Are WEB Devices Cost-effective for Cerebral Aneurysm Repair?

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Introduction

- Woven EndoBridge (WEB) Devices are a recent tool in endovascular cerebral aneurysm repair, proposed as a replacement for Stent-Assisted Coiling (SAC).
- Still a new technology, they were FDA approved in 2019
- WEB devices are ~$15K per device, leading to questions about the cost effectiveness. (Stents cost anywhere from 7K-13K, and coils cost ~2K-5K per, but typically use multiples.)

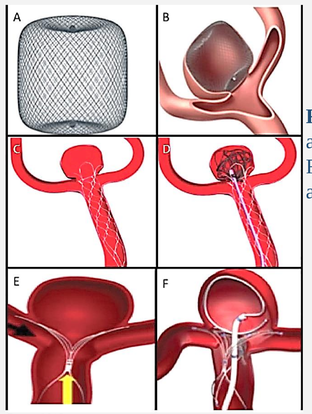

Figure 1: WEB device (A,B) and Stent-Assisted Coiling (C-F) for wide-necked bifurcation aneurysms.

Gupta, 2018

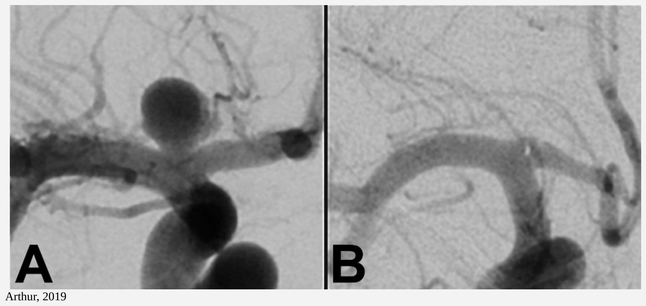

Figure 2: WEB Treatment of Carotid Terminus Aneurysm (A) and 1 year follow-up (B).

Arthur, 2019

Methods

- Compare Cost-effectiveness of WEB treatment to Stent-Assisted Coiling (SAC) for endovascular cerebral aneurysm repair in UC patients with saccular cerebral aneurysms.
- Some categories of interest are hospital stay, recurrence rates, total costs of procedure.
- Multicenter design to increase sample size. Collaboration with other UC centers who are also using these devices.
- Attempt to closely match WEB and SAC cases for size and rupture status.

Results

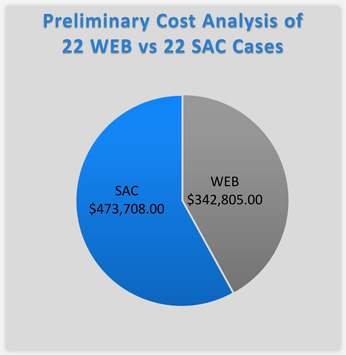

Figure 3: Preliminary Cost Comparison of 22 WEB Device Cases vs 22 similar Stent-Assisted Coiling Cases (SAC).

	WEB Devices Opened	WEB Devices Installed
Total Number	34	22
Total Cost	~$528,836.00	$302,805.00

Table 1: WEB Devices Opened vs Installed for 22 Cases

Note: Current 'fail rate' of WEB device insertion **(Table 2)** is approximately 35%, meaning that if the institution was charged for all opened devices, a 75% increase in treatment cost would be expected (**Fig. 4**).

- It is likely that in the future, the manufacturer will charge for any WEB devices that are opened, significantly impacting costs.

- Preliminary analysis of raw data *appears* to be comparable in cost between the two groups (**Fig. 3**), however, when 'failure rate' of WEB device placement (instances where multiple devices need to be opened, but not implanted) is accounted for (**Fig. 4**), **the results are not as clear**.
- There is some concern that other variables pending further analysis may equalize the cost in figure 3.

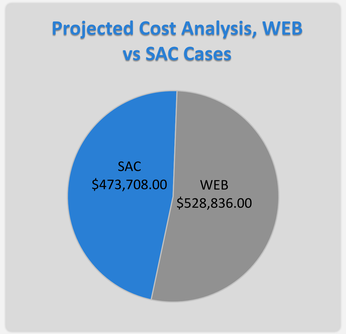

Figure 4: Projected Cost Comparison of 22 WEB Device Cases vs 22 similar Stent-Assisted Coiling Cases (SAC).

WEB implanted	WEB failed	Approx. Success Rate	Approx. Fail Rate
22	12	65%	35%

Table 2: Current device placement success/fail rate for 22 WEB Cases

Note (Table 2): This *does not* reflect WEB cases that were converted to SAC, since the 22 examples here were all ultimately successful implants. Conversion rate will be covered later in this study.

	WEB Group	SAC Group
Avg. Aneurysm Diameter	6.84 mm	6.03 mm
Avg. Neck diameter	3.60 mm	3.39 mm
# Ruptured	N=4	N=7
Most common location	Anterior Comm. a. (n=6)	Basilar (n=7)
Avg. Room Time	208 min.	195 min.
Avg. Radiation dose (mGy)	4710	4424
Avg. Fluoro Time	48.7 min	53.6 min
Sex M/F	6/16	5/17
Avg. age	59	59

Table 3: Group characteristics for 22 WEB and 22 SAC Cases

Discussion

- Cost-effectiveness of WEB devices is highly contingent on the vendor's billing policy, as well as a theoretical decrease in 'fail rate' over time.
- Potential improvements in cost of care for certain cerebral aneurysms could reduce the burden on our institutions.
- WEB usage is promising in terms of favorable outcomes, if they are found to be more cost effective, it would make their use realistically applicable and generalizable to other institutions.
- Further studies are necessary in order to determine the superior treatment in terms of patient outcomes.

References

Arthur AS, Molyneux A, Coon AL for the WEB-IT Study investigators, et alThe safety and effectiveness of the Woven EndoBridge (WEB) system for the treatment of wide-necked bifurcation aneurysms: final 12-month results of the pivotal WEB Intrasaccular Therapy (WEB-IT) StudyJournal of NeuroInterventional Surgery 2019;11:924-930.

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