



Arthroplasty in patients with rare conditions

Arthroplasty in organ transplant patients

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ABSTRACT

The number of solid organ transplants performed in the United States continues to increase annually as does survival after transplant. These unique patients are increasingly likely to present to arthroplasty surgeons for elective hip or knee replacement secondary to a vascular necrosis from chronic immunosuppression, or even age-related development of osteoarthritis. Transplant recipients have a well-documented increased risk of complications but also excellent pain relief and dramatic improvement in quality of life. A multidisciplinary approach with the assistance of the medical transplant services for risk stratification and perioperative medical optimization is necessary. Prior solid organ transplant is not a contraindication to surgery; however, it is the responsibility of the surgeon to educate patients about the relative risks and benefits of prior to surgery.

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Introduction

The Annual Report of the U.S. Organ Procurement and Transplantation Network demonstrated the increased incidence of all solid organ transplantations (kidney, liver, lung, heart) in recent years [1]. Kidney transplants encompassed the vast majority of solid organ transplants in 2013 with 17,654 procedures performed, a 2.1% increase from the previous year. Additionally, the number of liver transplants increased 3.2% to 6455 and heart transplants increased 6.1% to 2554 procedures. Lastly, the number of lung transplants performed in the United States increased by 9.1% to 1946 procedures in 2013. Aside from the increasing prevalence of transplant procedures performed annually, improved surgical technique, patient selection, perioperative care, and post-transplant immunosuppression regimens has led to improved graft survival and life expectancies for transplant recipients [1].

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Table 1 summarizes the most recently reported five year survivorship, as well as the volume of the four major organ transplants in the United States.

Postoperative medical regimens for transplant recipients influence consideration for elective hip or knee arthroplasty. Newer immunosuppressive regimens including tacrolimus and mycophenolate have decreased the need for corticosteroids, but chronic immunosuppression has lasting consequences beyond infection risk. While immunosuppression is associated with osteonecrosis of the hip and knee, and represents the more traditional indication for consideration of joint replacement surgery, these agents in combination with chronic steroid use may result in poor bone quality and potential for periprosthetic fracture or prosthesis failure. Clearly, improved graft and patient survivorship with modern transplant surgery means that patients are living longer, more active lives. As such, degenerative disease secondary to osteoarthritis is becoming a common indication for joint replacement in this rare population.

Recipients of successful organ transplantation experience substantial gains in functional status and relish the opportunity to regain independence. Degenerative joint disease, as result of avascular necrosis or osteoarthritis, may significantly hinder functional independence and even limit cardiopulmonary rehabilitation. As this unique patient population continues to expand, arthroplasty surgeons will inevitably be faced with patients seeking elective joint replacement. The purpose of this report is to combine

Table 1
Case volume and five year survivorship by organ transplanted in the United States

Organ	# Performed in 2013	5 year patient survivorship
Kidney	17,654	82%
Liver	6455	71%
Heart	2554	75%
Lung	1946	53%

Data from 2012/2013 OPTN/SRTR Annual Data Report and United States Renal Data System 2011 Annual Report.

the current literature with our own experiences to make recommendations regarding perioperative optimization to improve patient outcomes.

Case history

Formal informed consent was obtained from patient (RC) for inclusion in this article as a case example of a typical transplant recipient treated with elective joint replacement at our institution. RC was a 66 year old male that presented to the orthopaedic clinic with end-stage hip osteoarthritis nearly 14 years status-post cardiac transplantation for heart failure (Fig. 1). His hip disease resulted in severe pain aggravated by everyday activity and significantly diminished his quality of life and ability to perform cardiopulmonary exercise. RC was diagnosed with advanced osteoarthritis of the right hip. He was deemed a candidate for arthroplasty with the caveat that he would require a formal consultation with his medical transplant team for risk stratification; if the medical team agreed elective arthroplasty was appropriate, he would then return to orthopaedic clinic for a preoperative appointment. RC wished to proceed with arthroplasty and, as such, he was referred back to his heart transplant medical doctor for preoperative evaluation. Serum levels of his immunosuppression drugs (cyclosporine and mycophenolate) were stable, he had no evidence of graft rejection, and a recent cardiac catheterization was normal. His transplant cardiology team obtained a preoperative echocardiogram, which was also normal, and RC was deemed low risk for cardiovascular complication and cleared for surgery. Recommendations were made to

continue immunosuppression and antihypertensive (amlodipine, labetalol) regimens perioperatively. RC then returned to the orthopaedic clinic for his preoperative visit. After a thorough discussion of the risks, benefits, and appropriate expectations related to elective joint replacement in the setting of chronic immunosuppression and history of solid organ transplantation, RC chose to proceed with total hip arthroplasty (THA), formal operative consent was obtained, and he was given a surgical date.

