Utilization of Post-Discharge Antibiotics in Spinal Fusion in a Nationwide Cohort of Commercially Insured Individuals

David K. Warren, Kate Peacock, Katelin B. Nickel, Victoria J. Fraser, Margaret A. Olsen, for the CDC Prevention Epicenter Program Division of Infectious Diseases, Department of Medicine, Washington University School of Medicine, St. Louis, MO

INTRODUCTION

• CDC guidelines for the prevention of surgical site infection (SSI) recommend the use of preoperative antibiotic prophylaxis for procedures in which there is data supporting its benefit, that involve implantation of a medical device, or in surgeries where an SSI is potentially catastrophic.

METHODS

Inclusion Criteria

The study population included patients aged 10-64 years with private health insurance in the Truven Health MarketScan Commercial Database coded with an ICD-9-CM procedure or CPT-4 code for a spine fusion during an inpatient hospitalization or in an outpatient surgical between 1/1/2010-6/30/2015. 

Exclusion Criteria:

• Insufficient evidence to establish date of fusion (n=11,342)
• Osteomyelitis or epidural abscess coded in the prior 30 days to or during the fusion hospitalization. Other SSI (i.e., surgical drains)

Post-Discharge Prophylactic Antibiotics

Post-discharge prophylactic antibiotics were identified based on filled prescriptions for an oral antibiotic in the outpatient pharmacy within 0-5 days after discharge from the fusion hospitalization.

Factors Associated with Post-Discharge Prophylactic Antibiotics

Patient-level factors potentially associated with receipt of post-discharge prophylactic antibiotics were identified during the year prior through fusion hospitalization. Identification of comorbidities required ≥ 1 inpatient facility claim and/or ≥ 2 provider/patient facility claims, excluding diagnostic claims (i.e., laboratory, diagnostic radiology) or claims for unrelated services (e.g., ambulance services).

Statistical Analysis

Univariate analyses were performed using X², logistic regression, or the Mann-Whitney U test. Cochran-Armitage tests were used to identify the trends in antibiotic use. All data management and analyses were performed using SAS v9.3 (SAS Institute Inc., Cary, NC).

Funded By Grant 5U01HD003842-04 from the Centers for Disease Control and Prevention (VJ)

RESULTS

Table 1. Select Factors Associated with Post-Discharge Prophylactic Antibiotics after 172,869 Spinal Fusion Procedures: Regression Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>N (%)</th>
<th>N (%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (median, IQR)</td>
<td>52 (45-66)</td>
<td>52 (44-69)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Setting</td>
<td>7,422 (66)</td>
<td>7,422 (66)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Patient residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>1,350 (93)</td>
<td>1,350 (93)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>North Central</td>
<td>3,055 (22)</td>
<td>3,055 (22)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>6,873 (54)</td>
<td>6,873 (54)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>West</td>
<td>2,073 (15)</td>
<td>2,073 (15)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

Conclusions: Post-discharge prophylactic antibiotic use following spinal fusion surgery was associated with geographic, operative and patient factors.

CONCLUSIONS

• 329,523 spinal fusion procedures were initially identified, based upon ICD-9-CM CPT-4 codes. 172,869 fusion procedures were included in this analysis.
• 13,535 (7.8%) fusion procedures received post-discharge prophylactic antibiotics. Dispersed antibiotics were:
  - Cephalexin - 52.7% (911)
  - Fluoroquinolones - 2.94% (222)
  - Trimethoprim/sulfamethoxazole (TMP/SMX) - 1.40% (10)
  - Doxycycline - 0.97% (60)
  - Cindamycin - 0.56% (33)

• Post-discharge prophylactic antibiotic use is relatively low after spinal fusion.
• Patient factors (e.g., obesity, COPD, smoking, diabetes and rheumatoid arthritis) and surgical factors (e.g., posterior combined approaches, 3-7 level fusions, and lumbar procedures) were associated with increased post-discharge antibiotic dispersion after fusion.
• There is regional variation in choice of antibiotic dispersed and the percentage of discharges in which antibiotics are dispensed.
• A strength of this study is the large sample size of patients from multiple regions of the United States. Limitations of this study are the use of administrative data, which does not allow for examination of some surgical factors (e.g., surgical drains) which may impact post-discharge antibiotic use and a commercially insured population, which limits generalizability to older and uninsured patients.
• Future studies will examine the incidence of infection and non-infectious complications in this cohort.