

Readmissions After Clipping of Unruptured Intracranial Aneurysms: A Study of 410 Patients

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Introduction

Despite the low risk of hemorrhage from unruptured intracranial aneurysms (UIAs), the devastating outcome of rupture often prompts elective treatments such as surgical clipping. While studies analyzing Medicare data found that rates of 30-day-readmissions have declined over time, there remains a lack of data characterizing the general population. Furthermore, excessive readmissions compromise patient outcomes and satisfaction and present additional cost to hospital systems. This study identifies risk factors for readmission in the general patient population following surgical clipping of un-ruptured intracranial aneurysms.

Methods

The National Readmission Database, a subset of the Healthcare Cost and Utilization Project, was queried to identify all patients who underwent clipping of a UIA for the 2013 calendar year. Patients were then grouped by their readmission status: No Readmission, Unplanned 30-Day Readmission, and Planned Readmission. Patients in the Planned Readmissions group were excluded. Patient characteristics, comorbidities, hospital characteristics, and discharge dispositions were collected for each patient. The primary outcome was the relationship between unplanned 30-day readmission rate and associated factors.

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Recognize pre-operative risk factors for readmission in patients undergoing surgical clipping for intracranial aneurysms.

Comorbidity by Readmission				
Comorbidity	No readmission (N=371)	Unplanned 30-Day (N=39)	Total (N=410)	p-value
Deficiency Anemias	23 (6.2%)	5 (12.8%)	28 (6.8%)	0.1189
Congestive Heart Failure	5 (1.3%)	3 (7.7%)	8 (2.0%)	0.0319*
Chronic Pulmonary Disease	77 (20.8%)	7 (17.9%)	84 (20.5%)	0.6796
Depression	67 (18.1%)	7 (17.9%)	74 (18.0%)	0.9864
Diabetes, Uncomplicated	38 (10.2%)	7 (17.9%)	45 (11.0%)	0.1431
Hypertension	232 (62.5%)	25 (64.1%)	257 (62.7%)	0.8472
Fluid and Electrolyte Disorders	43 (11.6%)	2 (5.1%)	45 (11.0%)	0.2884
Obesity	33 (8.9%)	6 (15.4%)	39 (9.5%)	0.1888
Pulmonary Circulation Disorders	1 (0.3%)	2 (5.1%)	3 (0.7%)	0.0249**
Renal failure	6 (1.6%)	4 (10.3%)	10 (2.4%)	0.0097**

Demographics by Readmission				
	No Readmission (N=371)	Unplanned 30-Day Readmission (N=39)	Total (N=410)	p-value
Age				0.4225
Mean (SD)	55.8 (11.1)	57.3 (12.3)	56.0 (11.2)	
Median	57.0	58.0	57.0	
Q1, Q3	49.0, 63.0	51.0, 66.0	49.0, 64.0	
Range	(21.0-85.0)	(30.0-90.0)	(21.0-90.0)	
Sex				0.8989
Male	89 (24.0%)	9 (23.1%)	98 (23.9%)	
Female	282 (76.0%)	30 (76.9%)	312 (76.1%)	
Primary Expected Payer				0.0228*
Medicaid	36 (9.7%)	5 (12.8%)	41 (10.0%)	
Private insurance	190 (51.2%)	13 (33.3%)	203 (49.5%)	
Self-pay	10 (2.7%)	5 (12.8%)	15 (3.7%)	
No charge	1 (0.3%)	0 (0.0%)	1 (0.2%)	
Other	16 (4.3%)	3 (7.7%)	19 (4.6%)	
Bed size of hospital				0.7721
Small	13 (3.5%)	0 (0.0%)	13 (3.2%)	
Medium	73 (19.7%)	8 (20.5%)	81 (19.8%)	
Large	285 (76.8%)	31 (79.5%)	316 (77.1%)	
Hospital Urban-Rural Designation				0.4529
Large metropolitan areas with at least 1 million	218 (58.8%)	20 (51.3%)	238 (58.0%)	
Small metropolitan areas with less than 1 million	152 (41.0%)	19 (48.7%)	171 (41.7%)	
Metropolitan areas	1 (0.3%)	0 (0.0%)	1 (0.2%)	
Teaching Status of Hospital				0.8054
Metropolitan teaching	329 (88.7%)	36 (92.3%)	365 (89.0%)	
Non-metropolitan hospital	1 (0.3%)	0 (0.0%)	1 (0.2%)	
Median Household Income				0.6851
0-25th percentile	84 (23.1%)	12 (30.8%)	96 (23.8%)	
26-50th percentile	91 (25.0%)	10 (25.6%)	101 (25.1%)	
51-75th percentile	102 (28.0%)	10 (25.6%)	112 (27.8%)	
76-100th percentile	87 (23.9%)	7 (17.9%)	94 (23.3%)	

Results

There were 410 patients who underwent surgical clipping for a UIA, of whom 9.5% (n = 39) had an unplanned readmission within 30 days of discharge and 90.5% (n = 371) had no readmission, planned readmission, or readmission more than 30 days after discharge. Baseline patient demographics including age and gender were similar, but readmitted patients had a significantly lower prevalence of private insurance (33.3% vs. 51.2%, p=0.02). These patients also had a higher prevalence of congestive heart failure (7.7% vs 1.3%, p=0.03), pulmonary circulation disorders (5.1% vs. 0.3%, p=0.02), and renal failure (10.3% vs 1.6%, p=0.01). There were no significant differences in other comorbidities or in occurrence of the most common post-operative complications, such as cerebral edema (3.5% vs 5.1%, p=0.64) or cerebral artery occlusion (3.2% vs 0%, p=0.61).

Conclusions

Factors associated with an increased rate of unplanned 30-day readmissions in this population include: private insurance status, congestive heart failure, pulmonary circulation disorders, and renal failure. Further studies are necessary to identify and reduce causes of preventable unplanned readmissions in this patient population.

References

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