Right total hip arthroplasty was performed via posterior approach uneventfully. He received three doses of perioperative cefazolin (the standard antibiotic prophylaxis at our institution), and low-molecular-weight heparin was used for deep venous thrombosis (DVT) prophylaxis. RC was discharged home on post-operative day 2 with no complications and did not require perioperative in-hospital consultation with the respective medical transplant service. His recovery was uneventful and without any wound complications. At one year follow up, radiographs were stable (Fig. 2), RC reported zero hip pain and a recent return to recreational golf.

Eighteen months postoperatively, RC was interviewed regarding his THA. When asked his overall impression of hip replacement surgery now that he was 18 months out from surgery he answered, "It was wonderful. I now have a high quality life. Before my hip was replaced I couldn't do anything; I could barely walk in my house. Now I am walking with no pain and golfing as much as I can." When what advice he would you give someone with a transplant considering joint replacement, he responded, "If anyone with a transplant is leery of joint replacement, I would love to persuade them to have it done. My advice would be to have it done as soon as possible. I put it off for a year and looking back I was dumb."

Discussion

An increased rate of complications after hip and knee arthroplasty in organ transplant recipients is well documented [2–8], but with excellent patient satisfaction also described [7,8], surgeons and patients are left to weigh risks and benefits prior to undertaking elective, primary joint replacement. However, a recent study by Cavanaugh et al., which analyzed National Inpatient Sample (NIS) data from 1993 to 2011, revealed that

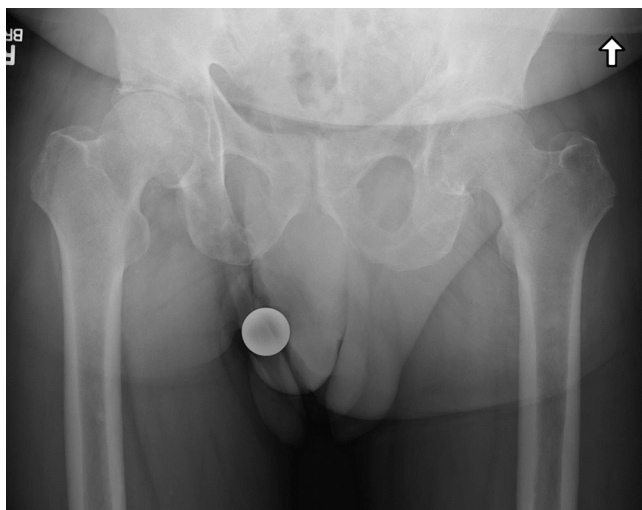


Figure 1. Low AP x-ray of the pelvis demonstrating significant end-stage osteoarthritis of the right hip.

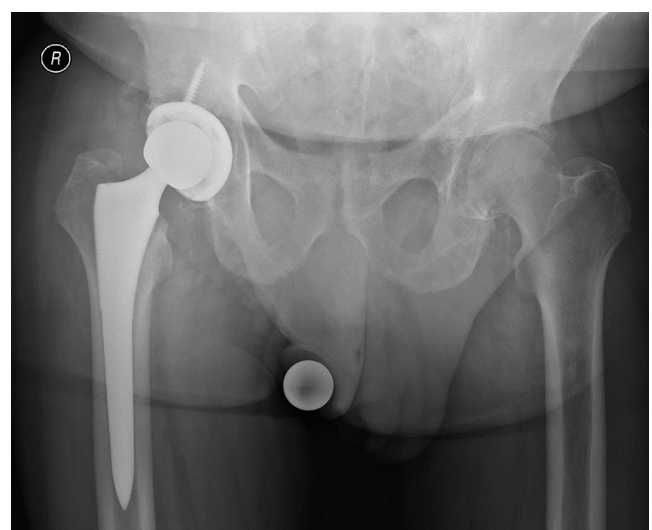


Figure 2. Post-operative x-ray one year following successful right total hip arthroplasty.

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