

Between a Clot and Hard Place – PE Lysis in 2018
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Key Points:

1. Thrombolyse patients who have sustained hemodynamic stability caused by acute PE: SBP<90 for >15 min. (termed “Massive PE”)
2. Do NOT thrombolyse patients who have sustained cardiorespiratory stability, regardless of clot burden on CT or echocardiographic findings
3. Patients with the following clinical/investigative findings have increased mortality from acute PE:
 - a. Hemodynamic instability eg intermittent hypotension, shock index>1.0
 - b. hypoxia
 - c. troponin elevation
 - d. syncope
 - e. lactate elevation
 - f. abnormal ekg/arrhythmia
 - g. RV strain on CT or US
 - h. Older age
 - i. Baseline CHF/COPD
4. Patients with “submassive PE” have been the focus of trials to determine if lysis is of benefit. To date, there is no conclusive evidence of overall benefit. We see mortality and morbidity benefit at the cost of increased bleeding events. The greatest benefit likely lies in treating in the sickest of these patients, who don’t quite qualify for the “massive PE” definition. This is where clinical judgement comes in. **Current evidence and expert opinion remains mixed as to what our threshold should be to lyse.** As patients accumulate the above findings, benefit likely increases. We don’t know exactly at which point benefit outweighs harm.
5. A sample decision support algorithm to aid clinicians is attached (developed for London Health Sciences Centre/ Western University). It includes dosing information and a decision tree.
6. Many low risk acute PE patients go home. This is accepted and standard practice in Canada. The PESI (Pulmonary Embolism Severity Index) score is an accepted method of risk calculation, with a simplified version found to be less complicated and as effective, known as sPESI. You will find this score easily on the web or resources like MDCalc. A new score has recently been published, called the HOPPE score, purportedly of greater prognostic value, however not yet externally validated.
7. Catheter Directed Thrombolysis (CDT) has been studied in the context of high risk acute PE. There are no head to head trials with conventional therapy. Current evidence is largely derived from registries and observational studies. CDT should be reserved for high risk PE patients who are felt to need thrombolysis, and have bleeding risk factors precluding systemic thrombolysis.

Some great FOAM resources to look at to read more about acute PE lysis : quick reads that give a great overview of the topic --

<https://emcrit.org/pulmcrit/submassive-pe-peitho/>

<https://lifeinthefastlane.com/ccr/thrombolysis-submassive-pulmonary-embolus/>

<http://rebelem.com/episode-38-do-all-submassive-pes-require-treatment-with-thrombolysis/>

<https://emcrit.org/emnerd/em-nerd-case-shadowy-spector/>

<http://rebelem.com/peapett-trial-half-dose-tpa-pea-due-massive-pulmonary-embolism/>

<http://www.emdocs.net/controversies-of-thrombolytics-for-pulmonary-embolism/>

Relevant Literature:

Konstantinides S et al, Impact of Thrombolytic Therapy on the Long-Term Outcome of Intermediate-Risk Pulmonary Embolism. *Journal of the American College of Cardiology* Volume 69, Issue 12, March 2017 Mar; 12(69)

Meyer G, et al; PEITHO Investigators. Fibrinolysis for patients with intermediate-risk pulmonary embolism. *N Engl J Med*. 2014 Apr 10;370(15):1402-11.

Kline JA, et al. "Treatment of submassive pulmonary embolism with tenecteplase or placebo: Cardiopulmonary outcomes at three months (TOPCOAT): Multicenter double-blind, placebo-controlled randomized trial." *Journal of Thrombosis and Haemostasis*. 2014 Apr;12(4):459-68

Sharifi M, Bay C, Skrocki L, Rahimi F, Mehdipour M; "MOPETT" Investigators. Moderate pulmonary embolism treated with thrombolysis (from the "MOPETT" Trial). *Am J Cardiol*. 2013 Jan 15;111(2):273-7.

Two meta-analyses of note:

Chatterjee S, Chakraborty A, Weinberg I, Kadakia M, Wilensky RL, Sardar P, Kumbhani DJ, Mukherjee D, Jaff MR, Giri J. Thrombolysis for pulmonary embolism and risk of all-cause mortality, major bleeding, and intracranial hemorrhage: a meta-analysis. *JAMA*. 2014 Jun 18;311(23):2414-21.

Nakamura S, Takano H, Kubota Y, Asai K, Shimizu W. Impact of the efficacy of thrombolytic therapy on the mortality of patients with acute submassive pulmonary embolism: a meta-analysis. *J Thromb Haemost*. 2014 Jul;12(7):1086-95.