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# Outcomes of patients with intermediate risk pulmonary embolism treated with a multidisciplinary Pulmonary Embolism Response Team. The emergent role of percutaneous catheter thrombectomy and the importance of cardiac surgery engagement

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# Outcomes of patients with intermediate risk pulmonary embolism treated with a multidisciplinary Pulmonary Embolism Response Team. The emergent role of percutaneous catheter thrombectomy and the importance of cardiac surgery engagement

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**Background:** Management of Intermediate Risk Pulmonary Embolism (IRPE) remains controversial due to the dynamic nature of the disease and the lack of correlative outcomes with large clot burden. We describe the outcomes of patients presenting with IRPE managed by a multidisciplinary Pulmonary Embolism Response Team (PERT).

**Methods:** This single center retrospective study included EMR data from patients that were a part of the multidisciplinary PERT program from January 2012 to June 2023. PERT was activated if risk of death was intermediate or higher. The simplified pulmonary embolism severity index (sPESI) and Bova score were used as risk stratification tools. Patients with intermediate risk PE defined as sPESI > 1, and Bova 3-4 were analyzed according to therapeutic approach yielding 5 groups: anticoagulation alone (AC), low dose systemic thrombolysis (ST), catheter directed thrombolysis (CDT), percutaneous catheter thrombectomy (PCT) and surgical embolectomy (SE). Patient demographics, ICU length of stay, hospital length of stay, hospital mortality, 30-day mortality, AKI, and hemorrhagic CNS events were analyzed. The percentages were reported, and median (IQR) were compared with Kruskal-Wallis test.

**Table 1: Patient Characteristics for intermediate risk PERT patients (BOVA 3-4)**

Demographics	Overall (n=216)
Age, years, median (IQR)	64 (51-73)
Male	116 (53.7)
Past medical history	
Diabetes	36 (16.7)
Hypertension	98 (45.4)
Previous CHF	10 (4.6)
Previous CVA	12 (5.6)
CAD	17 (7.9)
Renal failure	11 (5.1)
Risk Factors	
Previous DVT/PE	40 (18.5)
Surgery <6 months	20 (9.3)

Values are median (IQR) or n (%)

**Results:** Of the 566 patients with PERT activation during the study timeframe, 216 (38%) were classified as intermediate risk (BOVA 3-4) category. Mortality rate for the study cohort was 2.5% at 30 days, and all deaths occurred in the AC group. Within the AC group, overall mortality was

4.3%. One hemorrhagic CNS event occurred in the AC group and one in the ST group (0.8% and 3.3% respectively). Patients undergoing PCT had the shortest ICU length of stay with 0.2 days (0-1) vs. 2.6 (1.7-3.9) in CDT and 1.6 (1-2.8) in ST ( $p < 0.01$ ). Surgical embolectomy was performed in patients who failed treatment, deteriorated during reperfusion, or had thrombus in transit. SE survival at 30 days was 100%.

**Table 2: Outcomes by initial treatment for intermediate risk PERT patients (BOVA 3-4)**

	AC (n=126)	ST (n=30)	CDT (n=23)	PCT (n=20)	SE (n=17)	Total (n=216)
Acute kidney injury (%)	3.2	13.3	13.0	5.0	29.4	7.9
CNS hemorrhage event (%)	0.8	3.3	0.0	0.0	0.0	0.9
Treatment failure (%)	N/A	6.7	8.7	5.0	0.0	2.3
<b>Mortality</b>						
Hospital (%)	0.8	3.3	0.0	0.0	0.0	0.9
30-Day (%)	4.3	0.0	0.0	0.0	0.0	2.5
<b>Length of stay</b>						
ICU, med. (IQR)	0.03 (0.0-1.5)	1.6 (1.0-2.8)	2.6 (1.7-3.9)	0.2 (0.0-1.0)	4.9 (2.7-7.9)	1.0 (0.0-2.6)
Hospital, med. (IQR)	3.8 (2.4-6.3)	4.4 (3.0-7.9)	6.3 (4.9-9.7)	3.9 (2.1-6.6)	11.0 (8.1-22.0)	4.7 (2.8-8.0)

**Conclusion:** The management of intermediate PE using a multidisciplinary PERT program may improve survival. Reperfusion therapy should be considered for these patients; and PCT appears to have the advantage due to its safety profile, reduced ICU and hospital length of stay compared with other reperfusion options. Surgical engagement is crucial for timely rescue treatment, complementing the excellent outcomes of this program. Long term follow up is warranted to further assess differences between reperfusion treatment options.

**Keywords:** pulmonary embolism response team, intermediate risk, therapeutic approach.

**Disclosures:** None