Patient Experience With Mupirocin or Povidone-Iodine Nasal Decolonization

JED MASLOW, BA; LORRAINE HUTZLER, BA; GERMAINE CUFF, BSN, MPH; ANDREW ROSENBERG, MD; MICHAEL PHILLIPS, MD; JOSEPH BOSCO, MD

abstract

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Led by the federal government, the payers of health care are enacting policies designed to base provider reimbursement on the quality of care they render. This study evaluated and compared patient experiences and satisfaction with nasal decolonization with either nasal povidone-iodine (PI) or nasal mupirocin ointment (MO). A total of 1903 patients were randomized to undergo preoperative nasal decolonization with either nasal MO or PI solution. All randomized patients were also given 2% chlorhexidine gluconate topical wipes. Patients were interviewed prior to discharge to assess adverse events and patient experience with their assigned preoperative antiseptic protocol. Of the 1903 randomized patients, 1679 (88.1%) were interviewed prior to discharge. Of patients receiving PI, 3.4% reported an unpleasant or very unpleasant experience, compared with 38.8% of those using nasal MO (P < .0001). Sixty-seven percent of patients using nasal MO believed it to be somewhat or very helpful in reducing surgical site infections, compared with 71% of patients receiving PI (P > .05). Being recruited as an active participant in surgical site infection prevention was a positive experience for 87.2% of MO patients and 86.3% of PI patients (P = .652). Those assigned to receive PI solution preoperatively reported significantly fewer adverse events than the nasal MO group (P < .01). Preoperative nasal decolonization with either nasal PI or MO was considered somewhat or very helpful by more than two-thirds of patients.

The authors are from the NYU Hospital for Joint Diseases, New York, New York. The authors have no relevant financial relationships to disclose. Correspondence should be addressed to: Lorraine Hutzler, BA, NYU Hospital for Joint Diseases, 301 E 17th St, Ste 1402, New York, NY 10003 (lorraine.hutzler@nyumc.org). Received: May 7, 2013; Accepted: November 25, 2013; Posted: June 11, 2014. doi: 10.3928/01477447-20140528-59
Enactment of the Patient Protection and Affordable Care Act of 2012 resulted in a restructuring of how health care providers, including physicians and hospitals, are reimbursed for the services they provide. A significant portion of reimbursement is now based on the quality of care provided. The patient’s perception of the care provided is now considered an indicator of the quality of that care; thus, hospitals and policy makers are focusing attention toward evaluation of the patient experience. Specifically, the Centers for Medicare and Medicaid Services (CMS) will implement value-based purchasing to allow a portion of hospital revenues to be directly linked to the quality of care provided. Value-based purchasing will reduce up to 6% of Medicare payments by 2016 and redistribute the money to hospitals providing the best patient care, as measured by clinical process and patient experience metrics. Clinical processes will make up 70% of the measures on which CMS will base reimbursement, and patient experience will make up the remaining 30% to create a total performance score that will have a financial effect on hospitals.

The primary tool used to assess patient experience is the Hospital Consumer Assessment of Healthcare Providers and Systems survey. This survey is designed to publicly report patients’ hospital experiences, reflecting the domains of quality of health care defined by the Institute of Medicine. There is a direct correlation between patient satisfaction and patient compliance with treatment, which leads to a positive effect on patient outcomes. Therefore, optimizing the entire patient experience, from admission to discharge, has become a priority of many institutions to receive full financial reimbursement and ensure the best possible patient outcomes.

Surgical site infections (SSIs), often resulting from Staphylococcus aureus, cause significant patient morbidity and hospital expense. This has prompted many orthopedic surgery institutions to initiate preoperative S. aureus screening and decolonization protocols to improve outcomes and decrease expenses. Reducing SSIs has become particularly important to health care systems given that CMS has stopped reimbursing for hospital-acquired conditions. Preoperative nasal decolonization with either nasal povidone-iodine (PI) or mupirocin ointment (MO) can reduce infection risk. However, both are highly dependent on patient compliance and the successful completion of a preoperative regimen. Factors potentially affecting patient completion of each antiseptic regimen include adverse reactions, subjective experience of nasal administration, and perception that the intervention was beneficial. This study assessed patient experience during preoperative SSI risk reduction, focusing on patient satisfaction and incidence of adverse events, to yield an optimal preoperative regimen with the best patient outcomes.

**MATERIALS AND METHODS**

A total of 1903 consecutive patients who underwent total joint arthroplasty or elective spine fusion surgery at NYU Langone Hospital for Joint Diseases and attended the pre-admissions testing clinic were included in this study. At the pre-admissions testing clinic, patients were randomized to apply either MO 2% ointment twice daily for 5 days preoperatively or PI 5% solution in both nostrils by staff within 2 hours of surgical incision. Each study group also self-administered chlorhexidine gluconate (CHG) 2% wipes according to standardized instructions. Study patients were subsequently assessed prior to discharge regarding adverse events and their overall experience using their assigned nasal antiseptic.

