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### Title

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# 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  $\geq 18$  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).

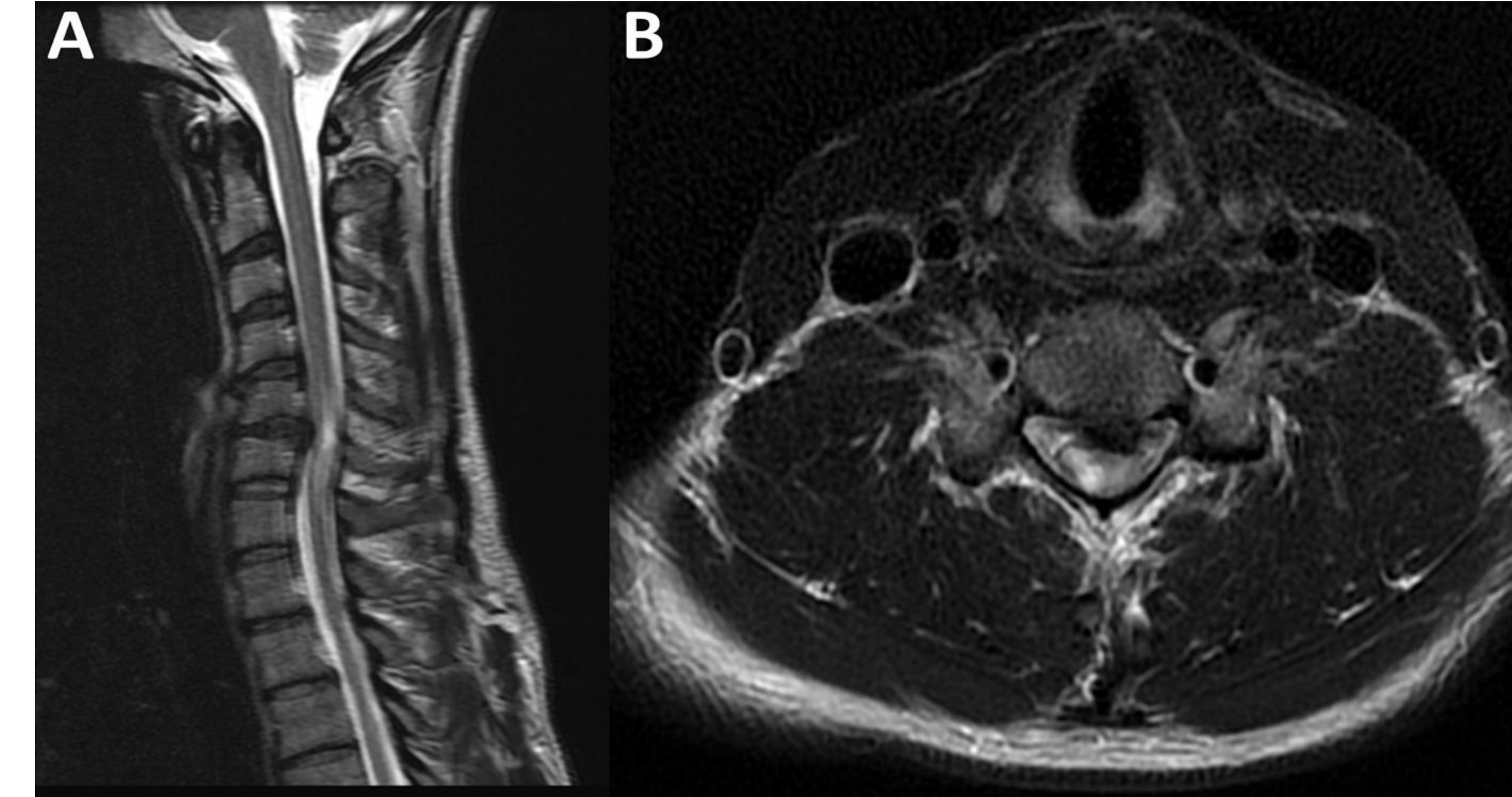
## Results

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

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

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

Variable	Group		p-value
	Call	Elective	
<b>Surgery</b>	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%)	
<b>Total</b>	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			P-Value
	Call (N = 100)	Elective (N = 227)	Total (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		p-value
	Call	Elective	
<b>Levels Operated (mean <math>\pm</math> std dev)</b>	3.4 $\pm$ 2.2	3.0 $\pm$ 1.8	0.08
<b>LOS (mean <math>\pm</math> std dev)</b>	9.8 $\pm$ 9.8	3.7 $\pm$ 4.3	<0.001*
<b>Postoperative Nurick (mean <math>\pm</math> std dev)</b>	1.9 $\pm$ 1.9	1.1 $\pm$ 1.6	0.0002*
<b>Discharge disposition</b>			
Home	35 (35%)	187 (82.3%)	< 0.00001*
Skilled nursing	29 (29%)	19 (8.4%)	
Other	36 (36%)	21 (9.3%)	
<b>Reoperations within 30 days</b>	10 (10%)	5 (2.2%)	0.003*
<b>Readmissions within 30 days</b>	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
<b>(Intercept)</b>	0.28	0.06-1.43	0.127	0.47	0.11-2.05	0.314
<b>BMI</b>	0.95	0.91-0.99	0.010*	0.95	0.91-0.98	0.007*
<b>Sex</b>						
Male	Reference			Reference		
Female	0.47	0.27-0.81	0.008*	0.50	0.28-0.85	0.012*
<b>Race</b>						
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
<b>Insurance</b>						
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
<b>Indices</b>						
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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