

AbstractID: 13031 Title: Adjustment of angiographic time-density-curves temporal parameters for more accurate healing prediction of stent-treated aneurysms

Purpose: Immediate treatment assessment of intracranial aneurysms using flow modifying stents, can be done using comparative analysis of pre- and post-stented normalized time density curves (NTDC). Previous study showed poor correlation of the time-related NTDC parameters with the treatment outcome. A parameter normalization method to improve the NTDC parameters-treatment outcome correlation, is proposed and investigated.

Method and Materials: Elastase animal aneurysms model were treated using Asymmetric Vascular Stent prototypes. Angiograms were acquired pre- and post-treatment and after four-weeks. NTDC's parameters: time-to-peak TTP, mean-transit-time MTT and wash-out-time WOT, were measured and normalized to the corresponding quantities derived from main artery bolus TDC. Aneurysms displaying small area with contrast filling localized at the aneurysm neck were dropped from the analysis. The results are further presented in terms of pre-stented/post-stented ratios to describe the flow changes due to stent treatment. Based on a four week follow-up angiogram, a five grade scale was used to generate a "healing" grade. The correlation between the parameter ratios and healing grade was calculated using Spearman correlation factor (SCF).

Results: The pre-/post-stented ratio parameters after normalization were: TTP=0.30±0.28, MTT=0.42±0.42 and WOT=0.29±0.28. The SCF's between the time-related ratios and the healing grade before the correction were under 0.52. After corrections implementation, all SCF's were above 0.82.

Conclusion: After implementation of the proposed adjustments the measured parameters agree better with the treatment outcome, hence a better treatment assessment scale can be built for accurate aneurysm occlusion prediction. (Support: R01NS43924 and R01EB002873 and Toshiba Medical Systems Corp)