Are Antibiotics Necessary in Hip Arthroplasty With Asymptomatic Bacteriuria? Seeding Risk With/Without Treatment

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Abstract

Background In patients with asymptomatic bacteriuria undergoing hip arthroplasty, the risk of prosthetic joint infection (PJI) and appropriateness of specific antibiotics are unclear. **Questions/purposes** We determined (1) the prevalence of asymptomatic bacteriuria; and (2) the incidence of PJI in patients with asymptomatic bacteriuria managed with or without specific antibiotics.

Methods We conducted a prospective, randomized study of all 471 patients without urinary symptoms receiving a total hip arthroplasty (THA; n = 228; average age 68 years;

122 female) or hemiarthroplasty (HA; n = 243; average age 85 years; 170 female) between April 2009 and November 2010. No patients were catheterized in the perioperative period and all received intravenous cefazolin (allergy, vancomycin) for 48 hours postoperatively. Urinalysis was conducted on all patients; if abnormal, a urine culture was performed. Patients with bacteriuria (> 100,000 colonies/mL cultured) were randomly assigned to receive specific antibiotics (Group A) or not (Group B). Minimum followup was 1 month including those six who died or were lost to followup (average, 10.4 months; range, 1–12 months).

Results Asymptomatic bacteriuria occurred in eight of 228 patients undergoing THAs (three of eight with specific antibiotics) and 38 of 243 patients undergoing HAs (23 of 38 with specific antibiotics). Arthroplasty infection after 3 months occurred in one of 228 patients undergoing THAs and 12 of 243 patients undergoing HAs (six of 117 in Group A and six of 126 in Group B); bacteria cultured from the wound were dissimilar to those cultured in urine samples in any case. No patient presented signs of PJI by 1 year after the index surgery.

Conclusions We identified no case of PJI from urinary origin in patients with asymptomatic bacteriuria whether or not they had been treated with specific antibiotics.

Level of Evidence Level IV, therapeutic study. See Guidelines for Authors for a complete description of levels of evidence.

Each author certifies that he or she, or a member of his or her immediate family, has no funding or commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted article.

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Introduction

Urinary infection is reportedly a risk factor for hematogenous infection in hip arthroplasty [2, 3, 6, 12, 16, 22, 25, 27, 28, 32], raising the risk by 2 to 18 [6, 28]. Although perhaps a different clinical situation, the prevalence of

asymptomatic bacteriuria increases with age, from 1% among schoolgirls to > 40% among women older than 80 years [4, 11, 14, 18, 19]. Among men older than 75 years residing in the community, the prevalence is 6% to 20% [14, 18, 19].

Several papers describe preoperative asymptomatic bacteriuria in patients undergoing hip arthroplasty [8, 10, 20, 23]. Glynn and Sheehan [10] found a prevalence of 28% in female and 8% in male patients undergoing hip or knee arthroplasty. Otermin et al. [20] referred positive leukocytes in 162 of 895 (18%) preoperative urinalysis in patients undergoing arthroplasty (407 hips), but they did not obtain urine cultures. It is unclear whether it is important to detect preoperative asymptomatic bacteriuria. David and Vrahas [8] proposed pyuria (more than 1000 white blood cells/mL in urinalysis) as a preliminary screening criterion for urine culture. Rajamanickam et al. [23] recommended performing a urinalysis before hip arthroplasty only when a urinary catheter was anticipated postoperatively, then obtaining a urine culture if urinalysis was abnormal. Furthermore, the appropriateness of treating patients undergoing hip arthroplasty with asymptomatic bacteriuria is unclear. Glynn and Sheehan [10] reported pre-, intra-, and/or postoperative treatment with a specific antibiotic according to the sensitivity of the cultured organisms, but they did not postpone surgery in their asymptomatic patients. The reviews (expert opinions with Level V of Evidence) [8, 20, 23] recommend to proceed with total joint arthroplasty and treating those patients with asymptomatic bacteriuria with an 8- to 10-day postoperative course of an appropriate oral antibiotic [8], with perioperative specific antibiotics [23], or with cefuroxime if preoperative pyuria is detected [20]. Other papers [18, 19] provide general recommendations for either treating or not treating asymptomatic patients with bacteriuria, but not in patients who will undergo hip arthroplasty.

We therefore determined: (1) the incidence of preoperative asymptomatic bacteriuria in patients undergoing THA and those undergoing hemiarthroplasty (HA); and (2) the prevalence of prosthetic joint infection (PJI) in THAs and HAs when patients with preoperative asymptomatic bacteriuria are managed without or with specific antibiotics.

