Role of Trellis Catheter in the Treatment of IVC Filter Thrombosis
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Background: Acute deep venous thrombosis (DVT) responds favorably to various thrombectomy devices including Trellis (Covidien). In patients with an IVC filter, occasionally massive bilateral DVT may occur with frequent involvement of the filter. The role of Trellis in the treatment of IVC filter thrombosis (IVCFT) has not been investigated.

Methods: Fifty two patients with IVCFT underwent treatment with Trellis as part of the percutaneous endovenous intervention (PEVI) strategy(Fig.1). All had bilateral lower extremity and iliac DVT and were quite symptomatic. For initial treatment an 8 F Trellis device was activated inside the filter. Following the procedure venography was obtained to assess the outcome.

Results: No patient achieved complete resolution of IVCFT with Trellis thrombectomy alone. Partial resolution was achieved in only 8 patients. The remaining 44 patients had no meaningful improvement and required catheter-directed thrombolysis (CDT) with tPA for a mean duration of 32±8 hours. With CDT complete or substantial resolution of IVCFT was achieved. There was no symptomatic pulmonary embolism as a result of PEVI.

Conclusions: IVCFT is associated with bilateral iliac and femoropopliteal DVT. Trellis thrombectomy alone has a limited role in its management and most patients require CDT.

TCT-757
Rapid resolution of right ventricular dysfunction using ultrasonic thrombolysis in massive and submassive pulmonary embolism patients
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Background: Acute pulmonary embolism (PE) is a potentially fatal condition. Recent studies demonstrate support for advanced treatment, especially in patients who present with systemic hypotension (massive PE) and those who are normotensive but show signs of RV dysfunction (submassive PE), leading to poor outcomes if inadequately treated. This study assesses the hemodynamic effects of ultrasonic accelerated thrombolysis (USAT), an emerging catheter-based modality, among these patients in resolving the thrombus and restoring cardiopulmonary function.

Methods: We retrospectively evaluated consecutive PE patients treated using USAT (EKOS Corporation) with recombinant tPA at East Jefferson General Hospital from 2009 to 2011. All patients presented with signs of acute PE and received chest CT scans for confirmation of PE. Follow-up CT was performed at 39±23 hours after USAT. RV dysfunction was characterized by the right-to-left ventricular dimension (RV/LV) ratio. Thrombus burden was assessed using the modified Miller Score. All CT measurements were performed by an independent core laboratory.

Results: Among the 42 patients (age 58±16 yrs), evaluated, 7 were massive and 35 were submassive PE cases. 37 patients (88%) presented with bilateral PE. Overall, the mean tPA dose was 31.0±16.6 mg infused over 19.0±6.8 hours. Following USAT, the RV/LV ratio was reduced from 1.48±0.42 to 0.96±0.18 (p<.001) and the modified Miller Score from 18.0±5.1 to 9.7±5.3 (p<.001) at follow-up CT. Patients treated early in the series (n=13) using a total dose of ~45 mg tPA did not show greater reduction in RV/LV ratio or Miller Score than those later in the series (n=29) using a total dose of ~20 mg tPA (p=0.38). Median length of stay was 1 day in the ICU and 7 days in the hospital. All patients were discharged alive. There were no systemic bleeding complications, but 4 access site bleeding complications requiring transfusion and 1 suspected recurrent massive PE event, all reported in the higher tPA dose group.

Conclusions: For massive and submassive PE, treatment by USAT rapidly reduced RV dilatation and pulmonary clot burden with minimal risk of bleeding, allowing restoration of cardiopulmonary function.
Methods: We retrospectively analyzed data from patients with massive and submassive PE treated with USAT over a 2-year period. EKOS catheters (Ekosonic Endovascular system, EKOS Corp., Bothell, WA) were placed in the largest lower lobe pulmonary artery, bilaterally in 14 patients (93%) and unilaterally in 1 patient (7%). Recombinant t-PA was administered through the EKOS catheters as a 5 mg bolus followed by 1 mg/hour for a maximum dose of 20 mg.

Results: Fifteen patients received USAT for PE between May, 2010 and April, 2012. Ten patients (67%) presented with saddle emboli. Four patients (27%) presented with massive PE requiring inotropic support and mechanical ventilation. Technical success in EKOS catheter placement was 100%. Pre-USAT echocardiographic RV/LV diameter ratios were obtained in 13 (87%) patients and were abnormal in 12 (92%) patients (mean 1.23 ± 0.28). After USAT, 53% patients had follow-up echocardiograms, in which the RV/LV ratio normalized in all patients (mean 0.83 ± 0.06) (p<0.07). Mean pulmonary artery (PA) pressures were 39.9 ± 2.1 before treatment and 31.2 ± 3.2 after treatment (p = 0.003).

Conclusions: In patients with massive and submassive PE, USAT restores hemodynamic stability and reverses right ventricular dilatation and with minimal risk of bleeding complications.

