



Two-Stage Arthroplasty for Prosthetic Joint Infection A Systematic Review of Acute Kidney Injury, Systemic Toxicity and Infection Control

Andrew Luu, MD ^{a,1}, Fahd Syed, MD ^{b,1}, Gowri Raman, MD, MS ^c, Anshul Bhalla, MBBS ^d,
Eavan Muldoon, MBBChBAO, MD ^e, Susan Hadley, MD ^e, Eric Smith, MD ^f, Madhumathi Rao, MD, PhD ^d

^a Tufts University School of Medicine, Boston, MA, USA

^b Department of Internal Medicine, Mt. Auburn Hospital, Boston, MA, USA

^c Division of Evidence-based Practice Center (EPC), Institute for Clinical Research and Health Policy Studies, Tufts Medical Center, Boston, MA, USA

^d Division of Nephrology, Tufts Medical Center, Boston, Massachusetts

^e Division of Geographical Medicine/Infectious Diseases, Tufts Medical Center, Boston, Massachusetts

^f Division of Orthopedic Surgery, Tufts Medical Center, Boston, Massachusetts

ARTICLE INFO

Article history:

Received 30 November 2012

Accepted 22 February 2013

Keywords:

acute kidney injury
prosthesis-related infections
arthroplasty
hip
knee
aminoglycoside
bone cement

ABSTRACT

Periprosthetic infections of hip and knee joints are now treated by two-stage revision arthroplasty with an infection control rate of 91%. The present systematic review studied the reported incidence of acute kidney injury (AKI) and infection recurrence from January 1989 to June 2012 to assess the risk–benefit ratio of antibiotic spacer use. Ten observational studies ($n = 544$ patients) with clinical outcomes showed an average incidence of AKI of 4.8%. The average reported persistence or recurrence rate of infection was 11% during a follow-up period that ranged from 13 to 108 months. The risk–benefit ratio presently favors treatment although there appears to be higher complication rates and incidence of AKI than previously reported. Marked heterogeneity in practice and lack of detail in reporting precluded more robust quantitative synthesis. Clinicians need to be aware of the potential risk of AKI, particularly in high-risk patients; practice patterns for the use of antibiotic spacers need to be standardized.

© 2013 Elsevier Inc. All rights reserved.

There are roughly a million joint arthroplasties performed each year in the United States (American Academy of Orthopedic Surgeons) and between 1% and 2% of these arthroplasties result in a prosthetic joint infection (PJI) [1]. Two-stage arthroplasty is currently the treatment of choice for infected hip and knee joint prosthesis [2]. The high local antibiotic levels exceeds the minimum inhibitory concentration (MIC) of many potential organisms; additionally, spacers preserve joint space and mobility thereby improving functional outcome as measured by the Harris Hip Score [2]. It is also generally believed that lack of vascularity of the spacer prevents toxic systemic concentrations. This technique has more than 90% success rate in terms of eradication of joint space infection [3]. Reports of recurrent infection have ranged from 2% to 20% but individual studies have been small and confined to single-center reports.

Despite widespread use of antibiotic-loaded spacers in the treatment of PJI, data on the systemic complications of antibiotic

spacers, specifically acute kidney injury (AKI), have been limited. Little is published on the systemic absorption of antibiotics eluted or their systemic toxicity [2]. Allergic reactions, acute renal failure, temporary hepatic enzyme elevation and temporary bone marrow suppression in individual cases have been reported [4–11]. Aminoglycosides and vancomycin are the most common antibiotics used, and AKI has been reported in 2%–6% of patients undergoing spacer placement, [3,6,12,13] although the true incidence may be higher. Risk factors for developing AKI have not been addressed.

Our objective was to carry out a systematic review of literature to examine the incidence of systemic complications from the use of antibiotic-loaded hip and knee spacers with emphasis on AKI. We also aimed to identify risk factors and the relationship between systemic antibiotic levels and its clinical course. Finally, we examined the rate of recurrent infection to assess the risk–benefit ratio of antibiotic spacer use.

Materials and Methods

We searched Ovid Medline from January 1989 to June 2012 (Appendix Table 1; available online at www.arthroplastyjournal.org and Fig. 1). Key search terms included antibacterial agents, including aminoglycosides, gentamicin, and tobramycin, prosthesis-related infections, antibiotic spacers, PMMA (polymethylmethacrylate),

Supplementary material available at www.arthroplastyjournal.org.

The Conflict of Interest statement associated with this article can be found at <http://dx.doi.org/10.1016/j.arth.2013.02.035>.

Reprint requests: Madhumathi Rao, MD, PhD, FRCP(E), Tufts University School of Medicine, Division of Nephrology Tufts Medical Center, Boston MA 02111.

¹ Equal contribution.

