

Peer-Reviewed Study



Reduced prosthetic joint infection rates with use of supplemental intraoperative air decontamination: A retrospective cohort study.

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Background

Periprosthetic joint infection (PJI) is a common complication after joint arthroplasty surgery with significant economic and human costs. Air contamination is a common but underappreciated source of bacteria etiologic to PJI.

Objective

To determine whether supplemental intraoperative air decontamination reduced the rate of PJI in arthroplasty surgery.

Methods

This is a retrospective observation study which analyzed the incidence of postoperative PJI following a consecutive series of 508 hip, knee and shoulder arthroplasty operations performed at a single institution by between the dates of January 2016 and August 2017. Patients with surgeries between January 2016 and February 2017 received a standard institutional surgical site infection measures, including antibiotic prophylaxis. Patients between March 2016 and August 2017 underwent an identical protocol with the addition of supplemental intraoperative air decontamination (Aerobiotix Illuvia). There were no significant differences in the groups regarding age, BMI, diabetes diagnosis, smoking status, length of surgery, or revision status.

Results

A total of five cases met the criteria for PJI (1.0%). All five cases were recorded during the study period when standard air treatment was used (Table 1). No further cases of PJI were observed after the institution of the supplemental air decontamination. This was statistically significant overall ($p < 0.042$).

Conclusions

Although PJI etiology is multifactorial in nature, this study found that the use of intraoperative air decontamination significantly reduced overall rates of PJI.

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| | Control (n=275) | | HUAIRS (n=233) | |
|----------------------|-----------------|----------|----------------|--------|
| Male | 98 (35.6%) | | 78 (33.5%) | |
| Mean age | 62.7 | | 63.1 | |
| Mean BMI | 33.4 | | 33.2 | |
| Revision | 42 (15.3%) | | 40 (17.1%) | |
| DM dx | 58 (21.1%) | | 61 (26.2%) | |
| Smoker | 48 (17.5%) | | 36 (15.4%) | |
| Mean OR time | 63.5 min | | 60.4 min | |
| | | | | |
| Procedures | | PJI | | PJI |
| Primary hip | 65 (23.6%) | 2 | 69 (29.6%) | 0 |
| Primary knee | 132 (48%) | 0 | 91 (39%) | 0 |
| Primary Shoulder | 5 (1.8%) | 0 | 19 (8.1%) | 0 |
| Revision hip | 9 (3.3%) | 2 | 9 (3.9%) | 0 |
| Revision knee | 24 (8.7%) | 1 | 30 (12.9%) | 0 |
| Revision shoulder | 1 (0.3%) | 0 | 0 (0%) | 0 |
| Bilateral hip | 3 (1.1%) | 0 | 0 (0%) | 0 |
| Bilateral knee | 26 (9.5%) | 0 | 13 (5.6%) | 0 |
| I&D | 7 (2.5%) | 0 | 1 (0.4%) | 0 |
| ORIF | 3 (1.1%) | 0 | 1 (0.4%) | 0 |
| | | | | |
| 16 wk Infection Rate | 5 | 5 (1.8%) | | 0 (0%) |

Table 1. Results of retrospective review of 508 consecutive patients with control group (n=275) and supplemental air (ABX) group (n=233)