ANTIBIOTIC PROPHYLAXIS

Cost-effectiveness of antibiotic prophylaxis

BACKGROUND

The routine use of antibiotic prophylaxis (AP) for the prevention of prosthetic joint infection (PJI) in patients undergoing dental care remains a controversial issue. The American Academy of Orthopaedic Surgeons (AAOS) and the American Dental Association (ADA) have not yet agreed upon a prophylaxis guideline to direct clinicians in this area. To further inform the discussion of this issue and the development of a consensus practice guideline, a cost-effectiveness decision model was developed. The benefits, harms, and costs of alternative prophylaxis strategies were compared.

METHODS

Lifetime health outcomes and costs of alternative AP strategies for dental patients age 65 years with a history of total knee arthroplasty (TKA) were plugged into a Markov state-transition model. Incremental cost-effectiveness ratios were used to compare the strategies of no AP, AP for the first 2 years after TKA, and lifetime AP. Quality-adjusted life years (QALYs) were used to convey health effect data. Comparisons of the different treatment strategies were facilitated by considering the incremental cost-effectiveness ratios (ICERs), and ICERS were compared with willingness-to-pay (WTP) thresholds to reflect the suggested thresholds for US health care interventions.

RESULTS

For the no-AP strategy, the average lifetime discounted cost was $17,119 and the QALYs were 11.2151. In contrast, the 2-year AP strategy had incremental costs of $56 and 0.0006 QALYs gained, with an ICER of $95,100 per QALY. Finally, the lifetime AP had the highest average QALYs at 11.2166 and the highest lifetime costs ($17,504). The lifetime AP strategy was not cost-effective at the threshold values used.

Various manipulations of the data were done, varying the model parameters individually over plausible ranges to determine what effect would result. In addition, combinations of potentially important model parameters were varied simultaneously to test the results. Overall, AP was found to be cost-effective only when used for patient populations at higher medical risk of infection.

DISCUSSION

Routine use of AP before invasive dental procedures to prevent prosthetic joint infection is not supported by the cost-effectiveness analysis. The data indicate that AP should be reserved for patients who are at higher risk for developing infection based on medical indications.

Clinical Significance

Lifetime AP was not cost-effective for any of the WTP thresholds used. The 2-year AP strategy was cost-effective only when a low risk estimate for adverse events related to amoxicillin was used. No AP was always cost-effective. Future research should assess AP effectiveness in populations who are at higher medical risk for infection to help fill in the gaps in our current knowledge. There may be clinical circumstances when AP effectively reduces PJI risk for this patient base and where it can be clearly recommended.

Skaar DD, Park T, Swiontkowski MF, et al: Is antibiotic prophylaxis costs-effective for dental patients following total knee arthroplasty? *JDR Clin Translational Res* 4:9-18, 2019

Reprints available from DD Skaar, Dept of Developmental and Surgical Sciences, School of Dentistry, Univ of Minnesota, 515 Delaware St SE, 7-368 Moos Tower, Minneapolis, MN 55455; e-mail: skaar003@umn.edu