Patients and Methods

We prospectively identified patients with asymptomatic bacteriuria from among all 471 patients treated with THA ($n = 228$) or HA ($n = 243$) from April 2009 to November 2010 and who fulfilled inclusion and exclusion criteria (Table 1). Patients with asymptomatic bacteriuria were randomly treated with no antibiotics or those specific for cultured organisms. For the study we included patients

undergoing hip arthroplasty without preoperative urinary symptoms or signs (including dysuria, frequency, urgency, suprapubic pain, pyuria, and/or cloudy/malodorous/bloody urine) and without active infections elsewhere. We excluded 12 patients who had urethral catheterization during surgery or during the postoperative period (Table 1) and 22 who had presumed contamination of repeated urine cultures (Table 2). The average age of patients undergoing HA was 84 years and the proportion of female patients was high: 170 of 243 (70%). The average age of patients undergoing THA was 68 years and 122 of them (54%) were female (Table 1).

The incidence of infection in patients undergoing hip arthroplasty is reportedly 0.3% to 2.2% for THA [15, 28, 29] and from 1.7% to 7.2% for HA [7, 24, 26]. Pathogenesis for most of these infections involves direct contamination, whereas distant seeding accounts for 10% to 20% of them. Moreover, the urinary tract is only one of the possible sources, being responsible for approximately 13% of hematogenous contamination [17]. Taking into account all of these circumstances, risk of arthroplasty infection from a urinary focus varies from 0.004% to 0.19%. Assuming that specific antibiotics could prevent distant seeding in 90% to 100% of these cases, it supposes an absolute risk reduction of 0.0036% to 0.19%. Thus, from 500 to 25,000 hip patients with asymptomatic bacteriuria treated with specific antibiotics would be needed to prevent one arthroplasty infection from a urinary focus.

Urinalysis was performed on all included patients 12 hours before surgery (when they arrived in the hospital). This urinalysis was received after 1 hour (approximately 10 hours before surgery) and considered abnormal if at least one of the following variables was positive: density < 1.006 or > 1.030, pH < 4.6 or > 7.0, white blood cell count > 5, positive leukocytes, positive nitrites, positive bacteriuria, and/or pyuria [18, 19]. Sixty-six of the 228 patients having a THA (28.9%) had an abnormal urinalysis, whereas 115 of the 243 who had HA (47.3%) did. If urinalysis was abnormal, a urine culture was immediately performed (approximately 10 hours before surgery). Results of quantitative urine culture were received after 24 hours (several hours after surgery). These results were considered negative if < 10,000 colony-forming units (CFUs) of a microorganism were cultured; it was repeated when > 10,000 CFUs but < 100,000 CFUs appeared and diagnosed as positive if > 100,000 CFUs were isolated. Only patients with positive urine culture, that is with > 100,000 CFUs, were diagnosed with asymptomatic bacteriuria [9, 14]. Repeated cultures were reported as grossly contaminated (ie, when three or more different species of microorganisms were detected) in two of 228 patients undergoing THA (0.9%) and in 20 of 243 patients undergoing HA (8.2%) (Table 2); these 22 patients were excluded per the previous criteria.

Table 1. Demographics and urinalysis in each group of patients

Demographic and urinalysis	THA Group A (with urinary treatment)	THA Group B (without treatment)	THA Group A versus Group B	HA Group A (with urinary treatment)	HA Group B (without treatment)	HA Group A versus Group B
Number of patients	111	117		117	126	
Age (years) (average $\pm$ SD)	68 $\pm$ 12	69 $\pm$ 14	p = 0.420	85 $\pm$ 8	84 $\pm$ 8	p = 0.247
Sex	F: 59/111 (53%) M: 52/111 (47%)	F: 63/117 (54%) M: 54/117 (46%)	p = 0.916	F: 81/117 (66%) M: 36/117 (32%)	F: 90/126 (71%) M: 36/126 (29%)	p = 0.399
Urethral catheterization (intra- or postoperative) (exclusion criteria)	2/111 (1.8%)	3/117 (2.6%)		4/117 (3.4%)	3/126 (2.4%)	
Abnormal urinalysis	35/111 (32%)	31/117 (27%)		60/117 (51%)	55/126 (44%)	

HA = hemiarthroplasty; F = female; M = male.

