Solitaire Flow Restoration Device

The Solitaire Flow Restoration Device was approved by the FDA in 2012 for mechanical thrombectomy of proximal occlusion of intracranial arteries.

The Solitaire stent retriever registry showed improved reperfusion, faster procedure times, and better outcome in acute stroke patients with large vessel occlusion treated with a balloon guide catheter (BGC) and Solitaire stent retriever compared with a conventional guide catheter.

The Solitaire™ Platinum revascularization device, featuring Parametric™ design, a unique overlapping stent retriever-based technology, restores blood flow and retrieves clots from occluded blood vessels in the brain for patients experiencing acute ischemic stroke (AIS) due to a large vessel occlusion (LVO).

In fact, the Solitaire device is indicated to reduce stroke-related disability by showing nearly 70% relative improvement in functional outcomes at 90 days in patients suffering LVO.

The system allows faster, safer, and more efficient thrombectomy than Merci or Penumbra systems [1)].

Case series

Eighty-nine patients treated with the Solitaire Flow Restoration Revascularization device (ev3/Covidien Vascular Therapies, Irvine, California) were retrospectively analyzed. Three endpoints were considered: revascularization (Thrombolysis In Cerebral Infarction), outcome (modified Rankin Scale), and complications. Univariate analysis and multivariate logistic regression were conducted to determine significant predictors.

The mean time from onset of symptoms to the start of intervention was 6.7 hours. The average procedure length was 58 minutes. The mean NIH Stroke Scale (NIHSS) score was 16 on arrival and 8 at discharge. Of the patients, 6.7% had a symptomatic intracerebral hemorrhage, 16.8% had fatal outcomes within 3 months post-intervention, and 81.4% had a successful recanalization. Thrombus location in the M1 segment of the middle cerebral artery was associated with successful recanalization (thrombolysis in cerebral infarction 2b/3) (P = .003). Of the patients, 56.6% had a favorable outcome (modified Rankin Scale score at 3 months: 0-2). In patients younger than 80 years of age, 66.7% had favorable outcome. Increasing age (P = .01) and NIHSS score (P = .002) were significant predictors of a poor outcome. On multivariate analysis, NIHSS score on admission (P = .05) was a predictor of complications. On univariate analysis, increasing NIHSS score from admission to 24 hours after the procedure (P = .05) and then to discharge (P = .04) was a predictor of complications. Thrombus location in the posterior circulation (P = .04) and increasing NIHSS score (P = .04) predicted mortality.

The Solitaire device is safe and effective in achieving successful recanalization after acute ischemic stroke. Important factors to consider include age, NIHSS score, and location [2)].

Case reports

A study aimed to report the retrograde technique of horizontal stenting through the PCoA using a

Solitaire AB stent.

A self-expandable stent was deployed from one posterior cerebral artery to the opposite, across the neck of a ruptured wide-neck basilar apex aneurysm.

The technique allowed successful aneurysm embolization with coils in a 53-year-old woman.

Different from clipping, where the fetal-type PCoA may pose an obstacle, in endovascular treatment, the Solitaire AB stent provides an alternative route to the aneurysm. It is easy to navigate, being fully retrievable and repositionable, which enables accurate deployment [3].

1)
Hann S, Chalouhi N, Starke R, Gandhe A, Koltz M, Theofanis T, Jabbour P, Gonzalez LF, Rosenwasser R, Tjoumakaris S. Comparison of Neurologic and Radiographic Outcomes with Solitaire versus Merci/Penumbra Systems for Acute Stroke Intervention. Biomed Res Int. 2013;2013:715170. doi: 10.1155/2013/715170. Epub 2013 Dec 30. PubMed PMID: 24490169.
2)
Daou B, Chalouhi N, Starke RM, Dalyai R, Hentschel K, Jabbour P, Rosenwasser R, Tjoumakaris SI. Predictors of Outcome, Complications, and Recanalization of the Solitaire Device: A Study of 89 Cases. Neurosurgery. 2015 Sep;77(3):355-61. doi: 10.1227/NEU.0000000000000830. PubMed PMID: 26075308.
3)
Demartini Z Jr, Alencar G, Koppe GL, DE Oliveira TV, Francisco AN, Gatto LA. Solitaire AB stent deployment for treatment of basilar apex aneurysm via the posterior communicating artery. Turk Neurosurg. 2021 Aug 12. doi: 10.5137/1019-5149.JTN.34847-21.3. Epub ahead of print. PMID: 35253150.