Postoperatively, all patients were assessed for adverse events using a standardized collection tool addressing 8 parameters (headache, rhinorrhea, burning of irritation in the nose, lung or throat congestion, cough, sore throat, pruritus, skin rash) in a yes/no format. Patients were also asked to describe their satisfaction with the assigned antiseptic protocol using a Likert-type scale. The level of patient satisfaction was assessed through parameters, including self-reported difficulty in administering or receiving the nasal antiseptic and the patient-perceived benefit from each intervention in reducing the postoperative infection risk. Patients were also asked about their experience using CHG 2% topical wipes on the evening prior to surgery and the morning of surgery. Each patient rated the experience of being an active participant in the prevention of infection as a negative, neutral, or positive experience. Patients also described what methods of reducing the risk of infection they were aware of.

Descriptive statistics were used to analyze each parameter using Excel 2008 software (Microsoft, Redmond, Washington). Chi-square analyses were used to compare patients receiving PI and those using MO on categorical responses related to adverse events and patient experience. *P* values were determined using a chi-square distribution.

**RESULTS**

**Interview Response**

Prior to discharge, 1679 (88.1%) of the total 1903 randomized patients were interviewed. Of these, 868 (51.7%) used nasal MO and 811 (48.3%) received nasal PI. A total of 539 (62.1%) patients interviewed in the MO group answered questions about the difficulty of self-administering MO. A total of 1137 (67.7%) patients responded to questions about their experience with their respective nasal antiseptic, of which 582 (51.2%) were assigned MO and 555 (48.8%) were assigned PI. A total of 1129 (67.2%) patients described whether they believed their nasal antiseptic to be helpful, of which 575 (50.9%) used MO and 555 (49.1%) received PI. A total of 1140 (67.9%) patients responded to questions...
regarding difficulty with CHG 2% wipes, and 1144 (68.1%) patients described their experience as an active participant in SSI prevention (Table 1).

### Adverse Events

Of the 1679 respondents, those receiving PI reported significantly less headache, rhinorrhea, lung or throat congestion, and sore throat than did those using MO ($P<.05$; Table 2). Other parameters, including nasal burning or itching, cough, pruritus, and skin rash, demonstrated no significant difference between treatment groups, although all adverse events, with the exception of pruritus, were less frequently reported in patients receiving PI.

### Patient Satisfaction

Of the 539 respondents self-administering MO, 511 (94.8%) found it very easy or easy to administer, whereas 28 (5.2%) described MO as either hard or very hard to administer.

Patients rated their experience applying MO for 5 days as pleasant, neither unpleasant nor unpleasant, unpleasant, or very unpleasant. The responses were compared with those from patients receiving PI (Table 3). Whereas 226 (38.8%) patients reported that self-administering MO was an unpleasant or very unpleasant experience, only 19 (3.4%; $P<.0001$) patients receiving PI reported an unpleasant or very unpleasant experience.

Regardless of their experience, 388 (67.5%) of the patients self-administering MO believed it to be very helpful or somewhat helpful in reducing the risk of infection postoperatively (Table 4). A total of 393 (70.9%; $P=.209$) patients receiving PI reported a similar perceived benefit, demonstrating that a significant proportion of each treatment group perceived a significant benefit of nasal antiseptic intervention.

Each nasal antiseptic protocol was supplemented with CHG 2% wipes administered on the evening prior to surgery.
and the morning of surgery, and patients were also asked about the experience using these wipes. Of the 1140 respondents, 1102 (96.7%) found the CHG wipes generally easy to use (very easy or easy), whereas only 38 (3.3%) respondents found them difficult to use (hard or very hard). Compared with other CHG regimens previously used (eg, bathing with 4% CHG soap for 3 days preoperatively, resulting in 16% of patients finding it difficult to administer), the current CHG protocol revealed substantially improved patient satisfaction. Overall, 72.2% of all respondents reported that the 2% CHG wipes were beneficial and helped to reduce the risk of infection postoperatively.

A total of 992 (86.7%) of 1144 respondents reported that recruiting them as an active participant was a positive experience. Of patients receiving PI, 86.3% reported a positive experience as an active participant, compared with 87.2% of patients using MO (P = 0.652). Although self-administering MO and receiving a PI nasal swab differ in the amount of patient autonomy required, both treatment groups had similar experiences as active participants (Table 5).

**Table 4**

<table>
<thead>
<tr>
<th>Helpfulness</th>
<th>MO Group</th>
<th>PI Group</th>
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<tbody>
<tr>
<td>Very</td>
<td>328 (57.0)</td>
<td>335 (58.3)</td>
</tr>
<tr>
<td>Somewhat</td>
<td>60 (10.4)</td>
<td>58 (10.5)</td>
</tr>
<tr>
<td>Not at all</td>
<td>12 (2.1)</td>
<td>10 (1.8)</td>
</tr>
<tr>
<td>Not sure</td>
<td>175 (30.4)</td>
<td>151 (27.3)</td>
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The least reported preoperative method of SSI risk reduction known to patients was smoking cessation, but other behavioral changes such as improving eating habits, losing weight, and avoiding shaving the surgical area are largely unknown to the current study’s population.

