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Racial and Socioeconomic Disparities in Occurrence of Hospital Acquired Complications Following Cerebrovascular Surgery

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Introduction

Patients with cerebrovascular disease undergo complex surgical procedures, often requiring prolonged inpatient hospitalization. Prior studies have demonstrated associations between racial/demographic factors and clinical outcomes in patients undergoing cerebrovascular procedures (CVPs). The Centers for Medicare and Medicaid Services (CMS) have published a series of 11 hospital acquired conditions (HACs) deemed "reasonably preventable" for which related costs of treatment are not reimbursed. We hypothesize that race and payer status disparities impact HAC frequency in patients undergoing CVPs and that HAC occurrence affects length of stay and hospital cost

Table: Hospital Acquired Complications (HAC) and Cerebrovascular Procedures
HAC Defined by CMS Criteria
Retained Foreign Body
Catheter Related Urinary Infection
Deep Venous Thrombosis/Pulmonary Embolism
Falls/Trauma
Manifestations of Poor Glycemic Control
Air Embolism
Blood Incompatibility
Pressure Ulcers
Iatrogenic Pneumothorax
Cerebrovascular Procedures Evaluated
Aneurysm Coiling
Aneurysm Clipping
Arteriovenous Malformation Embolization
Arteriovenous Malformation Resection
Carotid Endarterectomy
Carotid Stenting
Mechanical Revascularization
Extracranial to Intracranial Bypass

Methods

Data was collected from the Nationwide Inpatient Sample (NIS) database from 2002-2010. Patients undergoing cerebrovascular procedures were identified by ICD-9 code. HAC occurrence was evaluated according to demographics including race, payer status, and median zip code income via multivariable analysis. Secondary outcomes of interest included length of stay and resulting inpatient charges.

Results

Significant disparities in HAC frequency existed according to ethnicity and insurance provider. Minorities and Medicaid patients had increased frequency of HACs ($p<0.05$), as well as prolonged length of stay and higher inpatient costs ($p<0.05$).

Table: Rate of HACs by Socioeconomic Status			
Race	**N**	**# of HACs**	**Rate per 100,000**
White	842,045	3,775	448
African American	50,349	466	926
Hispanic	52,355	521	995
Asian Pacific Islander	13,314	121	909
Native American	4,341	20	461
Other	21,586	176	815
Missing	306,392	1,299	424
Payer Information	**N**	**# of HACs**	**Rate per 100,000**
Medicare	838,475	3,689	440
Medicaid	55,216	555	1,005
Private Insurance	341,873	1,621	474
Self-Pay	26,177	240	917
No Charge	3,208	77	2,400
Other	23,924	171	715
Missing	1,508	25	1,658

Table: Mean Length of Stay (LOS) and Inpatient Charges				
RACE				
	Had a HAC		**No HAC**	
Race	**Mean LOS**	**Mean Charges**	**Mean LOS**	**Mean Charges**
Black	31.1	$273,264.50	8.2	$94,446.68
Hispanic	20.1	$253,539.00	7.4	$106,813.10
White	15.3	$156,154.80	3.7	$47,793.78
API	20.0	$355,389.10	7.5	$126,503.90
Native American	12.0	$69,679.62	4.6	$59,829.50
Other	19.5	$258,120.60	5.8	$76,910.74
INSURANCE STATUS				
	Had a HAC		**No HAC**	
Payer Status	**Mean LOS**	**Mean Charges**	**Mean LOS**	**Mean Charges**
Private Insurance	17.1	$213,173.80	4.8	$65,975.73
Self pay	23.6	$302,237.70	9.3	$104,031.30
No charge	30.5	$266,354.10	8.5	$102,285.00
Other payer	19.8	$233,815.80	6.2	$83,181.94
Medicare	15.3	$156,154.80	3.4	$42,013.13
Medicaid	31.1	$273,264.50	9.3	$112,114.50

Table: Patient and Hospital Predictors of HACs, 2002-2010			
PATIENT PREDICTORS			
Race	**OR**	**95% CI**	**P-VALUE**
White	Reference		
Black	1.44	1.15, 1.80	0.0012
Hispanic	1.58	1.26, 1.98	< 0.0001
API	1.42	0.88, 2.28	0.1519
Native American	0.95	0.39, 2.28	0.9021
Other	1.58	1.12, 2.21	0.0083
Payer Information	**OR**	**95% CI**	**P-VALUE**
Medicare	0.85	0.72, 1.01	0.0697
Medicaid	1.50	1.21, 1.86	0.002
Private Insurance	Reference		
Self-Pay	1.51	1.12, 2.04	0.0070
No Charge	3.57	2.21, 5.78	< 0.0001
Other	1.26	0.91, 1.74	0.1678

Conclusions

HAC occurrence is associated with racial and socioeconomic factors in patients who undergo cerebrovascular procedures. Improved processes and protocol implementation may help to decrease the frequency of these potentially avoidable events.

Learning Objectives

By the conclusion, participants should have 1) An Understanding impact of Hospital acquired conditions on Length of Stay and Hospital costs, 2) Evaluated race and socioeconomic factors on HAC rate

References

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