Vascular Interventions: Cerebrovascular/Carotid Interventions

Abstract No. 257

Carotid Artery Stenting without the Use of Balloon Angioplasty and Cerebral Protection Devices.
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PURPOSE: Embolic stroke represents the main complication during carotid artery angioplasty. The aim of this study is to evaluate whether stenting alone is sufficient to dilate carotid stenoses without performing pre and post balloon dilatation, and whether this technique can reduce the rate of neurological periprocedural complications.

MATERIALS AND METHODS: 192 patients with 213 symptomatic carotid stenoses and/or with high risk morphology plaques of > 50% and asymptomatic of > 70%, were prospectively identified. Patients underwent neurological evaluation previous to the procedure and during follow up at 1, 3, 6, 12 months and annually thereafter. Carotid ultrasound and plain films of the neck were performed immediately after the procedure and then at the same time intervals.

RESULTS: Primary stenting was successful in 209/213 (98,12 %) cases. In 4 cases predilatation was necessary prior to stent deployment; in 1 case the procedure failed. Neurological periprocedural complications within 30 days, included 3 (1,4%) non disabling, 1 (0,46%) disabling strokes and 11 (5,1%) transient ischemic attacks and 3 (1,4%) deaths. The mean duration of follow-up was 32 months (range 2-62 months). During the follow-up period there were 8 additional deaths (7 unrelated to the carotid disease, and 1 strokes related) and 2 strokes. Degree of stenosis decreased from a mean of 79% before the procedure, to a mean of 33% immediately after.

CONCLUSION: Carotid stenting without balloon dilation is effective and safe with a low incidence of periprocedural complications. Most stents expands alone over time.

Abstract No. 258

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PURPOSE: Show feasibility of MR-guided real-time catheterization of carotid arteries in an aortic phantom using the MR-compatible polyetheretherketone-based (PEEK) guidewire.

MATERIALS AND METHODS: A novel design 0.035" PEEK-based guidewire (Biotronik, Vascular Intervention, Büllach, Switzerland) was used. Equipped with small paramagnetic ring-markers at the tip for passive visualization, this guidewire had a soft tip and a hydrophilic coating (Mekle et al. 2006, J Magn Res Med, 23:145-55). Unlike standard guidewires (e.g. nitinol) PEEK does not bear the risk of rapid heating. The aortic silicon phantom (Elastrat, Geneva, Switzerland) had an aortic arch with normal supraventricular vessels. Through a 6 F transfemoral access we advanced the guidewire into the ascending aorta. Over the wire an either passively visualized vertebral catheter (5 French) was placed in the ascending aorta. Selective catheterization of the brachiocephalic trunci, the right and left carotid artery were performed by simultaneous use of catheter and guidewire. Experiments were conducted in an open-bore 1.5 Tesla scanner (Espree, Siemens, Germany) using surface coils and a True-FISP sequence (TR 5.3ms; TE 5.2ms; slab thickness 10.0 mm, FoV=200 mm x 150 mm, phase resolution 85%, in-plane resolution 0.8 x 1.0 mm, Flip Angle 80°). Real-time images were displayed on in-room monitor with a frame rate of 1/s. We evaluated success rates of a) guidewire guidance into the ascending aorta, b) catheter configuration, c) selective artery catheterization and d) catheter guidance over the wire. Procedure times and guidewire visibility (+ + + + +) were assessed.

RESULTS: Guidewire guidance into the ascending aorta (100%), catheter guidance (100%) and selective carotid artery catheterization (100%) were successful in all attempts (10/10) on both sides. Mean procedure time was 4 minutes. The marked PEEK guidewire offered excellent visibility (+ + + + +) and steerability. No signs of device heating occurred.

CONCLUSION: The PEEK-based guidewire does not bear the risk of rapid heating in strong magnetic fields, but still provides excellent mechanic properties. This guidewire enables selective catheterization of the carotid arteries.

Abstract No. 259

Carotid Artery Stenting, the First 100 Patients with Zero Complication Rate: How Can We Improve Our Learning Curve.
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PURPOSE: Carotid artery stenting (CAS) is used for stroke prevention in high-risk patients. Stroke, myocardial infarction, and death are known periprocedure complications. The use of cerebral protection devices and careful technique may prevent most complications. We would like to present our experience with CAS and the importance of the learning curve.

MATERIALS AND METHODS: Between January 2005 and September 2007, CAS was performed in 100 consecutive (80 males, 20 females, mean age, 70 Yrs) symptomatic (72%) or asymptomatic (28%) patients with severe carotid artery stenosis (> 70 %). De novo lesions were present in 60 pts, restenosis in 36 pts and radiation induced stenosis in 4 patients. Xact, Precise and Acculink stents were used. Cerebral protection devices were used, including Emboshield, Accunet, SpideRx, and the Neuroprotection System with reversal of flow. All patients were evaluated by a neurologist, before, after and one month following the procedure, as part of clinical trials. The experience acquired in the performance of the procedures was constantly reviewed and the methodology adjusted as needed. Careful indication analysis (plaque tissue characterization, presence of symptoms, degree of stenosis), risk stratification (clinical and anatomical), selection of devices (delivery system, protection device, stent cell size), clinical and pharmacologic optimization and operator selection were performed.