**DISCUSSION**

Surgical site infections caused by *S. aureus* are a major contributor to patient morbidity and rising hospital expenses after orthopedic surgery. It is estimated that preoperative screening for *S. aureus* nasal colonization and immediate treatment could result in more than $231 million in savings if all patients undergoing elective joint replacement surgery in the United States were screened and treated if they were a carrier. Evaluating patient experiences and attitudes associated with preoperative decolonization can allow for improved regimens favoring patient compliance and optimal risk reduction. As such, the most effective preoperative antiseptic regimen will be easy to complete, minimize adverse reactions, and be a relatively positive experience for patients. The PI nasal swab has an improved side

**Table 5**

<table>
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<th>Experience</th>
<th>MO Group</th>
<th>PI Group</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Positive</td>
<td>509 (87.2)</td>
<td>483 (86.3)</td>
<td>992 (86.7)</td>
</tr>
<tr>
<td>Neutral</td>
<td>72 (12.3)</td>
<td>75 (13.4)</td>
<td>147 (12.8)</td>
</tr>
<tr>
<td>Negative</td>
<td>3 (0.5)</td>
<td>2 (0.4)</td>
<td>5 (0.4)</td>
</tr>
</tbody>
</table>

**Abbreviations:** MO, mupirocin ointment; PI, povidone-iodine.

**Figure:** Responses indicating the methods of reducing infection that patients reported being aware of preoperatively. Abbreviation: CHG, chlorhexidine-containing soap.
effect profile compared with nasal MO. Although it was expected to be at least comparable with nasal MO regarding the potential for adverse reactions, nasal PI demonstrated significantly fewer reported adverse events in several parameters of this study and can be considered a better-tolerated alternative to nasal MO.

The process of self-administering nasal MO requires 5 days of twice-daily applications in which the patient must press 0.25 g of MO in each nostril for 1 minute. Alternatively, a staff member can effectively administer PI in 1 session just prior to surgery for only 30 seconds at a time. Although most patients assigned to self-administer nasal MO in this study found it easy to administer, many more of these patients found MO unpleasant or very unpleasant compared with those receiving nasal PI. Furthermore, despite a shorter course of treatment, nasal PI was perceived by patients to be similarly effective in reducing the postoperative SSI risk.

The majority of patients felt that 2% CHG wipes were easy to use. Although depending on patient adherence may limit the effectiveness of each protocol, the majority of patients found being an active participant in reducing their infection risk a positive experience. There may also be a role for patient education, specifically regarding behavioral changes preoperatively, that can further increase SSI risk reduction. Because most patients enjoyed being active participants in the process of reducing their infection risk, emphasizing and providing assistance for changes such as smoking cessation, weight loss, and abstaining from shaving the surgical area may be simple and cost-effective measures to optimize each patient’s risk reduction.

Previous studies have shown MO to be difficult to obtain for at least 13% of patients. In addition, 54% of patients reported paying out-of-pocket expenses for MO totaling as much as $115 (average, $25), whereas PI nasal antiseptic has a current market unit price of $1.71. Although other studies have described the cost-effectiveness of decolonizing patients with MO prior to elective orthopedic surgery, decolonizing patients with PI may represent a less expensive alternative with comparable efficacy.21

The process of evaluating patient experience and satisfaction has become more important to health care providers as publically reported Hospital Consumer Assessment of Healthcare Providers and Systems survey scores become standard measures of performance. The addition of financial incentives for improving these measures of satisfaction and experience is causing hospital quality improvement activity to become more valuable to health care providers. The benefits of improving a patient’s experience with their preoperative SSI risk reduction protocol extend beyond financial reimbursement. Prior studies have shown that poor patient satisfaction is directly correlated with poor adherence to prescribed treatment.2 This may not only negatively affect patient outcomes, but it can also increase hospital costs associated with care. By improving patient satisfaction, hospitals can also improve current patient retention and decrease costs related to recruiting new patients. This is especially true given that Hospital Consumer Assessment of Healthcare Providers and Systems survey scores are publicly reported data designed to allow consumers easy comparisons among hospitals.3 Isaac et al22 reported that the overall patient rating of the hospital, in particular a willingness to recommend the hospital, was more strongly associated with better technical performance. By making changes to improve patient satisfaction, hospitals may positively affect the technical quality of the care provided and decrease complication rates. S aureus decolonization is a prime example of a program that improves outcomes and is associated with a high degree of patient satisfaction.

REFERENCES


