



Case report

Total femoral allograft with simultaneous revision total hip and knee arthroplasty: 18 year follow-up

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ABSTRACT

Massive allograft can be a useful option in revision total joint arthroplasty for treatment of significant bone loss. In rare cases, revision hip and knee arthroplasty procedures can be performed simultaneously using massive allograft-prosthetic composites. We present an 18 year follow up of a patient who received a simultaneous revision hip and knee total femoral allograft and discuss recent literature as it relates to this case. Copyright © 2015 Published by Elsevier Inc. on behalf of American Association of Hip and Knee Surgeons. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Revision total joint arthroplasty has many variables to consider when surgical planning begins. One of the most important of those is the amount of bone available to facilitate the revision. In the event of excessive bone loss, the options become even more limited. When the joints being revised involve the ipsilateral total hip and total knee arthroplasty simultaneously, the options include resection arthroplasty, megaprosthesis, large structural allograft, or amputation. In order to preserve as much function as possible, resection arthroplasty and amputation are avoided at all costs.

Case history

A 79-year-old female with severe rheumatoid arthritis underwent right total femoral allograft with simultaneous THA revision and TKA revision in 1996. The massive allograft was used for treatment of a distal femoral periprosthetic fracture with persistent non-union despite several surgical interventions attempting to achieve bony union (Fig. 1). A femoral allograft was selected pre-operatively based on templating the patient's host bone for size and components likely to be used for procedure. A lateral approach was used as well as a trochanteric slide to expose the length of the femur. An oscillating saw was used to split the lateral cortex of the femur and the previous components were taken out proximally and distally, while verifying the acetabulum and tibial components were still stable. Using standard instrumentation, a long-stemmed femoral hip implant and semi-constrained knee implant were cemented simultaneously to create a single uniform cement mantle. The allograft was then placed into the host bone shell that remained hinged medially, and bone graft was placed at the interface to enhance union. Multiple cerclage wires and cable grip greater trochanter attachment were used to finalize fixation [1].

Two weeks post-op, she did have a dislocation that was closed reduced and treated with a single leg spica cast for a period of six

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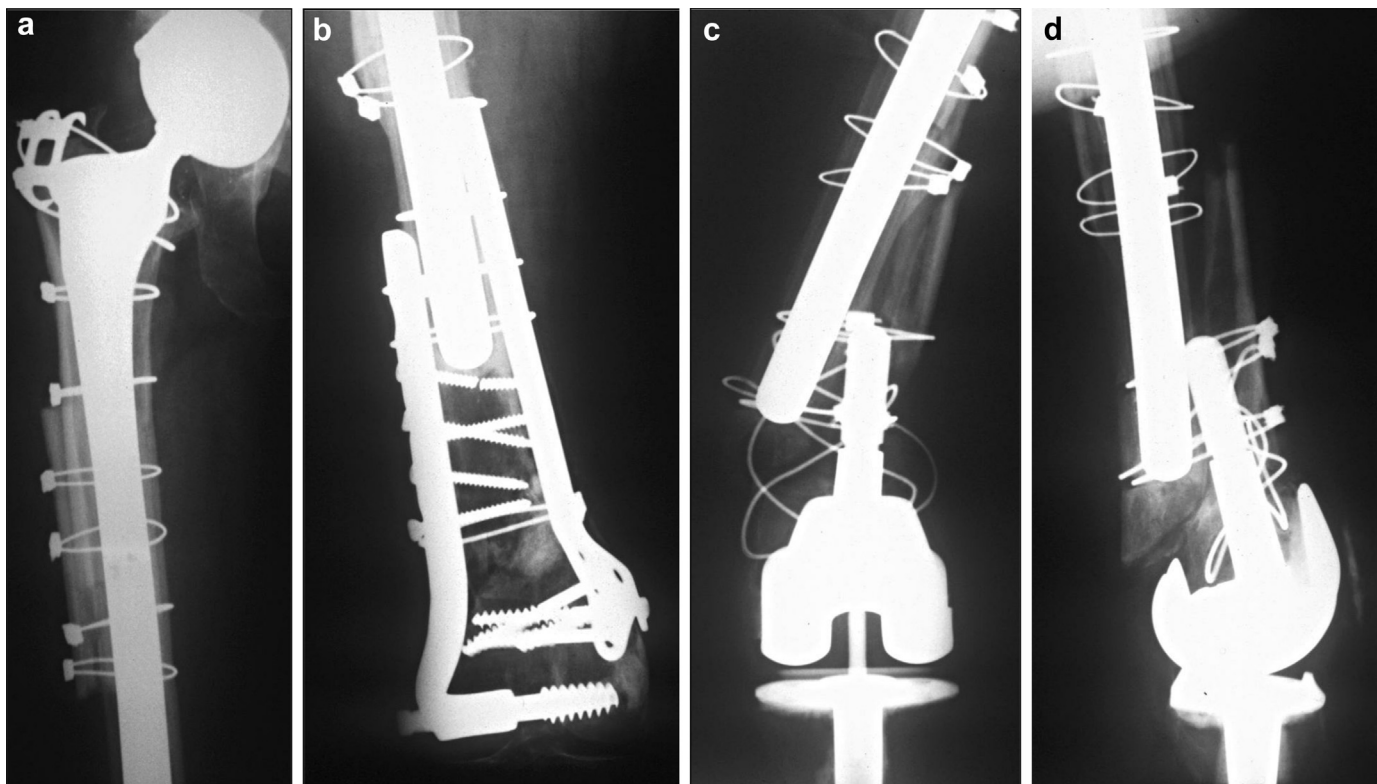


