Paper #18

Cost Effectiveness of Staphylococcus Aureus Decolonization Strategies in High-Risk Arthroplasty Patients

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Introduction: The risk of prosthetic joint infection (PJI), a rare and costly complication of total joint arthroplasty (TJA), is increased with Staphylococcus aureus (Sa) colonization. The cost-effectiveness of different approaches to decrease the risk of PJI by decolonization is controversial. We sought to evaluate cost-effectiveness of preoperative protocols in high-risk patients.

Methods: A decision analytic model represented the PJI risk under 3 protocols: (1) nasal swab, (2) nasal & 1 other swab, and (3) 4 swabs (nares, axillae, groin, and pharynx). These protocols were also compared to no-testing-no-treatment and universal-decolonization strategies. Sensitivity and costs of the 3 Sa protocols were based on Sa screening results at one large orthopedic hospital between 2008-2015. Results of 4 swab sets were considered the gold standard. PJI risks were derived from literature. Cost effectiveness was evaluated from the hospital (hospital pays for screening and infection costs), patient (patient pays for mupirocin and chlorhexidine), and societal (combined hospital and patients) perspective and expressed in US$ per PJI detected. Stability of the model was evaluated over a range of PJI rates and decolonization effectiveness values.

Results: 1,641 patients were evaluated. Assuming 1.5% PJI risk, base case results showed that universal-decolonization resulted in the largest reduction in number of PJIs, followed by 4 swab, 2 swab and 1 swab strategies (80 PJI vs. 82 PJIs vs. 83 PJIs vs. 83 PJIs/10,000 patients respectively). Nasal-swab-only and universal-decolonization approaches were more cost-effective than the other three strategies. From the patient and societal perspective, the nasal-swab strategy was maximally cost-effective (incremental cost of ~$13,000 per prevented PJI). From the hospital perspective, universal-decolonization was the dominant treatment; however, the nasal swab remained cost-effective (incremental cost of ~$9,000 per prevented PJI). The model results were stable over a range of plausible values.

Conclusions: In a bundled-payment system, selection of meaningful, cost-effective infection prevention strategies is critical. Sa decolonization strategies may benefit high-risk arthroplasty patients. Nasal-only Sa screening or universal-decolonization approaches appear most cost-effective. Additional swabs were cost-ineffective.

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