

National Trends in Neurosurgical Healthcare Utilization of Neurofibromatosis 1 Patients

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Poster # 1402

Disclosure

- Nothing to disclose

Introduction

- Neurofibromatosis type 1 (NF1) is one of the commonest syndromes, occurring in roughly 1 out of 3000.¹
- This study examined the recent trends in the national healthcare utilization by NF1 patients, especially in neurosurgical care.

Methods

- In this multi-year cross-sectional study, all patients in Nationwide Inpatient Sample database with diagnosis code for NF1 were queried from 2010 to 2015.
- Demographic and hospital characteristics were summarized and compared between years.
- Proportion of common neurologic diagnoses and neurosurgical procedure were also compared.
- The length of stay, in-hospital death, discharge disposition, and total charge/cost of admission were the main outcomes.

Results

- This study included 4726 patients with NF1 diagnosis.
- The proportion of patients covered through Medicaid (33.1 %-38.0%) increased significantly ($P < 0.001$).
- Gradually higher proportion of patients were treated in Northeastern, small/medium, or urban teaching hospitals. (all $P < 0.001$)

Table 1. Demographic and Hospital Characteristics

Variables	Total (n=4726)	2010-2011 (n=1452)	2012-2013 (n=1681)	2014-2015 (n=1593)	P
<i>Demographic Characteristics</i>					
Age (Years)	29.52(±21.38)	30.48(±21.49)	29.42(±21.61)	28.75(±21.01)	0.08
Female (%)	54.2	54.9	54	53.7	0.79
Healthcare Coverage (%)					
Medicare	20.1	22.0	20.5	18.1	<.0001
Medicaid	34.7	33.1	33.1	38.0	
Private Insurance	37.0	36.4	36.5	38.0	
Self-Pay/Other	8.1	8.6	9.9	5.7	
<i>Hospital Characteristics</i>					
Hospital Region (%)					
Northeast	17.4	13.5	19.8	18.4	<.0001
Midwest	27.5	25.8	28.6	28.0	
South	33.5	37.5	31.2	32.4	
West	21.6	23.2	20.5	21.3	
Hospital Size (%)					
Small	11.3	8.1	11.4	14.3	<.0001
Medium	21.5	17.6	22.6	23.8	
Large	66.2	71.1	66.0	62.0	
Hospital Type (%)					
Rural	4.8	5.6	4.5	4.4	<.0001
Urban Non-Teaching	12.6	14.9	13.5	9.5	
Urban Teaching	81.7	76.3	82.0	86.2	

Results pt.2

- The frequency of scoliosis (8.8% - 11.7%, $P=0.03$) and neuro-oncological disease (11.3%-13.6%, $P<0.001$) increased.

- HOWEVER, the rate of spinal fusion, cranial/peripheral nerve procedure and craniotomy did not change.

Table 2: Neurological diagnoses and surgical interventions

Variables	Total (n=4726)	2010-2011 (n=1452)	2012-2013 (n=1681)	2014-2015 (n=1593)	P
Diagnoses (%)					
Hydrocephalus	6.5	5.4	7	6.8	0.17
Scoliosis	10.3	8.8	10.2	11.7	0.03
Epilepsy	12.4	12.6	11.5	13.2	0.33
Neuro-oncological	13.5	11.3	15.2	13.6	<0.001
Surgical Interventions (%)					
Craniotomy	3.9	3.5	3.7	4.4	0.42
Cranial/Peripheral Nerve Procedures	9.5	9.1	10	9.3	0.66
Spinal Fusion	4.6	4.6	4.5	4.6	0.93
Laminectomy	2.7	3.2	2.2	2.8	0.54
Shunt Placement	2.3	2.2	2.7	2.1	0.2

Results pt.3

- There were no differences in length of stay, mortality, discharge disposition and charge/cost of admission over the years.

Table 3: Admission Outcomes

Variables	Total (n=4726)	2010-2011 (n=1452)	2012-2013 (n=1681)	2014-2015 (n=1593)	P
Length of Stay (Days)	5.83(±8.93)	6.01(±9.74)	5.87(±8.88)	5.62(±8.17)	0.47
Mortality (%)	1.27	1.72	0.95	1.19	0.15
Discharge Disposition (%)					
Routine	76.0	75.6	75.8	76.6	0.752
Non-Routine	24.8	24.4	24.2	23.4	
Cost					
Total Charge (\$)	52497	48183	53193	55664	0.059
Total Cost (\$)	17043	16843	17201	17056	0.946

Discussion

- There appears to be ongoing changes in demographic, hospital and insurance characteristics of NF1 admissions.
- An investigation in to the financial impact of insurance status changes is warranted.
- The rises in prevalence of neurological diagnoses have not led to increase in surgical intervention.
- Similarly, the overall admission outcomes including mortality and cost do not seem to have changed significantly from 2010 to 2015.
- More granular examination of surgical and medical complications during the admissions is warranted.

Summary

- NF1 is one of the most common syndromes. Examination of healthcare utilization patterns in patients with NF1 may elucidate significant research priorities.
- There are significant demographic shifts as well as increase in the proportion of patients who carry diagnoses relevant to neurosurgery. This has not led to higher rate of surgical intervention.
- Overall cost of admission does not seem to have increased in the recent years. Overall admission outcomes, including mortality and discharge disposition, also remained consistent.