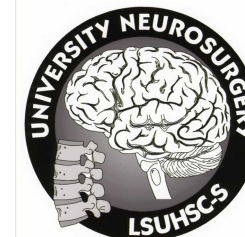


Does Timely Intervention for Ruptured Aneurysm Affect Outcome? A United States Nationwide Inpatient Sample Database Study

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Introduction

Limited studies have compared the outcomes for ruptured aneurysm (RA) between the ultra-early intervention groups (within 24 hours of admission) and those treated after 24 hours. The objective of the study was to assess whether intervention within 24 hours of admission and transfer status, affects mortality and morbidity in patients with RA. Further analyses of demographic and socioeconomic factors which may determine the transfer status in such patients were also analyzed.

Methods

Retrospective study of United States Nationwide Inpatient Sample database for the year 2008 and 2009 was done. Total of 1692 & 2118 admissions for clipping and coiling respectively, for RA were analyzed. Also, previous studies have highlighted a definitive risk of early re-bleed within 24 hours of the initial bleed and the patients getting transferred from another health care facility may contribute towards delayed intervention, therefore the NIS data was analyzed separately for transfer and direct admission patients.

Results

A total of 3810 inpatient admissions were recorded in the NIS database for the years 2008 and 2009 which underwent intervention for RA; out of which 2118 (55.6%) were endovascularly-coiled and 1692 (44.4%) were surgically clipped. 2115 (55.5%) inpatient admissions for RA were direct admissions, 1567 (41.1%) were transferred in from a different acute care hospital and 128 (3.4%) were transferred in from another type of health care facility. Among the Non-Transfer Patients mortality rate was slightly lower in patients who underwent intervention within 24 hours of admission as compared to those treated after 24 hours and the difference was not significant (12.5% vs. 13.1%, $p=0.7$). Morbidity was also slightly lower in the ultra-early group and the difference was not significant (49.6% vs. 51%, $p=0.6$).

Results

Among the transfer patients, mortality rate was significantly lower in the cohort of transfer patients which were treated within the 24 hours of admission as compared to those operated after 24 hours of admission (8.3% vs. 13.3%, $p=0.002$); and the regression analysis showed significant positive association of intervention after 24 hours with increased mortality rate ($p=0.001$, Odd's ratio 1.7 and 95% CI 1.2 to 2.4). Regression analysis highlighted that ultra-early intervention independently decreased the odds of death in ruptured aneurysm patients ($p=0.01$, Odd's ratio 0.77, 95% CI 0.62 to 0.95) meanwhile non transfer status had an independent negative association with morbidity ($p=0.001$, Odd's ratio 0.77, 95% CI 0.66 to 0.89). Multivariate regression analysis showed that the odds of a patient with aneurysmal SAH getting admitted directly to the primary treatment facility (without an interim transfer to another health care facility) was significantly higher in african american and hispanic race, south region, non teaching hospitals, patients residing in the central/fringe areas of population more than 1 million and those residing in the areas with median zip code income of = \$ 63,000.

Conclusions

Ultra-early intervention seems to have better outcome as compared to those treated after 24 hours post SAH. Transfer status is an important parameter which can influence outcomes in RA aneurysm patients. There exists a geographical and socio-economic disparity concerning the likelihood of patients admitted directly to primary treatment facility without a transfer in patients with aneurysmal SAH.

Univariate Analysis for Factors Predicting Transfer Status

Variables	Direct Admission (%)	Transfer (%)	p value
Population density			<0.001
Central or Fringe	51	49	
Population < 1 million or micropolitan	61.7	38.3	
Median Zip Income			0.01
<63,000\$	54.3	45.7	
≥63,000\$	59.3	40.7	
Insurance			0.15
Medicare	52.8	47.2	
Medicaid	57.5	42.5	
private	55	45	
self pay	59	41	
no charge	51.4	48.6	
other	61.2	38.8	
Race			<0.001
White	55.7	44.3	
African American	71.1	28.9	
Hispanic	69.2	30.8	
Asian or Pacific Islander	59	41	
Native American	36.3	63.7	
other	49	51	
Intervention			0.01
Clipping	57.8	42.2	
Coiling	53.7	46.3	
Hospital Region			<0.001
Northeast	52	48	
Midwest	38.9	61.1	
South	71	29	
West	54.3	45.7	
Hospital Teaching Status			<0.001
Teaching	53.5	46.5	
Non-Teaching	78.8	21.2	