

# Q: Should an asymptomatic patient with an abnormal urinalysis (bacteriuria or pyuria) be treated with antibiotics prior to major joint replacement surgery?

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**A:** There are no clear guidelines for the treatment of asymptomatic patients with abnormal urinalysis results prior to major joint replacement surgery. However, the current literature supports treating with a course of antibiotics and proceeding with joint replacement surgery for those asymptomatic patients with evidence of bacteriuria on preoperative evaluation.

## Defining terms

Diagnosis of asymptomatic bacteriuria requires isolation of a specified quantitative count of bacteria (usually  $\geq 10^5$  colony-forming units [CFU]/mL), collected in a manner to minimize contamination, from a person without symptoms or signs referable to urinary infection. In a urinary dipstick specimen, the leukocyte esterase is a more sensitive indicator of bacteriuria than are nitrites. Pyuria is defined as the presence of increased numbers of polymorphonuclear leukocytes in the urine (usually  $\geq 6$  to 10 white blood cells per high-power field).<sup>1</sup>

## Preoperative urinalysis: Common, but cost-effective?

Orthopedic prosthetic surgery is becoming increasingly important as the US population ages and requires more procedures. Deep joint infection continues to be one of the most dreaded complications of total joint arthroplasty, and urinary tract infections (UTIs) are generally believed to be a source for hematogenous seeding of the prosthetic joint. Because of this, routine urinalysis continues to be common practice.

A 1989 cost-effectiveness study of elective clean-wound, nonprosthetic knee procedures estimated that approximately \$7 million is spent annually on preoperative urinalysis and its consequent treatment in the United States.<sup>2</sup> This study estimated that about five wound infections may be prevented annually with routine urinalysis prior to these knee procedures in the United States, at a cost of \$1.5 million per wound infection prevented, and that the cost of treating additional cases of wound infection is approximately 500-fold less

than the cost of screening with routine urinalysis.<sup>2</sup> The cost-effectiveness of preoperative urinalysis in prosthetic joint surgery has not been studied extensively.

## A limited literature on connections between deep joint infection and preoperative UTI

In a review of the literature on the risk of deep joint infection in patients with abnormal perioperative urinalyses, David and Vrahas noted that several case reports in the 1970s linked postoperative UTIs to prosthetic joint infection but that the literature supporting a correlation between preoperative UTIs and deep joint infection following total joint arthroplasty is inadequate.<sup>3</sup> A 1974 retrospective study of 274 total hip replacements found that 5 patients with deep joint infection had perioperative UTI.<sup>4</sup> However, only in 3 patients were the same organisms isolated from the urinary tract and the hip. Of these 3 patients, who had risk factors for joint infection (diabetes or rheumatoid arthritis), only 1 had a documented preoperative urinalysis.<sup>4</sup>

Few studies have evaluated the risk of deep joint infection associated with the presence of asymptomatic UTI in the preoperative setting.

A 1987 retrospective analysis of 277 patients undergoing 364 total joint replacements showed that 35 patients had evidence of preoperative or perioperative UTI with colony counts greater than  $10^5$  CFU/mL on preoperative “clean catch” urine specimens.<sup>5</sup> Only 3 patients (1.1%) developed joint infections—at 9, 19, and 45 months, respectively—and none was secondary to perioperative UTI.

A 1984 retrospective analysis of 299 patients admitted for hip or knee arthroplasty found that 57 patients (55 asymptomatic and 2 symptomatic) had bacteriuria on admission.<sup>6</sup> Twenty of the 57 patients went to surgery before the routine culture results were available but received appropriate antibiotics postoperatively for treatment of UTI. Eighteen of the 57 patients had preoperative UTI and underwent surgery during a treatment course of antibiotics. The remaining 19 patients

All authors reported that they have no commercial affiliations or financial interests that pose a potential conflict of interest with this article.

had completed their antibiotic course prior to surgery and received no intraoperative or postoperative antibiotics for UTI. Deep joint infection was not seen in any patients at 3-month follow-up, prompting the authors to conclude that asymptomatic bacteriuria is common and should not be a cause for postponement of surgery. These findings suggest that a treatment course of antibiotics can be implemented at any time perioperatively once urinalysis results are known to be abnormal.

In a prospective multicenter study of 362 knee and 2,651 hip operations published in 1992, deep joint infections were diagnosed at 1-year follow-up in 9 of 362 patients (2.5%) after knee arthroplasty and in 17 of 2,651 patients (0.64%) after hip arthroplasty.<sup>7</sup> All patients had received a short course of perioperative cefuroxime. Univariate analysis showed no association between deep joint infection and preoperative UTI ( $> 10^5$  CFU/mL), although multivariate analysis showed that postoperative UTI increased the incidence of hip joint infections.

### A few risk factors merit more caution

More caution is indicated in patients who are determined to be at a higher risk for deep joint infections. In a study of 12,118 primary knee arthroplasties, risk factors for an increased incidence of joint infection included a large prosthesis, postoperative wound-healing complications, rheumatoid arthritis, a prior deep infection, and skin infections.<sup>8</sup> In other studies, patients with diabetes, prior hip surgeries, or posttraumatic degenerative joint disease have had a higher incidence of deep joint infection.<sup>9,10</sup>

### Conclusions

There are no treatment guidelines for the management of asymptomatic bacteriuria or pyuria prior to major

joint replacement surgery. A strategy of treating asymptomatic patients who have urine counts greater than  $10^5$  CFU/mL with an effective perioperative course of antibiotics and proceeding with surgery seems reasonable, based on the limited literature.<sup>3-5</sup> Treatment of patients with asymptomatic preoperative pyuria is less clear. Clinicians may consider more aggressive management of asymptomatic bacteriuria and pyuria if other risk factors for postoperative deep joint infection are present.

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