

Introduction:

Angio-architectural factors affecting early clinical and angiographic outcome after treatment of brain aneurysms using pipeline embolization device (PED) has not been fully studied.

Methods:

Aneurysm size, aspect ratio (AR), aneurysm segment tortuosity (AST), aneurysm transition (junctional vs mid-segment), aneurysm-parent artery angle (APA), and number of pipeline curvatures (after deployment) were evaluated for impact on the primary outcome measure, early stagnation. Based on the duration of contrast stagnation inside the aneurysm after deployment of the pipeline, we graded stagnation status as follows: grade 1: arterial phase, grade 2: capillary phase, grade 3: venous phase, grade 4: persistence of crescent after end of venous phase, and grade 5: complete occlusion. Effect of aneurysm segment tortuosity on intraoperative and postoperative complications was further evaluated using a Chi2 method for the categorized data analysis. A multivariate analysis was also performed to report adjusted statistical outcomes.

Results:

Forty-five patients with fifty-six aneurysm with mean age 56.25 (± 9.74) years, 84.9% females, a mean aneurysm size of 8.93 (± 6.11) mm and average aspect ratio (AR) of 1.75 (± 1.12) were included in this analysis. Larger the size of aneurysm and higher the aspect ratio were both significantly associated with higher grades of early stagnation in both crude and multivariate analysis ($p < 0.01$). On the other hand, aneurysm transition ($p = 0.892$), APA ($p = 0.513$), AST ($p = 0.337$), number of pipeline curvatures ($p = 0.592$) was not significantly associated with higher rate of early stagnation. Moreover, AST was also not significantly associated with intraoperative complications or postoperative neurological deficit ($p = 0.226$, $p = 0.259$, respectively). Mean stagnation grade significantly increased from 3.54 in early postop period to 4.33 after a mean follow up of 5.14 months (Paired t-test $p < 0.01$). However, there was no significant association between early and late stagnation grades ($p = 0.17$).

Conclusions:

Aneurysm size and aspect ratio are the only angio-architectural factors affecting the early stagnation status after treatment of brain aneurysms using flow diversion stents. Long term Follow up will be required to see if stagnation translate into continued occlusion of aneurysms.

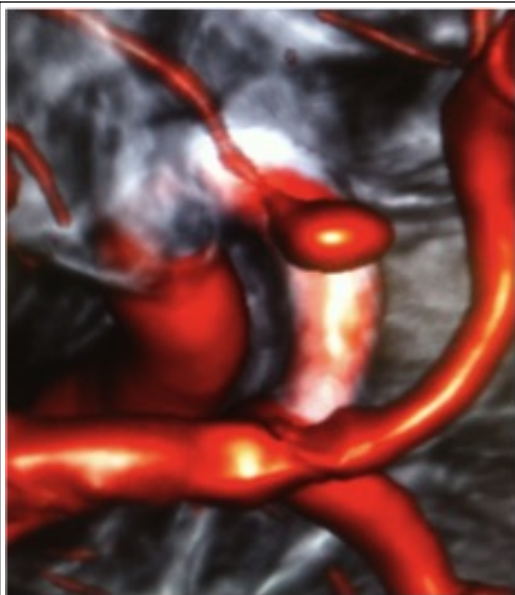
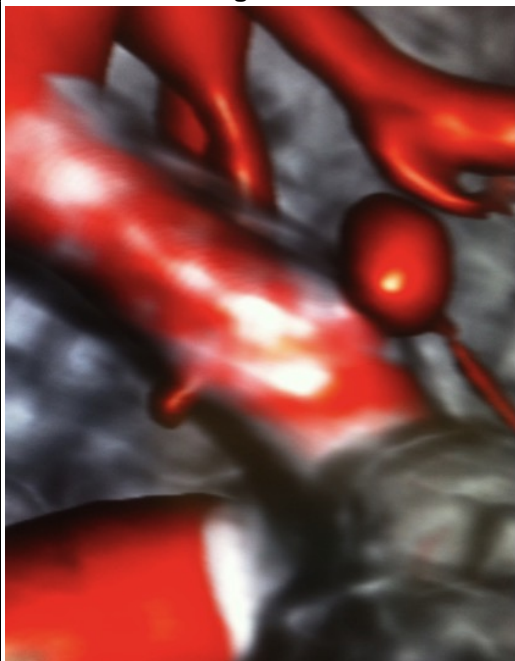


Figure 1



Dual Volume recon after Pipeline of Paraophthalmic aneurysm.

Learning Objectives:

understanding Angio-architectural factors affecting early clinical and angiographic outcome after treatment of brain aneurysms using pipeline embolization device. Also, longer follow up angiography is very important for assessment of final success rate.

References:

1.Murphy M, Bell D, Worth RD, Jehle KS, Critchley GR, Norris JS. Angiography postclipping and coiling of cerebral aneurysms. Br J Neurosurg. Jun 2005;19(3):225-228.

2.Raymond J, Guilbert F, Weill A, et al. Long-term angiographic recurrences after selective endovascular treatment of aneurysms with detachable coils. Stroke. Jun 2003;34(6):1398-1403.

3.Gallas S, Pasco A, Cottier JP, et al. A multicenter study of 705 ruptured intracranial aneurysms treated with Guglielmi detachable coils. AJNR Am J Neuroradiol. Aug 2005;26(7):1723-1731.

4.Li MH, Gao BL, Fang C, et al. Angiographic follow-up of cerebral aneurysms treated with Guglielmi detachable coils: an analysis of 162 cases with 173 aneurysms. AJNR Am J Neuroradiol. May 2006;27(5):1107-1112.