Patients were randomized to one of two groups (A or B) with an automatic randomization machine. Two of the authors (EG-F, DM-V) were in charge of generating the random allocation sequence, enrolled participants, and assigned participants to interventions. Those patients included in Group A received specific antibiotic treatment for 7 days according to microorganism susceptibility in urine culture. Treatment began the operation day, typically 12 hours after completion of surgery. Group A (receiving specific treatment for asymptomatic bacteriuria) was composed of three patients undergoing THA and 23 patients undergoing HA (Table 2). Posttreatment urine cultures were not performed. Those patients included in Group B received no antibiotics except a conventional prophylaxis protocol. Group B consisted of five patients undergoing THA and 15 patients undergoing HA. There were no differences in sex (THA: $p = 0.916$; HA: $p = 0.399$) or ages (THA: $p = 0.420$; HA: $p = 0.247$) of patients included in Group A (urinary treatment) and in Group B (no urinary treatment) (Table 1).

All patients received the conventional antibiotic prophylaxis protocol used in our department: 2 g intravenous cefazolin (1 g vancomycin if allergic) immediately preoperatively and 1 g cefazolin every 8 hours (1 g vancomycin every 12 hours if allergic) for 48 hours postoperatively.

Our followup protocol included clinical interview (Harris hip score questionnaire), blood analysis (hemogram with total leukocyte count and differential count, erythrocyte sedimentation rate [ESR], and C-reactive protein [CRP]), and radiographic control (standard AP and frog-lateral view of the hip with the patient supine and x-ray tube perpendicular and 1 meter away from the cutaneous surface) of all patients in our external offices after 1, 3, 6, and 12 months. One year after THA, three of 228 patients (1.3%) were lost to followup, whereas another three (1.3%) died of causes unrelated to surgery or bacteriuria; there were no symptoms or signs suspicious of arthroplasty

infection in all the medical records of these three patients who died. By 1 year after HA, 12 of 243 patients (4.9%) were lost to followup and another 45 (18.5%) died; none of these patients who died presented symptoms or signs suspicious of arthroplasty infection in all the medical records along all their followup (Table 3).

An arthroplasty infection was investigated in any patient if chronic moderate/severe pain, persistent regional inflammatory signs (erythema and/or swelling), wound drainage, wound dehiscence, fistula, leukocyte count (total and differential), CRP, ESR, and/or radiographic signs suggestive of infection were present at any time during followup [6]. Radiographic signs include periostitis (periosteal reaction), endosteal scalloping, and ring osteolysis (focal resorption); infection is likely if there is rapid onset of osteolysis or endosteal scalloping in the absence of obvious mechanical causes such as poorly implanted prostheses and/or excessive polyethylene wear [28–31]; early implant loosening may alert for a dormant underlying infection [21]. Diagnosis of infection in an arthroplasty required: (1) clinical and/or analytical symptoms and signs (unexplainable pain and/or draining sinus and/or persistent local erythema plus swelling and/or CRP greater than 1 mg/dL and ESR greater than 30 mm in the first hour [Katz index]) as well as (2) microbiological confirmation (three or more positive cultures with the same organisms from intraoperative samples and/or cultures of joint aspiration).

Homogeneity of sex between Groups A and B was analyzed with the Pearson chi-square test. Homogeneity of age between Groups A and B was analyzed with Student's t-test. We calculated also 95% confidence intervals for incidence/prevalence of asymptomatic bacteriuria. Eventual differences between Groups A and B in arthroplasty infection from urinary focus should be analyzed by Poisson. All statistical calculations were made by means of SAS 9.1 software (SAS Institute Inc, Cary, NC, USA).