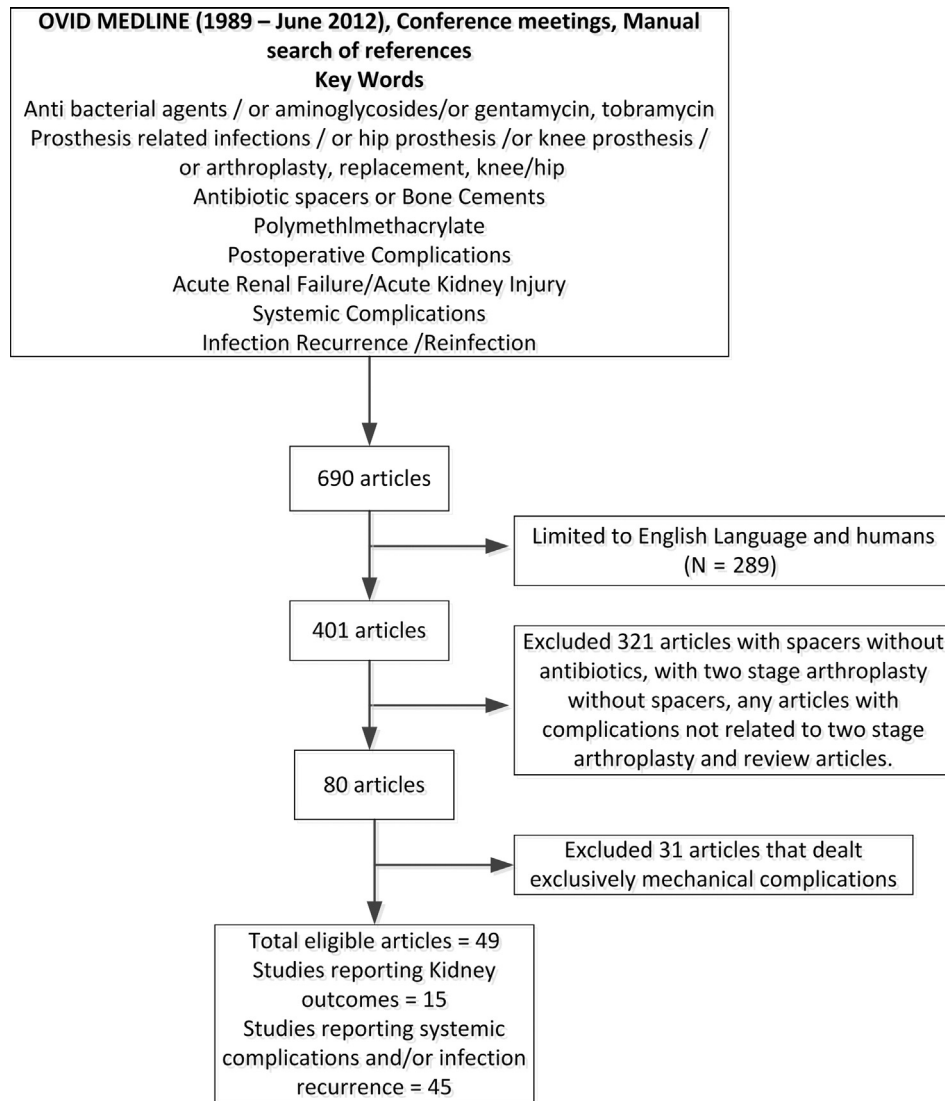


Fig. 1. Flowchart of search criteria and study selection for inclusion in the systematic review.

arthroplasty (knee and hip), post-operative complications or systemic complications, infection recurrence and reinfection and drug elution. We reviewed articles published in English. This search strategy yielded a total of 401 citations.

Our eligibility criteria covered all original reports dealing with two-stage revision arthroplasty and their outcomes including post-operative and systemic complications, in particular AKI and control of infection. We considered observational studies, clinical trials, case series or case reports and systematic review articles. Abstracts and manuscripts were reviewed by three independent investigators (M.R., A.L., F.S.) to determine eligibility. Reference lists from all reviewed articles including relevant narrative reviews were assessed to complete the literature search. Information from unpublished data such as conference abstracts was also included.

Data regarding the methods and results of each of the articles included in the study was extracted into a spreadsheet database. The investigators reviewed the data and conflicting data were re-checked from the original papers and corrected after discussion.

As available literature was heterogeneous and did not provide complete and quantitative information, a qualitative and descriptive summary of the results was compiled with regard to risk factors or other relevant covariates. No meta-analysis was performed. However, where appropriate, the individual study was used as a unit of analysis, given

that these were single-center reports, under the assumption that there would be internal consistency in their practice patterns. Information from conference abstracts are presented but not included in any compilations of numerical data. We followed standard systematic review methods as outlined in the “Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement” [14].

Results

We identified 10 published observational studies [6,7,10,12,13,15–19] and 5 published case reports [4,5,8,9,11] addressing patients with two-stage arthroplasty that specifically examined systemic complications including AKI; we also found 3 related conference abstracts [20–22]. In addition there were 40 studies that addressed infection recurrence [6,7,10,11,13,15,16,23–55] (Fig. 1).

Studies Addressing Acute Kidney Injury Among Patients Undergoing Two-Stage Arthroplasty

Observational Clinical Studies

The 10 studies included a total of 544 subjects (Table 1). The gender distribution was 310 males and 224 females (not reported in one study—Chohfi et al. [15], 10 patients). There were 316 hip revision

Download English Version:

<https://daneshyari.com/en/article/4061116>

Download Persian Version:

<https://daneshyari.com/article/4061116>

[Daneshyari.com](https://daneshyari.com)