TCT-762
Impact of left atrial appendage occlusion, with percutaneous device on left atrial function
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Background: Favorable results with the occlusion of the left atrial appendage (LAA), using percutaneous devices, for thromboembolic events prevention, has lead to a widespread use of this technique. However, the long-term effects on left atrial (LA) function are unclear. The objective of this study was to evaluate the impact of LAA occlusion on LA function.

Methods: LAA occlusion by percutaneous femoral access was performed in five female common swine, in sinus rhythm. TEE evaluation of LA dimensions using 2D, mitral and pulmonary veins (PV) Doppler flow, and TDI of mitral annular motion was performed at baseline and after 90 days. Results: Four animals survived until the 90 days. Weight and body surface area increased from 53.0 ± 4.7 kg/1.3 ± 0.1 m² to 74.1 ± 1.5 kg/1.6 ± 0.4 m². At baseline, minimum LA diameter, area and volume were 22.0 ± 2.1 mm/m²; 5.6 ± 0.4 cm²/m² and 12.1 ± 1.1 cm³/m². Maximum LA diameter, area and volume were 27.6 ± 3.7 mm/m²;7.8 ± 0.1 cm²/m² and 19.1 ± 1.4 cm³/m². At 90 days, systolic diameter, area and volume were 19.5 ± 2.9 mm/m²; 5.5 ± 0.6 cm²/m² and 13.2 ± 1.4 cm³/m² and diastolic values were 40.1 ± 5.6 mm/m²; 8.9 ± 1.5 cm²/m² and 27.1 ± 6.0 cm³/m². LA ejection fraction significantly increased from 35 ±9% to 50 ± 7% at 90 days (p = 0.038). There was a significant increase in LA maximal diameter (p=0.014) and a trend toward LA maximal volume increase from baseline to follow-up (p = 0.082). There was a significant increase of E wave VTI (p = 0.024) from 7.4 ±0.6 cm to 10.5 ± 1.4 cm. TDI of mitral annulus showed E’, A’ and S’ basal velocities of 10.8 ± 2.7 cm/s; 8.4 ± 2.4 cm/s and 4.8 ± 1.6 cm/s with no significant changes to follow-up. The E/E’ ratio suffered no significant change, and there was a trend towards peak A’ wave velocity (p = 0.067). Baseline PV flow velocities were: S 65.0 ± 2.8 cm/s; A 31.0 ± 8.5 cm/s and D 51.0 ± 7.1 cm/s. At 90 days, S, A and D were 55.0 ± 2.4 cm/s; 21.5 ± 3.5 cm/s and 44.5 ± 6.4 cm/s. The S/D ratio was 1.3 ± 0.1 at baseline and 1.3 ± 0.3 at 90 days. The D velocity at follow-up, revealed a significant reduction relative to the baseline (p=0.049).

Conclusions: This study provides initial evidence that LAA occlusion may not significantly impair LA function and does not lead to artrial atrial remodeling or loss of contractile function.

TCT-764
Safety and Biocompatibility of the Coherex WaveCrestTM Left Atrial Appendage Occluder in a 30-Day Canine Study
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Background: Left atrial appendage (LAA) occlusion is proposed to reduce the risk of thromboembolic stroke in atrial fibrillation patients.

Methods: WaveCrestTM (Coherex Medical, Salt Lake City, UT) LAA occluder was deployed in 6 dogs via transseptal puncture under fluoroscopy and transesophageal hypererophic obstructive cardiomyopathy (HOCM). However, clinically relevant complications result, including death and complete heart block (CHB) associated with syncope or resuscitation.This study was designed to evaluate the incidence of major complications with a focus on CHB after ASA for HOCM.

Methods: This international, multicenter, retrospective study reviewed 545 patients who were treated using ASA, 421 (77%) met the inclusion criteria for this study. Clinical and echocardiographic follow-up (3–6 months) was completed in 394 patients (94%).

Results: ASA led to a significant reduction in symptoms and outflow gradient. One patient (0.2%) died of cardiac tamponade four days after ASA. Two other patients (0.5%) died several weeks after ASA (sudden death of unknown cause). Sustained ventricular arrhythmias occurred within the first day in three patients (0.7%). A total of 70 patients (17%) developed mostly transient intra-procedural CHB; in 30% of them, CHB occurred/reoccurred later than 24 hours after ASA. Ninety-seven percent of CHB occurred until the fifth post-ASA day. A random pacemakers for CHB were implanted in 35 patients (91%). Multivariate analysis identified the intra-procedural bundle branch block and age as independent predictors of CHB.

Conclusions: In this multicenter study, ASA was clinically effective in highly symptomatic patients undergoing a first intervention for HOCM. The most frequent major post-procedural complication was CHB (17%) that occurred late or recurred in almost one-third of these cases (5%). Ninety-seven percent of all CHB cases occurred until the fifth post-procedural day. Independent predictors of its development were intra-procedural bundle branch block and age of patients. Difficulties in predicting CHB should lead to close post-procedural monitoring and hospital stays lasting at least 5 days. Generally, these results highlight the importance of proper interventional training and establishing complex “HCM centers” as a prerequisite for all institutions offering ASA.