Table 2. Urine cultures in each group of patients

Urine culture	THA Group A (with urinary treatment)	THA Group B (without treatment)	HA Group A (with urinary treatment)	HA Group B (without treatment)
Positive urine culture ($\geq 100,000$ CFUs) in total series	3/111 (2.7%)	5/117 (4.3%)	23/117 (20%)	15/126 (12%)
Positive urine culture ($\geq 100,000$ CFUs) in patients with abnormal urinalysis	3/35 (8.6%)	5/31 (16%)	23/60 (38%)	15/55 (27%)
Bacteria identified in positive urine cultures (specific antibiotics administered to patients in Group A) (bacteria sensible [Y] or not sensible [N] to cephalosporins used for prophylaxis protocol)	1 <i>Pseudomonas aeruginosa</i> (fosfo) 1 <i>Escherichia coli</i> (amox-clavul) 1 <i>Klebsiella pneumoniae</i> (cipro)	3 <i>E. coli</i> (1Y, 2N) 1 <i>P. aeruginosa</i> (N) 1 <i>Proteus mirabilis</i> (N)	5 <i>E. coli</i> (amox-clav) 4 <i>E. coli</i> (fosfo) 2 <i>E. coli</i> (cipro) 1 <i>P. aeruginosa</i> (cipro) 1 <i>P. aeruginosa</i> (levo) 1 <i>P. aeruginosa</i> (fosfo) 1 <i>P. aeruginosa</i> (cefta+cipro) 1 <i>P. mirabilis</i> (amox-clav) 1 <i>P. mirabilis</i> (imipenem) 1 <i>Enterococcus faecalis</i> (amox-clav) 1 <i>E. faecalis</i> (cipro) 1 <i>Klebsiella oxytoca</i> (amox-clav) 1 <i>K. pneumoniae</i> + <i>M. morganii</i> (CMX) 1 <i>Citrobacter freundii</i> (cipro) 1 mixed flora (amox-clav)	8 <i>E. coli</i> (4 Y, 4 N) 2 <i>P. aeruginosa</i> (N) 1 <i>Escherichia cloacae</i> (N) 1 <i>E. faecalis</i> (N) 1 <i>E. coli</i> + <i>P. aeruginosa</i> (N) 1 <i>E. coli</i> + <i>E. faecalis</i> (N) 1 <i>E. coli</i> + <i>P. mirabilis</i> (N)
Repeated urine cultures with gross contamination (exclusion criteria)	2/111 (1.8%)	0/117 (0%)	9/117 (7.7%)	11/126 (8.7%)

HA = hemiarthroplasty; CFUs = colony-forming units; Y = yes; N = no; fosfo = fosfomicin; amox-clavul = amoxicillin-clavulanic; cipro = ciprofloxacin; levo = levofloxacin; cefta = ceftazidime; CMX = cotrimoxazole.

Table 3. Followup and arthroplasty infection in each group of patients

Group of patients	THA Group A (with urinary treatment)	THA Group B (without treatment)	HA Group A (with urinary treatment)	HA Group B (without treatment)
Arthroplasty infection after 3 months in total series (with bacteria cultured)	1/111 (0.9%) 1 (negative cultures from fistula and surgical débridement)	0/117 (0%)	6/117 (5.1%) (2 MSSE, 2 MRSE, 1 <i>Staphylococcus hominis</i> , 1 MRSA + <i>Proteus mirabilis</i> + <i>Corynebacterium spp</i>)	6/126 (4.8%) (1 MSSE 2 MRSA 1 <i>Pseudomonas aeruginosa</i> 1 <i>P aeruginosa</i> + <i>Enterococcus cloacae</i> 1 <i>Klebsiella pneumoniae</i> + <i>P mirabilis</i>)
Arthroplasty infection after 3 months in patients with normal urinalysis	0/76 (0%)	0/86 (0%)	3/57 (5.3%)	4/71 (5.6%)
Arthroplasty infection after 3 months in patients with abnormal urinalysis but negative urine culture	1/32 (3.1%)	0/26 (0%)	2/37 (5.4%)	2/40 (5%)
Arthroplasty infection after 3 months in patients with asymptomatic bacteriuria	0/3 (0%)	0/5 (0%)	1/23 (4.3%)	0/15 (0%)
Lost to followup to 1 year	1/111 (0.9%)	2/117 (1.7%)	5/117 (4.3%)	7/126 (5.6%)
Exitus before 1 year	0/111 (0%)	3/117 (2.6%)	17/117 (15%)	28/126 (22%)
Arthroplasty infection after 1 year	0/111 (0%) (1 infection at 3 months is healed)	0/117 (0%)	0/117 (0%) (3 infections at 3 months are healed) (3 patients have died)	0/126 (0%) (4 infections at 3 months are healed) (2 patients have died)

HA = hemiarthroplasty; MSSE = methicillin-sensitive *Staphylococcus epidermidis*; MRSE = methicillin-resistant *S epidermidis*; MRSA = methicillin-resistant *S aureus*.

