Initial Clinical Experience With an Intravascular Patent Foramen Ovale Closure Using a Blind Transeptal Technique

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Background: Percutaneous closure of patent foramen ovale (PFO) is an alternative to surgical treatment of this defect. Transcatheter echocardiography (TEE) or intracardiac echocardiography (ICE) guidance is used for percutaneous placement of closure devices. The use of general anesthesia during TEE or the use of ICE significantly increases the cost of this procedure. We report our experience of PFO closure with CardioSEAL using transcatheter puncture without TEE or ICE guidance.

Methods: We report 29 consecutive patients (men 18, age 52±13, ejection fraction 60±3%) with cerebral embolic event and associated PFO treated with percutaneous CardioSEAL placement using the transeptal approach. Previous data from 33 consecutive patients using TEE or ICE guidance for PFO closure was used as a control group.

Results: The CardioSEAL device was used in all patients. Procedural success was defined as successful placement of the device. Follow-up transhoracic echocardiography (TTE) with bubble study at 3 month was performed in all but one patient. Results: Twenty-eight patients in the transeptal group presented to penetrate the dissection membrane. A procedural success (>25% residual stenosis) could be achieved in all cases after predilatation and stenting of the occlusion with self-expanding nitinol stents. Conclusion: The CrossPoint device is an effective and safe tool to facilitate true lumen re-entry during recanalization of total superficial femoral artery occlusions.

Percutaneous Left Atrial Appendage Transcatheter Occlusion (PLAATO™) to Prevent Stroke in Patients With Atrial Fibrillation: Interim Results of the Multicenter Feasibility Trial

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Background: In order to prevent stroke in patients with AF and additional risk factors who are suboptimal candidates for warfarine therapy, 103 persons have been enrolled in the PLAATO™ Multicenter Trial so far (average age 71±7, 43-90 years; M/ F= 63/ 40). Transeptal occlusion transseptal puncture without additional risks and cost. A large randomized trial and follow-up is needed to determine if a blind transcatheter technique is comparable to echo guided techniques.

NEW IMAGING MODALITIES FOR CORONARY ARTERY DISEASE

In Vivo Macrovascular Imaging of Acute Coronary Syndromes With Intravascular Optical Coherence Tomography

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Background: Atherosclerotic macrophage infiltration is a hallmark of coronary plaque instability. Optical coherence tomography (OCT) is capable of imaging macrophages within atherosclerotic plaque allowing quantitative and qualitative evaluation of coronary inflammation.

Aim: To establish the pattern of macrophage infiltration in ST elevation myocardial infarction (STEMI) and other forms of acute coronary syndromes (ACS).

Methods & Results: We performed OCT at culprit sites and remote lesions in 38 patients (19 STEMI, 19 ACS). A total of 95 lipid-rich plaques were analyzed. Macrophage density was calculated as the normalized standard deviation (NSD) of the optical signal within the superficial 50 microns of the fibrous cap. Macrophage heterogeneity was calculated as the variance of the NSD. There was no significant difference in the macrophage density for STEMI and ACS groups (5.59 ± 1.70 %, 5.95 ± 1.88 %, P = NS). However, macrophage heterogeneity was higher in the ACS group compared to the STEMI group (1.68 ± 0.61 %, 2.1 ± 0.75 %, P = 0.002). Conclusion: Although the superficial macrophage density is similar for both STEMI and ACS, the pattern of macrophage infiltration varies significantly with a greater heterogeneity found in the ACS group.

Figure (A) OCT image of a lipid-rich plaque (LP) adjacent to a site of intimal disruption (arrow). Scale bar = 500 µm, * represents guide wire shadow. (B) NSD image corresponding to (A) demonstrating sites of high macrophage density (green to red).

VIRTUAL HISTOLOGY OF INTRAVASCULAR ULTRASOUND IMAGES: FEASIBILITY AND CLINICAL CORRELATIONS IN HUMANS


Virtual histology (VH, Volcano Therapeutics) uses spectral analysis of backscattered intravascular ultrasound (IVUS) to classify plaque elements as calcium, fibrotic, fibrofatty, or lipid core. Algorithms have been derived and validated in vitro. We report the first in vivo studies (68 native arteries in 50 pts). ECG-gated, motorized pullback IVUS images are analyzed. External elastic membrane (EEM) and lumen borders are identified by automatic edge detection; plaque/media is “separated” into its components. Results: The length analyzed was 44±16 frames (2.4±0.6 frames/mm). Total segment (lesion reference) EEM volume was 593±317 mm³, lumen was 256±159 mm³, plaque & media was 28±17 mm³, and %obstruction was 51±8%; calcium was 2±3%; fibroblastic plaque 31±14%, fibrofatty plaque 14±16%, and lipid core 12±8% of total plaque & media volume. When compared to histopathological analysis, %total segment calcium was greater in stable to be 5.3 % on the average (1.9 %–18.2 %). Two patients whose LAA was occluded suffered from a stroke six month after implantation of the device. The annual stroke rate of PLAATO™ patients was therefore calculated to be 2.9 % on the average. In one case, there was no relation to the device or the implantation, in the other, the relation is unknown.

Conclusions: As far as the interim follow up results show, transcatheter occlusion of the LAA with the PLAATO™ device is not only a safe method, but seems to reduce the risk of stroke in patients with AF.