Figure 1. AP radiograph of right hip (a) and knee (b) after initial hip revision and internal fixation of the distal femur. AP (c) and lateral (d) radiographs of right knee after periprosthetic fracture following conversion to total knee replacement.

weeks. She was seen at two years having returned to her pre-fracture level of function, ambulating with a cane, WBAT and doing well. At three years she was seen, also doing well, with a Harris Hip Score of 75 at that time. Office notes were reviewed at 8 and 10 years, where she stated no pain in the right hip and that she was doing well, with no additional procedures to the right hip noted during the interval. The patient continued to do well and was very functional for over 17 years post-operatively (Fig. 2). This patient and method were previously described by Urch and Moskal [1].

After nearly two decades with a well functioning prosthesis the patient was diagnosed with acute methicillin-resistant *Staphylococcus aureus* (MRSA) sepsis and bacteremia of unknown origin. She was hospitalized for several weeks in another facility and was in the ICU secondary to concern for sepsis related cardiac events. She was found to have an infected pacemaker that was subsequently removed. She was treated with IV antibiotics and recovered sufficiently to be discharged from the hospital. Two weeks after discharge she developed right hip and knee pain. Clinical evaluation showed a right knee effusion and an aspiration revealed 15,655 WBCs with 83% neutrophils, and the knee aspiration culture showed 2+ MRSA. Given her TKA infection and hip pain with probable infection of her entire allograft, removal of her entire component was recommended. Because of her advanced age and multiple medical comorbidities, hip disarticulation was recommended, as it was not felt she could safely tolerate staged revision with antibiotic spacer. Additionally, debridement and chronic antibiotic suppression were also discussed, however due to the size of her allograft, complete debridement would be difficult with significant risk of recurrence.

Intra-operative findings noted full incorporation of her allograft and continued mechanical stability. A tract was identified at the time of surgery between areas of the allograft and the outer host bone that was closed and cabled around the allograft during the

initial procedure (Fig. 3). Purulent material tracked from the TKA components proximally to the THA components and prosthetic infection of the hip was confirmed. The patient has since healed her disarticulation incision site well with no signs of recurrent infection and has been able to transfer herself from bed to wheelchair without assistance (Fig. 4).

Discussion

The surgical options for managing patients with excessive bone loss have evolved over the past century. These options have also been greatly impacted by the advent of THA and TKA. The first review of massive bone allografts dates back to the early 1900s by Lexer, while the first femur allograft procedure was described in 1965 by Buchman [2,3]. Before that, the only options were amputation or hip disarticulation. Resection arthroplasty became a viable option when the need to retain the limb or salvage an extremity was greater than the need for an amputation, or when there was concern that a patient could not tolerate a more extensive procedure. As treatment protocols evolved and the ability to replace bone loss became more practical, the pendulum swung toward limb salvage in the majority of cases. The ability to retain mobility and range of motion using metal arthroplasty for degenerative joint disease and other pathology further advanced retention of a functional limb to aid in mobility. This case update looks at selected literature since our patient was first presented in Journal of Arthroplasty in 1998.

Patients in need of these procedures usually fall into two subsets: bone loss due to tumor/malignancy or bone loss associated with total joint arthroplasty. In 2010, Ruggieri reviewed results of patients who received either a megaprosthesis or an allograft for a tumor diagnosis. The review comprised of 23 patients over 19 years. Six patients continued to be disease free, 13 died from

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