Results

Eight of 228 patients undergoing THA (3.5%) (95% confidence interval [CI], 1.5%–6.8%) and 38 of 243 patients undergoing HA (16%) (95% CI, 11%–21%) presented positive urine cultures. Microbiological results from those eight of 228 patients undergoing THA (seven of them female) showed four *Escherichia coli*, two *Pseudomonas aeruginosa*, one *Proteus mirabilis*, and one *Klebsiella sp.* Three were randomly assigned to Group A and treated with specific antibiotics (fosfomycin, ciprofloxacin, amoxicillin-clavulanic acid) and the other five were assigned to Group B and not treated (Table 2). Only one *E coli* in this THA Group B was sensible to cefazolin in prophylaxis (Table 2). Urine cultures from 38 of 243 patients undergoing HA (29 female) included 21 *E coli*, seven *P aeruginosa*, four *Enterococcus sp*, three *P mirabilis*, two *Klebsiella sp*, and one *Enterobacter cloacae*; 23 were randomly assigned to Group A and treated with specific antibiotics (fosfomycin, ciprofloxacin, levofloxacin, amoxicillin-clavulanic, ceftazidime, imipenem, cotrimoxazole), whereas the other 15 were assigned to Group B and not treated at all (Table 2). Only four *E coli* in HA Group B were sensitive to cefazolin used for prophylaxis (Table 2).

After 3 months of followup, one patient in THA Group A presented signs of arthroplasty infection (a chronic fistula), but cultures of fistula and multiple (six) intraoperative tissue samples were negative. After 3 months of followup, six of 117 (5.1%) patients undergoing HA in Group A and six of 126 (4.8%) in Group B (without specific urinary treatment) presented signs of HA infection and positive cultures from the wound; in no case were the bacteria found in these cultures the same as those identified in the corresponding urine cultures (Table 3). The patient with the infected THA had presented an abnormal urinalysis but a normal urine culture (that is, she did not have preoperative asymptomatic bacteriuria) (Table 3); her PJI was treated with débridement plus empiric antibiotics; the wound healed. Among the six patients in Group A with infected HA, three had presented normal urinalysis, two abnormal urinalysis but negative culture, and one a positive urine culture (Table 3). Among the six infected HAs in Group B, four had presented normal urinalysis and two abnormal urinalysis but negative urine culture (Table 3). At 1-year followup, no patient in THA Groups A or B had signs of PJI (Table 3). After 1 year of followup, no patient undergoing HA in either group

presented signs of PJI; in seven of them, the infection present at 3 months had healed (three in Group A and four in Group B) and five died (three in Group A and two in Group B) (Table 3).

Discussion

Urinary infection is a reported risk factor for hematogenous PJI [2, 3, 6, 12, 16, 22, 25, 27, 28, 32]. A related but absolutely different clinical situation, asymptomatic bacteriuria, presents an increasing prevalence with age and female sex, from 1% among schoolgirls to >40% among women older than 80 years [4, 11, 14, 18, 19]. There are four papers about preoperative asymptomatic bacteriuria in patients undergoing hip arthroplasty [8, 10, 20, 23]. Prevalence is reported from 8% to 28% [10]. It is unclear whether it is important to detect preoperative asymptomatic bacteriuria as well as the best approach for that [8, 23]. Furthermore, the appropriateness of treating patients undergoing hip arthroplasty with asymptomatic bacteriuria is unclear. Recommendations include not to postpone surgery but to treat those asymptomatic patients with preoperative empiric antibiotics [20] or with perioperative [10] or postoperative [8, 23] specific antimicrobial therapy. Our purposes were therefore (1) to determine the prevalence of asymptomatic bacteriuria in patients undergoing hip arthroplasty; and (2) to analyze the incidence of PJI when patients with asymptomatic bacteriuria are managed with or without specific antibiotics.

Readers should be aware of the limitations of our study. First, we had a relatively small series considering the relatively low incidence of infection. The reported incidence of hip arthroplasty infection varies from 0.3% to 7.2% [7, 15, 24, 26, 28, 29]; of these, distant seeding accounts for 10% to 20%, and urinary tract is only one of the possible sources (responsible in 13%) [17]. Then risk of PJI from urinary focus varies from 0.004% to 0.19%. If specific antibiotics could prevent 100% of cases, the absolute risk reduction could vary from 0.0036% to 0.19%, that is, from 500 to 25,000 hip patients with asymptomatic bacteriuria should receive specific antibiotics to prevent one arthroplasty infection from urinary focus. We have included prospectively almost 500 patients and followed them up to 1 year. The other previously published study [10] is retrospective with a shorter followup (3 months), and the series is smaller: 299 patients (including 10% total knees). Second, gross contamination of repeated urine cultures forced us to exclude approximately 8% of patients undergoing HA. This event could be expected because of their hip fracture and advanced age. Hip fracture provoked severe pain with thigh movement, making difficult the meticulous hygiene necessary for obtaining a noncontaminated urine sample. Advanced age was accompanied by

frequent dementia, so it is hard to manage a correct urine collection (to eliminate the first third of urine void and then to collect the intermediate third of urine void) in demented patients.

