



Comparative Outcomes of Ultrasound-Assisted Catheter Directed Thrombolysis in Low versus Normal Cardiac Index Submassive Pulmonary Embolism

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Introduction: Ultrasound-assisted thrombolysis (USAT) is a catheter-based technique that deploys ultrasound waves and a targeted thrombolytic mechanism to break down thrombi. Several trials have demonstrated the efficacy and safety of USAT in submassive pulmonary embolism (SPE), with improvement in markers of right ventricular (RV) dysfunction, thrombus burden and Cardiac Index (CI). Two recent studies showed that most patients presenting with acute SPE had a low pre-procedural CI, despite normal blood pressures. Thus, our risk stratification tools may not identify patients with “higher risk” SPE who need aggressive therapy.

Objectives: 1) To determine if USAT leads to a larger change in pulmonary hemodynamic factors in patients with SPE and a low CI compared to those with a normal CI; and 2) To assess the difference in the post-procedural outcomes between the two groups.

Methods: We evaluated patients who had SPEs within 14 days of onset of symptoms and who underwent a USAT procedure between 11/15/15-6/19/19. Patients were stratified into a low CI group and a normal CI based on pre-USAT right heart catheterization. We evaluated six factors as surrogate outcome measures, one echocardiographic (RV/LV ratio) and five invasive. Data were analyzed using the chi-squared test, Student’s t-test and the paired-t test.

Results: We assessed 58 patients, mean age 59.0 ± 13.4 years, 50% female and 51.7% white. All six surrogate outcome measures significantly improved from baseline to post-USAT. The delta improvements, stratified by CI, are shown in the table. Only the change in PVR was significantly different. The low CI group had a shorter mean length of stay than the high CI group: 6.2 ± 3.2 vs 8.9 ± 7.8 days, $p=0.06$. There were no deaths or severe bleeding events.

	LOW CI Median (range) n=40	Normal CI Median (range) n=18	p-value
PASP	-11 (-49,2)	-8.5 (-38,6)	0.96
mPAP	-6.5 (-37,7)	-8.0 (-23,4)	0.56
RVSWI	2.7 (-8.4, 9.8)	2.0 (-12.5, 5.1)	0.08
PAPi	1.3 (-4.0, 24.1)	1.0 (-1.5, 14.1)	0.22
PVR	-2.6 (-9.3,0.8)	-0.64 (-4.1, 6.1)	0.008
RV/LV ratio	-0.4 (-1.45,0.39)	-0.3 (-0.6,0.0)	0.26

Conclusion: USAT provides consistent improvements in invasive pulmonary hemodynamic parameters with no serious/fatal complications in all patients presenting with SPE. Preprocedural CI measurement should not influence the decision to proceed with USAT.