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Age-Related Intra-Pipeline Stenosis: Complication or Benign Endothelial Healing

Elias Atallah MD; Kimon Bekelis MD; Robert H. Rosenwasser MD, FACS, FAHA; Pascal Jabbour MD; Stavropoula I. Tjoumakaris MD

Thomas Jefferson University Hospital

Introduction

The use of flow diverters has not been limited to giant wide-necked Intracranial Aneurysms (IA), it stretched to address several other sets of aneurysms such as small blister, fusiform, distal IAs of the anterior and posterior circulation. Only very few studies considered addressing the rate and the characteristics of intra-pipeline stenosis (IPS). We aimed to appraise the prevalence, the predictors and outcomes of IPS and the consequent clinical implications.

Methods

We reviewed the charts of 537patients treated with PED for their IAs between 2011 and 2017. We consecutively gathered clinical and angiographic data related to Intra-Pipeline Stenosis. (IPS) was interpreted by the operating neurointerventionist: mild<50%, moderate 50-75% and severe>75%. To control confounding, we used multivariable logistic regression and propensity score conditioning.

Results

Of 537 patients, 31(15.6% were females) had an angiography perceived IPS. 8(25.8%) of our patients were >65yo. 23(74%) patients had their IPS detected at 6moths follow-up. The mean follow-up time to detect IPS was 7.2months(SD=6.33). 23(74.2%) and 8(25.8%) patients had their aneurysms located in the anterior & posterior circulation respectively. The average pipeline size was 3.8x19.4mm. Six patients had an IPS located, at the proximal (n=3) and distal end (n=3) of the pipeline, 25 patients had IPS somewhere along the body of the pipeline. 20/31 patients had mild IPS, 5/31 had moderate IPS and 6/31 had severe IPS. Regression of IPS was perceived in 9/31 patient. IPS progression was noted in one patient from 70% to 90%. 4(12%) patients had >90% IPS, all were symptomatic: 3 had a right hemispheric stroke and 1 patient precipitated an intra-cerebral hemorrhage. In multivariable logistic regression, patients of older age (>65yo) were less likely to develop IPS (OR 0.96; CI95%, 0.92-0.99; p=0.03). Those with a history of hypertension were more prone to develop IPS (OR 3.3; CI95%, 1.11-9.84; p=0.03). Per-procedural use of balloon angioplasty, aneurysm size and ruptured aneurysm were not independent predictors of IPS.

Conclusions

Young patients <65yo and patients with hypertension are more prone to develop IPS. Balloon angioplasty does not predict IPS. IPS remains a benign development, most likely to regress than to progress into a clinically manifest stenosis.

Learning Objectives

-Intra-Pipleine Stenosis is a relatively safe phenomenon, rarely clinically manifest.

-IPS tends mostly to regress.

- IPS is an age-related phenomenon that tends to happen more frequently in young patients.