

Learning Objectives

1. To describe risk factors associated with the development of dysphagia among patients with acute cervical spine injury.
2. To describe outcomes in adult patients developing dysphagia after cervical spine injury.

Introduction

- Cervical spine injuries (CSI) may be complicated by dysphagia in hospitalized patients.
- We sought to identify risk-factors associated with dysphagia among CSI patients.

Methods

- We analyzed 2003-2010 Nationwide Inpatient Sample. Adults (>18years) with CSI (ICD9codes: 805.xx-806xx) were included.
- Individuals who developed dysphagia (ICD9code: 787.2x-x) and/or underwent cervical spine fusion surgery (CSFS) (ICD9codes: 81.01-81.03) were identified using ICD9 codes.
- Multivariate logistic regression assessed factors associated with developing dysphagia.

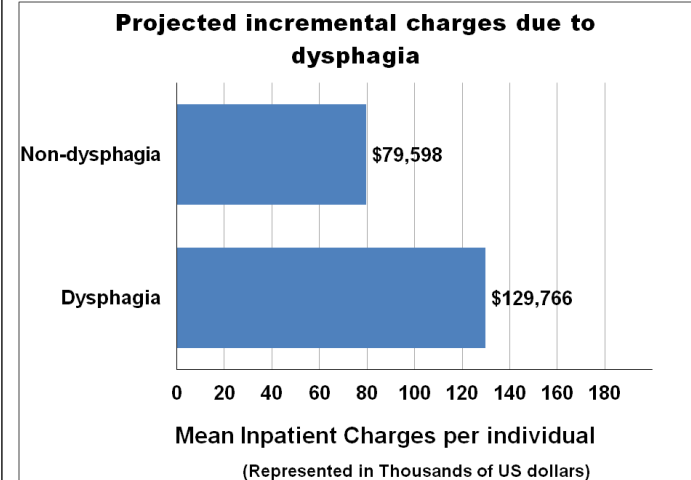
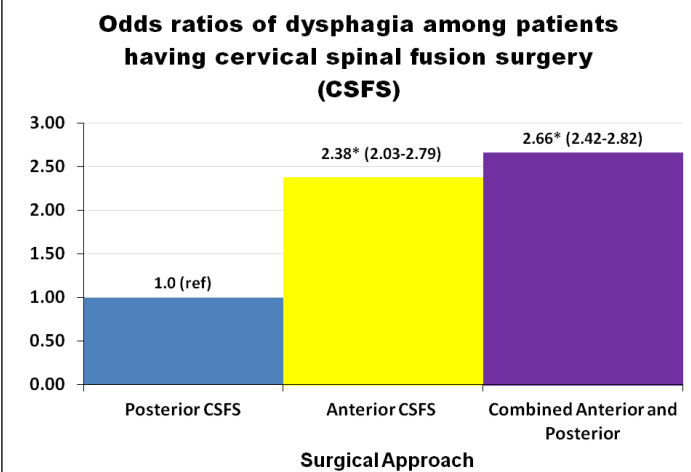
Results

- Out of 384,174 CSI patients, 3.27% developed complications of dysphagia.
- Dysphagia patients were mostly aged ≥ 65 years (62.52%) with mean age of 66.97 years (SE=0.45)
- There were no gender differences between dysphagia and non-dysphagia patients ($p=0.351$).
- Overall, 17.33% of patients underwent CSFS. Dysphagia occurred in 5.56% of patients that underwent CSFS versus 2.79% without CSFS ($p<0.001$).
- Multivariate analysis showed higher likelihood for dysphagia among patients ≥ 65 years (OR2.20; 95%CI=1.94-2.51), males (OR1.17; 95%CI=1.07-1.27), patients with associated spinal cord injury (OR1.29; 95%CI=1.15-1.45), patients that underwent CSFS (OR1.69; 95%CI=1.41-2.03).

Risk of Dysphagia	Odds Ratios	95% Confidence intervals
Age≥65	2.2	1.94-2.51
Males	1.17	1.07-1.27
Associated Spinal cord injury	1.29	1.15-1.45
Cervical Spine Fusion Surgery	1.69	1.41-2.03
Medical Comorbid conditions		
• Stroke	1.76	1.52-2.04
• PUD	2.03	1.39-2.97
• Hemiplegia/Paraplegia	3.29	2.61-4.16
• Dementia	1.75	1.28-2.40
• COPD	1.15	1.02-1.31
• Cancer	1.77	1.51-2.05
Level of significance was set at 0.05		

Results (Continued)

- Patients that underwent anterior-CSFS versus posterior-CSFS (OR2.38; 95%CI=2.03-2.79), and CSFS involving multiple spine segments [2-3 segments (OR1.37; 95%CI=1.30-1.66) and 4-8 segments (OR1.30; 95%CI=1.04-1.63)] were at increased risk of dysphagia.
- Patients with medical comorbidities including stroke (OR1.76; 95%CI=1.52-2.04), peptic ulcer disease (OR2.03; 95%CI=1.39-2.97), cancer (OR1.77; 95%CI=1.51-2.05), dementia (OR1.75; 95%CI=1.28-2.40), hemiplegia/paraplegia (OR3.29; 95%CI=2.61-4.16), and chronic obstructive pulmonary disease (OR1.15; 95%CI=1.02-1.31) also demonstrated higher risk of dysphagia.
- Inpatient mortality in dysphagia versus non-dysphagia (6.58% vs. 6.91%, $p=0.53$).
- Dysphagia patients were more likely for prolonged hospitalization (Mean(SE):16(SE=0.4) vs. 9(SE=0.5) days, $p<0.001$).
- Average total incremental charges associated with dysphagia per individual were \$50,168, amounting in additional charges in CSI management totaling nearly \$80 million annually.



Conclusions

Dysphagia in CSI is associated with increased morbidity, prolonged hospitalization, and increased hospitalization costs. At-risk patients need to be identified, in order to minimize adverse outcomes.

Key:

CSI=Cervical Spine Injury; CSFS=Cervical Spine Fusion Surgery;
ICD9=International Classification of Diseases Ninth Revision;
OR=Odds Ratios; 95%CI=95%Confidence Interval; SE=Standard Error;