Surgical Management of Degenerative Cervical Myelopathy: Comparing Outcomes Between Patients Admitted Through Clinic vs Emergency Department

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Introduction

Degenerative cervical myelopathy (DCM) can lead to pain, disability, and permanent neurological impairment. Here, we compared patients who were admitted through clinic versus the emergency department (ED) for surgical management of DCM.

Hypothesis

We hypothesize patients presenting with DCM through the ED have worse clinical presentation, more severe spinal cord compression, and poorer outcomes than those initially evaluated in the outpatient setting.

Methods

Retrospective study, spanning 2015-2021.
Inclusion Criteria:

- Aged ≥18 years and admitted for surgery for DCM
  - Admitted through clinic (Elective cohort)
  - Admitted and evaluated through the ED (Call cohort)

Preoperative variables compared:

- Demographics (age, sex, race, ethnicity, and insurance payor), Social Deprivation Index (SDI), Area Deprivation Index (ADI), cervical MRI grading, Nurick grade

Postoperative variables compared:

- Nurick grade, levels fused, length of stay (LOS), discharge disposition, 30-day reoperation and readmission rates

Analysis

Numeric variables were compared using a t-test or Wilcoxon rank-sum test. Categorical variables were compared using a chi-square test or Fisher's exact test, as appropriate.
Univariate logistic regression models were fit to obtain odds ratios and multivariable logistic regression models were fit to assess the impact of ADI and SDI, separately, on patient presentation (Call or Elective).

Results

Table 1: Patient population, baseline characteristics, and deprivation indices among the call and elective groups

	Group		
	Call (N = 100)	Elective (N = 227)	p-value
Sex			
Female	30 (30%)	109 (48%)	0.002*
Male	70 (70%)	118 (52%)	
Age (mean ± std dev)	61.9±11.7	61.3±11.2	0.66
Body Mass Index (BMI)	28.1±7.6	30.6±6.6	0.003*
Race			
White	51(51%)	165 (72.7%)	0.0001*
Black	23 (23%)	17 (7.5%)	
Asian	8 (8%)	8 (3.5%)	
Other	18 (18%)	37 (16.3%)	
Ethnicity			
Non-Hispanic	84 (84%)	205 (90.7%)	0.24
Hispanic	14 (14.3%)	21 (9.3)	
Unknown	2	1	
Insurance			
Medicare/other Government	77 (77%)	145 (63.9%)	0.04*
Private	18 (18%)	71 (31.3%)	
Other	5 (5%)	11 (4.8%)	
Deprivation Indices			
Social Deprivation Index (SDI) (mean ± std dev)	68.0±25.6	56.2±27.8	<0.001*
Area Deprivation Index (ADI) (mean ± std dev)	7.9±2.1	7.1±2.2	0.009*
Baseline Nurick Score (mean ± std dev)	2.2±1.5	2.1±1.3	0.34

Table 3: Surgical Approach in Call and Elective Groups for DCM

Variable	Group		
	Call	Elective	p-value
Surgery	N (%)	N (%)	
ACDF	37 (37%)	107 (47.1%)	< 0.001*
CDR	0 (0%)	20 (8.8%)	
Hybrid	0 (0%)	8 (3.5%)	
Laminoplasty	33 (33%)	57 (25.1%)	
PSF	30 (30%)	35 (15.4%)	
Total	100	227	

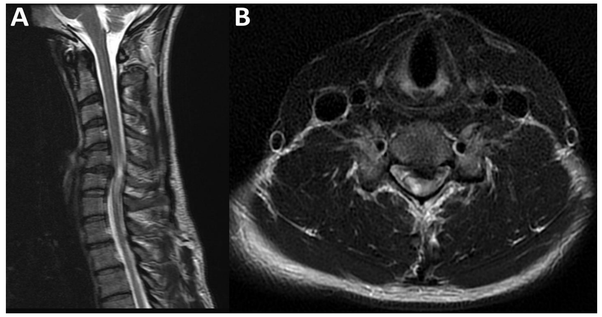

Figure 1 Sagittal (A) and axial (B) T2-weighted MRI demonstrating severe cord compression (Grade III) at C5-6 with evidence of myelomalacia.

Table 2: Cervical Stenosis MRI Grading Distribution

Grade	Group			
	Call	Elective	Total	P-Value
	N = 100	N = 227	N = 327	
0	1 (1%)	0 (0%)	1 (0.3%)	< 0.001*
1	1 (1%)	22 (9.8%)	23 (7.2%)	
2	18 (18.6%)	106 (47.3%)	124 (38.6%)	
3	77 (79.4%)	96 (42.9%)	173 (53.9%)	
Missing	3	3	6	

Table 4: Surgical characteristics and outcomes of the call and elective groups

Variable	Group		
	Call	Elective	p-value
Levels Operated (mean ± std dev)	3.4 ± 2.2	3.0 ± 1.8	0.08
LOS (mean ± std dev)	9.8 ± 9.8	3.7 ± 4.3	<0.001*
Postoperative Nurick (mean ± std dev)	1.9 ±1.9	1.1 ± 1.6	0.0002*
Discharge disposition			
Home	35 (35%)	187 (82.3%)	< 0.00001*
Skilled nursing	29 (29%)	19 (8.4%)	
Other	36 (36%)	21 (9.3%)	
Reoperations within 30 days	10 (10%)	5 (2.2%)	0.003*
Readmissions within 30 days	17 (17%)	27 (11.9%)	0.2125

Table 5 : Multivariable Logistic Regression models fit to assess impact of ADI and SDI on presentation

Predictors	Presentation			Presentation		
	Odds Ratios	Confidence Interval	P-Value	Odds Ratios	Confidence Interval	P-value
(Intercept)	0.28	0.06-1.43	0.127	0.47	0.11-2.05	0.314
BMI	0.95	0.91-0.99	0.010*	0.95	0.91-0.98	0.007*
Sex						
Male	Reference			Reference		
Female	0.47	0.27-0.81	0.008*	0.50	0.28-0.85	0.012*
Race						
White	Reference			Reference		
Black	3.49	1.67-7.44	0.001*	2.95	1.39-6.36	0.005*
Asian	3.21	1.03-10.08	0.042*	2.07	0.64-6.68	0.218
Other	1.64	0.80-3.29	0.166	1.49	0.74-2.96	0.258
Insurance						
Private	Reference			Reference		
Medicare/other Government	1.96	1.03-3.89	0.045*	2.06	1.10-4.02	0.029*
Other	1.54	0.39-5.48	0.5185	1.41	0.36-4.95	0.604
Indices						
ADI	1.22	1.07-1.39	0.004*			
SDI				1.02	1.01-1.03	0.002*

Asterisks (*) indicates statistical significance with p-value < 0.05.

Summary/Conclusions

DCM patients managed on an urgent basis present with worse disease, experience inferior outcomes, and are more likely to be from disadvantaged backgrounds. As such, efforts must be expanded to improve screening and access to care for DCM among sociodemographic disadvantaged patients.

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