

Single Patient Multimodality Treatment for Cerebral Aneurysms: Single Center Eleven Year Experience

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Introduction

Endovascular and surgical techniques are recognized options for aneurysm treatment. Both modalities employed in tandem on single patients are efficacious, achieving durable aneurysm occlusion(s) and good patient outcomes. Indications, sequencing rationale and categorization for single patient multimodality treatment are reviewed.

Methods

Aneurysms treated from 2004 through 2014 were reviewed. Patients were included in our analysis when endovascular and surgical modalities were used on single patients. Endovascular treatment included: coiling, balloon-assisted coiling, stenting, or parent vessel occlusion (PVO). Angioplasty was excluded. Surgical treatments included: clipping, attempted clipping, decompressive craniectomy, and bypass. EVDs and shunts were excluded. Demographics, presentation data, locations, size, treatment sequencing, and outcomes were assessed.

Results

1493 aneurysms were treated between 2004-2014. 30 patients met the definition criteria and were available for final analysis. Mean age was 54.3. 70% were females. 70% had SAH. Categorization was as follows (table-1): 17 had clipping and coiling (CL+CO), 5 had clipping and stenting (CL+ST), two had bypass and endovascular parent vessel occlusion (PVO) (BY+PVO), two had decompressive craniectomy and coiling, one had attempted clipping then stenting, one had decompressive craniectomy followed by PVO, and two had bypass followed by stenting.

The CL+CO group was divided into four categories (Table-2): initial clipping followed by coiling of a different aneurysm (CL-CO-Multiple, 6 patients), initial coiling with clipping of a different aneurysm (CO-CL-Multiple, 4 patients), clipping followed by coiling of residual/recanalized aneurysm (CL-CO-Single 4 patients), and coiling followed by clipping for residual/ recanalized aneurysm (CO-CL-Single, 3 patients). All stenting patients had surgical intervention prior to stenting. GOS was CL-CO-Multiple: 4.17, CO-CL-Multiple: 5, CL-CO-Single: 3, CO-CL-Single: 5. Stenting patients had a GOS of 4.8. Bypass patients had GOS of 4. There were 3 mortalities.

Illustrated Cases:

Fig-1 and Fig-2

Conclusions

Single patient multimodality aneurysm treatment is a safe and effective paradigm for treating patients with multiple or complex aneurysms. With appropriate patient selection and treatment sequencing, good outcomes are achieved.

Table-1

Table-1: Categorization/Quantification of All Single Patient Multimodality Treatments for Cerebral Aneurysms (GOS)

Surgery	Clipping	Attempted Clipping	Decompressive Craniectomy	Bypass	Total
Endovascular					
Coiling	17 (4.23)	0	2 (2)	0	19 (4.0)
Stenting	5 (5)	1 (5)	0	2 (4.5)	8 (4.88)
Occlusion	0	0	1 (3)	2 (3.5)	3 (3.33)
Total	22 (4.41)	1 (5)	3 (2.33)	4 (4)	30 (4.17)

Table-2

Table-2: Clipping and Coiling (CL+CO) Categorization

Categories	Number of Patients	Mean GOS
Clipping followed by coiling of a different aneurysm (CL-CO-Multiple)	6	4.17
Coiling followed by clipping of a different aneurysm (CO-CL-Multiple)	4	5
Clipping followed by coiling of residual/recanalized aneurysm (CL-CO-Single)	4	3
Coiling followed by clipping for residual/ recanalized aneurysm (CO-CL-Single)	3	5
Total	17	4.23

Fig-1



64 female present with right third nerve palsy. She underwent clipping of right PCOM and right Ant. Choroidal, then Pipeline stent for left ophthalmic aneurysm.

Fig-2



74 year-old female, present with failure to thrive due to 5 cm ICA bifurcation aneurysm. She underwent right EC-ICA bypass and M1 occlusion. Then, she underwent stent assisted coiling, with the stent passed from ICA to A1.