PERT (no PERT group). The mean age of participants was 61.6 years, with 49% males. The studies evaluated included 5 that compared outcomes with and without PERT activation, 3 assessing pre- and post-PERT era with PERT activation, and 16 examining pre- and post-PERT eras. Most studies were from the US (18), with additional studies from Spain (2), and one each from Germany, Singapore, Vietnam, and Iran.

Critical Review Form: Meta-Analysis

Guide	Comments
Are the results valid?	
Did the review explicitly address a sensible question?	Yes. The authors sought to evaluate the impact of PERT on clinical outcomes in patients with intermediate PE. PE response teams are multidisciplinary and can typically be activated at all hours, requiring a great deal of effort and resources to run and maintain. It is therefore important that these teams demonstrate meaningful improvements in clinical outcomes to justify their ongoing existence.

Was the search for relevant studies detailed and exhaustive?	Somewhat. The authors searched the most relevant databases (PubMed and EMBASE) as well as the US-based trial registry (clinicaltrials.gov) and the grey literature. They did not search the Cochrane Central Register of Controlled Trials, CINAHL, or conference abstracts from relevant conferences.
Were the primary studies of high methodological quality?	Yes. While all of the included studies were observational in nature and hence prone to known potential sources of bias (selection bias , information bias , confounding), scores on the Newcastle-Ottawa scale ranged from 7 to 9, suggesting high methodological quality.
Were the assessments of the included studies reproducible?	Yes. Study quality was assessed using the Newcastle-Ottawa Quality Assessment Scale , a widely used tool for assessing risk of bias in observational studies.
What are the results?	
What are the overall results of the study?	• All-Cause Mortality: PERT was associated with lower in-hospital or 30-day mortality compared to no PERT (OR=0.72; 95% CI 0.56 to 0.93; p=0.01). • Advanced Therapy Utilization: PERT had higher utilization of advanced therapies compared to no PERT (OR=3.16; 95% CI 1.81 to 5.49; p<0.001). • Major or Clinically Relevant Bleeding: PERT was associated with lower rates of major or clinically relevant bleeding compared to no PERT (OR=0.60; 95% CI 0.42 to 0.86; p=0.01). • Thirty-Day Readmission: There was no significant difference in 30-day readmission rates between PERT and no PERT (OR=1.05; 95% CI 0.74 to 1.50; p=0.77). • Hospital Length of Stay (LOS): PERT was associated with a shorter hospital length of stay compared to no PERT (MD=-1.49 days; 95% CI -2.59 to -0.39 days; p=0.01). • ICU Length of Stay: PERT showed a trend towards shorter ICU length of stay compared to no PERT (MD=-0.80 days; 95% CI -1.61 to 0.02 days; p=0.050).
How precise are the results?	See above.
Were the results similar from study to study?	Heterogeneity between studies was high for all-cause mortality ($I^2 = 69\%$), advanced therapy utilization ($I^2 = 92\%$), major or clinically relevant bleeding ($I^2 = 58\%$), hospital length of stay ($I^2 = 96\%$), and ICU length of stay ($I^2 = 98\%$). For 30-day readmission, heterogeneity was moderate ($I^2 = 43\%$).
Will the results help me in caring for my patients?	
How can I best interpret the results to apply them to the care of my patients?	This systematic review and meta-analysis of observational studies suggests that the use of a PE response team was associated with a lower risk of all-cause mortality and major or clinically relevant bleeding with a shorter hospital length-of-stay (mean difference 1.49 days). There was no significant difference in 30-day readmission rates or ICU length of stay.
Were all patient important outcomes considered?	Mostly yes. The authors did not consider cost, patient satisfaction, or the impact on long-term outcomes such as development of chronic thromboembolic pulmonary hypertension (CTEPH) .
Are the benefits worth the costs and potential risks?	Likely yes. Again, the authors did not assess cost associated with PERT use, but it seems likely that these multidisciplinary teams would be worth the cost given their significant impact on mortality, bleeding, and hospital length-of-stay.

Limitations:

1. Authors did not search the Cochrane Central Register of Controlled Trials, CINAHL, or conference abstracts from relevant conferences.
2. All of the included studies were observational in nature and hence prone to known potential sources of bias ([selection bias](#), [information bias](#), [confounding](#)).
3. [Heterogeneity](#) between studies was high for almost all outcomes.
4. The authors did not consider cost, patient satisfaction, or the impact on long-term outcomes such as development of [chronic thromboembolic pulmonary hypertension \(CTEPH\)](#).

Bottom Line:

This systematic review and meta-analysis of observational studies suggests that the use of a PE response team was associated with a lower risk of all-cause mortality and major or clinically relevant bleeding with a shorter hospital length-of-stay (mean difference 1.49 days). There was no significant difference in 30-day readmission rates or ICU length of stay.