

Factors that Predict Poor Outcome after Treatment of Un-ruptured Anterior Communicating Artery Aneurysms

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Background

Management strategies for un-ruptured anterior communicating artery (ACOM) aneurysms are variable. Depending on various factors, the aneurysm could be monitored untreated or treated surgically. When treatment is opted for, various pre-operative and peri-operative factors are thought to affect the outcome, but no measure exists for which of these factors contribute most to a poor post-treatment outcome.

Objective

The objective of this study was to identify demographical information, presentation indices, and clinical information that could help predict poor patient outcome after undergoing treatment for an un-ruptured ACOM aneurysm.

Methods

The study was performed as a retrospective review of 139 patients with un-ruptured ACOM aneurysms, from 2007 to 2012, who underwent either microsurgical clipping or endovascular coiling to treat the aneurysm. Demographics, medical history, presenting clinical condition, and health outcomes were analyzed. The outcome of the treatment was quantified using the Glasgow Outcome Score. A score of 3 or greater at discharge was considered a poor outcome whereas a score of less than 3 was considered a favorable outcome. Multivariate regression analysis was used to identify significant predictors of poor

Characteristics of Patients with Un-ruptured Anterior Communicating Artery Aneurysms (2007-2012)			
	Total in Population (%)	Total in Patients with GOS _{discharge} < 3 (%)	Total in Patients with GOS _{discharge} of ≥ 3 (%)
Gender			
Male	60 (43.17%)	51 (43.97%)	9 (39.13%)
Female	79 (56.83%)	93 (56.03%)	14 (60.87%)
Mean Age	59.22 years	58.84 years	61.13 years
Age > 70	25 (17.99%)	18 (15.52%)*	7 (30.43%)
Hypertension	94 (67.73%)	76 (65.52%)	18 (78.26%)
Smoking (Current)	43 (30.93%)	33 (28.45%)*	10 (43.48%)
Smoking (Remote)	59 (42.45%)	52 (44.83%)	7 (30.43%)
Smoking (Never)	37 (26.62%)	31 (26.72%)	6 (26.09%)
Mean Aneurysm Size	6.77 cm	6.23 cm	9.52 cm
Giant Aneurysm (≥ 20mm)	11 (7.91%)	7 (6.03%)*	4 (17.39%)
Type of Treatment Performed			
Microsurgery	94 (67.63%)	74 (63.79%)*	20 (86.96%)
Endovascular	46 (32.37%)	43 (36.21%)*	3 (13.04%)
Prior Brain Injury	58 (41.73%)	44 (38.39%)*	14 (60.87%)
Peri-Operative Complications	11 (7.91%)	6 (5.36%)	5 (21.74%)
Mean Time of Temporary Occlusion	13.23 min	6.87 min*	36.33 min

Table 1: Total population of 139 patients, 116 of them received a GOS < 3 at discharge and 23 received a GOS 3 at discharge. The * indicates factors that differed significantly between patients that received GOS_{discharge} < 3 and those that received GOS_{discharge} 3.

Results

A favorable outcome at discharge was achieved in 116 of the 139 total patients (83.45%). The remaining 23 patients had poor outcomes. Multivariate analysis identified patient age greater than 70 (p < 0.005), a history of prior brain injury or surgery (p < 0.005), current, but not previous, smoking (p < 0.05), giant aneurysms of a size greater than 20mm (p < 0.05), a duration of temporary occlusion greater than 20 mintues (p < 0.001), and the use of microsurgical clipping (p < 0.005), as significant predictors of poor outcome. Also, the types of deficits that most commonly occurred subsequent to treatment of ACOM aneurysms were analyzed. This yielded the result that the most common type of deficit resulting from an ACOM aneurysm was cognitive (39.13%), followed by motor (26.07%). An additional point of note is that all patients who suffered from post-operative cognitive deficits underwent microsurgical treatment, and not endovascular treatment.

Conclusion

Age over 70, prior history of brain injury, current smoking, and an aneurysm size greater than 20mm, along with the use of clipping, and a duration of temporary occlusion greater than 20 minutes are the strongest predictors of a poor outcome from treatment of unruptured ACOM aneurysms. In addition, patients who are treated for unruptured ACOM aneurysms are more at risk for cognitive defects than any other type of defect. This would indicate that treatment should be reconsidered in patients with any of the above risk factors, and coiling should be attempted whenever possible to minimize the risk of cognitive