Delayed Migration of a Self-Expanding Intracranial Microstent

SUMMARY: A 43-year-old patient with a basilar apex aneurysm had a 4.5-mm × 14-mm Enterprise stent placed from the midbasilar artery to the left P1 segment of the posterior cerebral artery. The patient experienced vertigo 4 months after stent placement and 1 week after stopping clopidogrel. At 5 months postembolization, angiography showed stent migration into the proximal basilar artery. This is the first described case of the spontaneous delayed migration of a self-expanding intracranial microstent.

Discussion

This case report represents the first published case of the delayed migration of a self-expanding intracranial stent used for the embolization of an intracranial aneurysm. Spontaneous migration of the stent occurred some time between the control angiogram performed at the conclusion of the procedure and the 5-month follow-up. The presence of symptoms 4 months after treatment suggests that the migration occurred at or before this time. The correlation of the neurologic symptoms with the discontinuation of clopidogrel can be attributed to the unopposed distal aspect of the migrated stent within the basilar apex, which very likely requires a longer period to become "passivated” (ie, nonthrombogenic) or endothelialized.

Self-expanding stents are delicate devices that are maintained in position within the cerebral vasculature by relatively low-level chronic outward radial forces. These stents are easily inadvertently displaced in the context of aneurysm embolization when attempts are made to manipulate other devices (eg, microcatheters, balloons, additional stent delivery systems) through or beyond them. For this reason, some operators prefer to either perform staged procedures, where embolization is performed at some interval after stent implantation to allow for “endothelialization” to occur, or to place the stent at the conclusion of the coiling procedure to minimize the amount of trans-stent manipulation.

At our institution, more than 200 Neuroform (Boston Scientific, Freemont, Calif) stents have been placed since 2003, and we have never observed a case of delayed spontaneous stent migration. In addition, no cases of spontaneous Neuroform migration have been reported in the literature. The closed-cell Enterprise (Cordis) stent is structurally different from Neuroform, which has an open-cell design. As such, forces exerted on 1 segment of the Enterprise are transmitted directly to the entire device. In our present case, the differential sizes of the PCA and basilar artery caused the distal aspect of the stent to be constrained to a greater degree than the proximal portion. We hypothesize that this differential constraint may have transferred a constant retrograde force to the stent, which ultimately caused it to “watermelon seed” backward into the basilar artery. Placement of the distal aspect of this stent into an artery measuring slightly less than 2 mm may have contributed to the proximal migration of this device. In a vessel of this size, the capacity of the “flared” distal segment of the Enterprise to engage the parent artery and adequately sta-
bilize the stent may have been limited. We urge caution when deploying the Enterprise device in similar anatomic configurations.

References