Eight of 228 patients undergoing THA (3.5%) and 38 of 243 patients undergoing HA (16%) presented positive urine cultures. Our figures are lower than those published previously for patients undergoing arthroplasty (28% in females and 8% in males) [10]. Moreover, they are similar or even lower than those published for the general population of the same age: 5% to 6% in women from 18 to 40 years [11]; 3% to 5% in women from 38 to 60 years [4]; 5% to 21% in men older than 65 years; 6% to 16% in women from 65 to 90 years old; and 22% to 43% in women older than 90 years [14]. Perhaps the carefulness and asepsis when taking urine samples may explain this variability.

After 3 months of followup, only one patient in THA Group A (those receiving specific antibiotics) presented signs of arthroplasty infection, but wound cultures were negative. At 1-year followup, no patient in THA Group A or B had signs of infection. A common dilemma in clinical medicine is whether to treat asymptomatic patients who present with bacteria in their urine [5, 20]. The number of articles addressing this issue is limited [5, 8, 10, 18–20, 23]. Because of increasing antimicrobial resistance, it is important not to treat patients with asymptomatic bacteriuria unless there is evidence of potential benefit, and THA is not included in general recommendations [5, 18, 19]. The absence of THA infections arising from a urinary focus in our series, even when the patients were not treated with specific antibiotics, supports the appropriateness of this recommendation. On the other hand, three papers [8, 10, 23] recommend treating asymptomatic bacteriuria with specific oral antibiotics before arthroplasty. In the only clinical series [10] (the other two papers are literature reviews and expert opinions), 20 of the 57 cases with asymptomatic bacteriuria were operated on before the results of culture were available, and 18 of 57 were operated on before finishing the specific antibiotic treatment; no wound infection by the same bacteria developed in any patient, thus providing no evidence to support the recommendation [10]. The other two papers [8, 23] recommended specific antibiotics and postponing surgery in case of symptoms (obstruction, irritation) but not to postpone surgery in asymptomatic patients. Other studies in the literature [1, 12, 13, 22, 25, 32] have analyzed a related but clearly different clinical situation, patients undergoing arthroplasty with a urinary tract infection (patients with urinary symptoms): risk factors in 17 PJIs among 2651 hip arthroplasties [32], risk of hematogenous infection in 1112 arthroplasties with 284 distant infections [1], urinary infection as a risk factor for PJI in 9245 arthroplasties [22], relation of 123 PJI with 37 urinary

infections [13], and influence of urinary infections or manipulations [12] on PJI in 364 arthroplasties [25].

After 3 months of followup, six of 117 patients undergoing HA (5.1%) in Group A (receiving urinary treatment) and six of 126 (4.8%) in Group B presented signs of HA infection and positive cultures from the wound; in no case were the bacteria the same as those in urine. After 1 year of followup, no patient in either group presented signs of arthroplasty infection (Table 3). Cordero-Ampuero and de Dios [6] reported urinary infection is a risk factor for deep prosthetic infection in hemiarthroplasties. Urinary catheterization, especially if long-term or repeated, is more frequent in PJIs in patients undergoing HA [7]. In a meta-analysis Southwell-Keely [30] identified 15 randomized trials and found most studies recommended a single dose of a cephalosporin as the best prophylactic antibiotic regime for avoiding urinary infection (and wound infection) in hip fracture surgery. However, these studies did not consider the problem of asymptomatic bacteriuria as a focus for distant seeding and HA infection.

The prevalence of abnormal urinalysis and asymptomatic bacteriuria is high, especially in patients undergoing HA, although our figures are lower than those previously published. Despite these frequent findings, we have not diagnosed any arthroplasty infection with the same bacteria as those found in urine cultures either in the group treated with specific antibiotics (this is coincident with previous published series) or in the group not treated at all. Our limited data suggest preoperative asymptomatic bacteriuria is not a cause for distant seeding of infection in hip arthroplasty. We believe screening for and treatment of asymptomatic bacteriuria are difficult to justify in patients awaiting hip arthroplasty.

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