Is postoperative antimicrobial prophylaxis needed for the management of surgical site infection after spinal instrumentation surgery?

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**CDC Clinical Guidelines**

Prevention for surgical site infection (SSI)

- Preoperative and intraoperative management
  - Patient
  - Surgical site
  - Operator
  - Operating room

- Postoperative management
  - Drainage
  - Surgical site care
  - Antibiotics
Antimicrobial prophylaxis (AMP) for instrumentation surgery

- For patients undergoing spine surgery *with spinal implants*, does antibiotic prophylaxis result in decreased infection rates?

*Grade of Recommendation: C*
*(Poor evidence for or against recommendation intervention)*

*NASS (North American Spine Society)*
*Evidence-Based clinical guidelines in 2007*
**Purpose**

If perioperative management was performed according to CDC guidelines,

- how much is the incidence of SSI in patients without administration of antibiotics after spinal surgery?
- is there efficacy of AMP even in patients with instrumentation surgery?
Subjects

No postoperative dose group
- November 2003 – June 2010
- 468 Cases
  (230 males, 238 females)
- Age: Average 57.1 years (5-82)
- Ope. time: Average 179.2 min.
- Blood loss: Average 206.7g

Postoperative dose group
- January 2000 – October 2003
- 380 cases
  (198 males, 142 females)
- Age: Average 51.3 years
- Ope. time: Average 231.3 min.
- Blood loss: Average 394.9g

Instrumentation surgery
- (121 cases: 25.9%)

Instrumentation surgery
- (147 cases: 43.2%)
Protocols for perioperative management for preventing SSI (No postoperative dose of AMP)

<Preoperative>
AMP administration within 30 min. before skin incision
Cephazolin Na was used as the first choice
Washing the skin using chlorhexidine

>Intraoperative>
Additional AMP administration every 4 hours
Wash surgical site as often as possible, finally wash with a large amount of saline before closing

<Postoperative>
Continuous negative pressure suction drainage
Culture suction drainage fluid
Analysis

Incidence of Surgical Site Infection (SSI)
(No operative dose vs Operative dose)

- Superficial SSI
- Deep SSI
  - Fisher’s exact test was used for comparison between the two groups.
  - P < 0.05 was considered significant.

Definitions of SSI

Identification of SSI involves interpretation of clinical and laboratory findings.

Superficial SSI
Only skin or subcutaneous tissue of the incision

Deep SSI
Fascia and muscle layers of the incision
## Results

### Overall incidence of SSI

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>SSI*</th>
<th>Superficial</th>
<th>Deep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative dose</td>
<td>8/340 (2.4%)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>No postoperative dose</td>
<td>7/468 (1.5%)</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

*No significant difference*

### Incidence of SSI in instrumentation surgery

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>SSI*</th>
<th>Superficial</th>
<th>Deep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative dose</td>
<td>3/147 (2.0%)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>No postoperative dose</td>
<td>1/121 (0.8%)</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

*No significant difference*
Discussion

Incidence of SSI

- National Nosocomial Infection Surveillance (NNIS) system report from 1992 to 2004
- 0.88% for laminectomy
- 1.04% for spinal fusion (Am J Infect Control 2004)

- Nationwide survey according to a report of the Japan Spine Research Society in 2001
- Overall incidence of SSI: 0.9% (Nohara; J Orthop Sci. 2004)

Duration of AMP for spinal surgery

- The incidence of SSI could be decreased despite shortening the duration of AMP administration to 2 days. (Takahashi; J Orthop Sci. 2009)
- There was no increase in risk of infection for a single preoperative dose of AMP compared with a multiple dose group in lumbar disc surgery. (Doczyniak; Spine 2003)
No Postoperative AMP in spine surgery

- No postoperative AMP in decompressive spinal surgery without instrumentation.
- 2/143 cases (1.4%) (Kakimaru; J Ortop Sci. 2010)

In our study
- No postoperative AMP in spinal surgery with/without instrumentation.
- 7/468 cases (1.5%)
- No postoperative AMP in spinal surgery with instrumentation.
- 1/121 cases (0.9%)

Postoperative administration of AMP appears to be unnecessary for spinal decompression surgery with instrumentation.
Conclusions

- AMP duration was not related to the SSI rate at our institution.

- If perioperative management is performed according to CDC guidelines, postoperative administration of AMP appears to be unnecessary for spinal surgery, even with spinal implants.