Intraarterial and Intravenous Abciximab for Management of Acute in-Situ Thrombosis During Pipeline Flow Diversion of Intracranial Aneurysms

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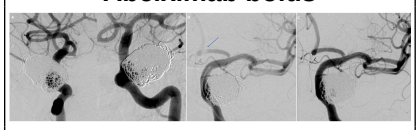
Introduction

Flow diversion is an effective and increasingly accepted method for endovascular treatment of cerebral aneurysms. Acute in-situ thrombosis during Pipeline embolization device (PED) deployment has potential for devastating morbidity. There is limited experience in the flow diversion literature on the usage of Abciximab (ReoPro).

Methods

Data were collected retrospectively on patients who encountered in-situ thrombosis during Pipeline flow diversion of intracranial aneurysms. Data collected include aneurysms characteristics, Abciximab dosing and administration regimen, and clinical/radiographical follow-up.

Figure 1 . Complete recanalization of in situ thrombosis after 5mg IA Abciximab bolus



A) 20 mm giant left cavernous ICA aneurysm with previous Neuroform stent assisted coil embolization and recurrence. B) Post deployment of the third PED, there is filling defect at the left A1 orifice and left A1/2 junction (arrow). C) 5mg IA ReoPro administered with complete recanalization

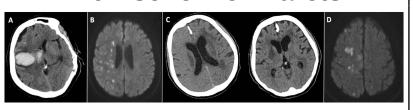
Results

Twenty-five patients (mean age 56 years; range 36-75 years) with 26 unruptured aneurysms (mean size 8.7 mm; range 2-25 mm) were identified to have in-situ thrombosis during PED deployment. Intraarterial (IA) ReoPro was administered in all cases, with 15 patients receiving increments of 5mg boluses and 10 patients receiving 0.125mg/kg bolus. Immediate or partial resolution of in-situ thrombosis was observed in 100% of the patients. Intravenous (IV) ReoPro infusion was administered post-procedurally in 18 patients. 19 patients were transitioned to Prasugrel (Effient) from Clopidogrel (Plavix) post procedurally. Average length of stay was 4.5 days (range 1-30 days), with 21/26 (81%) patients discharged to home. Intracranial hemorrhage was noted in 2 patients (8%). At six-months clinical follow up, 20/25 (80%) patients had mRS of 0. Angiographic follow up was available for 18 patients at a mean duration of 9.6 months, at which time aneurysm occlusion rate was 94% (16/17 patients).

Conclusions

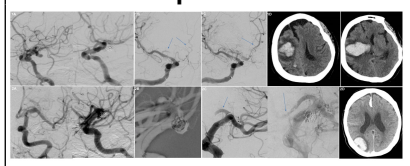
IA and IV ReoPro administration is a effective and safe strategy for the management of acute in-situ thrombosis during PED, with high rates of immediate thrombosis resolution and relatively low rates of hemorrhagic complications and long term morbidity.

Figure 2. Radiographic presentation of four patients with ischemic infarcts



A) Right caudate ischemia and hemorrhagic conversion. B) Scattered infarcts right ACA/MCA subcortical and watershed regions. C) R hemispheric diffuse cerebral edema on POD1 (left), which subsequently improved by POD3 but with a new right basal ganglia infarct. D) R ACA cortical and subcortical scattered infarcts.

Figure 3. Radiographic presentation of two patients with hemorrhagic complications



1A) 5mm PCOM aneurysm before (L) and after (R) coiling. 1B) Thrombus with flow limitation in the right ACA (arrows). 1C) Post ReoPro angio with complete recanalization of the right ACA. 1D) HCT showing multifocal ICH. 2A) Persistent filling of a previously coiled 4mm PCOM aneurysm. 2B) Balloon angioplasty for small segment wall mal-apposition. 2C) In situ thrombosis with partial recanalization after 10mg IA ReoPro (arrows). 2D) HCT showing a right occipital ICH

Learning Objectives

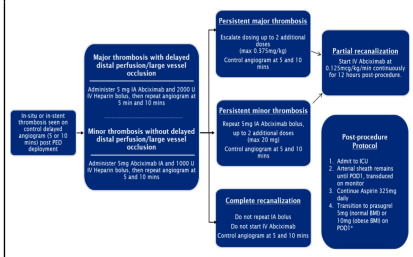
To discuss the use of Abciximab for in-situ thrombosis during flow diversion

References

1. Kallmes, D. F. et al. International retrospective study of the pipeline embolization device: a multicenter

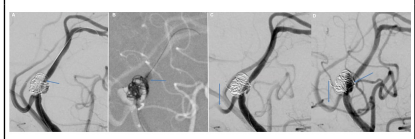
2. Patel, A., Miller, T. R., Shivashankar, R., Jindal, G. & Gandhi, D. Early angiographic signs of acute thrombus formation following cerebral aneurysm treatment with the Pipeline embolization device. J Neurointerv Surg, doi:10.1136/neurintsurg-2016-012701 (2016).

Figure 5. Proposed protocol for the use of IA and IV Abciximab as rescue therapy for in-situ thrombosis



*Relative contraindications to Effient or Brilinta include: insurance/logistical/cost issues, persistently low PRU pre-op and post op, and/or other medical comorbidities such as active bleeding, liver cirrhosis, ESRD, or coagulopathy.

Figure 4. Incomplete recanalization after 20mg IA Abciximab bolus necessitating IV infusion



A) Platelet plug causing partial occlusion of the pericallosal artery. B) Balloon angioplasty. C) Recurrence of plug within the callosal marginal artery. D) Near complete recanalization of both pericallosal and callosal marginal arteries after 20 mg IA ReoPro. IV ReoPro infusion was initiated at 0.125mcg/kg/min.