

Total Hip Arthroplasty in Rapidly Destructive Osteoarthritis of the Hip: A Case Series

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Abstract Rapidly destructive osteoarthritis (RDO) of the hip is a rare condition characterized by rapid joint degeneration and destruction similar to findings of infection, osteonecrosis, or Charcot disease but without a definitive diagnosis. The cause and natural history of RDO are unclear, but total hip arthroplasty has been utilized as a treatment modality due to the severity of the symptoms. We reviewed retrospectively the records of total hip arthroplasties performed between 1990 and 2003 and identified ten hips in eight patients who fit the profile of the diagnosis of RDO. The mean age at time of surgery was 70. Nine hips were treated with total hip arthroplasty with a hybrid configuration; one hip was treated with a non-cemented total hip arthroplasty. Average follow-up was 6 years with no radiographic evidence of acetabular loosening or osteolysis and no evidence of asymmetric cup wear. One femoral component had evidence of loosening but has not been revised. RDO is an idiopathic condition with no single diagnostic laboratory, pathological,

or radiographic finding. A complete preoperative work-up for other causes of hip disease prior to arthroplasty for suspected RDO is necessary to rule out treatable disease. Our series of patients with RDO responded well to hybrid and non-cemented total hip arthroplasty with good clinical and radiographic results.

Keywords rapidly destructive osteoarthritis · total hip arthroplasty · level of evidence: IV—case series

Introduction

Rapidly destructive osteoarthritis (RDO) of the hip is a rare condition characterized by rapid joint degeneration and destruction without any specific diagnosis. Multiple names have been given for this condition, including rapidly destructive hip disease, Postel's disease, rapidly destructive arthropathy, and rapidly destructive coxarthrosis [1]. Initially, this process arises as pain in a radiographically normal hip. Within months, increasing symptoms of pain are accompanied by rapid radiographic joint space narrowing (>2 mm in 1 year or 50% joint-space narrowing in 1 year) leading to severe osteoarthritis [2]. This often proceeds to rapid bony destruction of the femoral head with or without acetabular involvement (Fig. 1). In rare cases, the rapid degeneration occurs in patients with a several-year history of preexisting hip osteoarthritis [3, 4]. This often proceeds to rapid bony destruction of the femoral head with or without acetabular involvement. In rare cases, the rapid degeneration occurs in patients with a several-year history of preexisting hip osteoarthritis [3, 4]. The radiographic findings of RDO may resemble hip destruction due to septic arthritis, inflammatory arthritides, osteonecrosis, or Charcot arthropathy [4].

Total hip arthroplasty has been recommended as the treatment of choice for RDO; however, there are limited reports of the efficacy of arthroplasty for this condition [3, 5, 6]. The most extensive results have been reported for

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Fig. 1. X-ray demonstrating bony destruction of both the femur and acetabulum in RDO

cemented implants [3, 5], with no clinical and radiographic series on either hybrid or press-fit implants. One report stated a revision rate without discussing outcomes [6]. Our specific aims are to (1) determine the midterm clinical results of either hybrid or non-cemented total hip arthroplasty for RDO, using more outcome measures than previous reports—including the Harris hip score, the Short-Form 12 (SF-12) health status questionnaire, and hip range of motion and (2) evaluate the midterm radiographic results of total hip replacement for RDO. Our hypothesis is that, despite bony destruction, the clinical and radiographic results of non-cemented and hybrid implants will be similar to cemented arthroplasty performed for this condition as well as similar to the results of hybrid total hip arthroplasty performed for other conditions.

Materials and methods

From 1990 to 2000, three cases of RDO were retrospectively identified in two patients undergoing total hip arthroplasty at our institution. The records for all 1,547 total hip arthroplasties performed during that time were not available, and additional cases may not have been identified. We then reviewed retrospectively the records of all 845 total hip arthroplasties performed between 2000 and 2003 and identified eight additional hips in seven patients. The diagnosis of RDO was based on the history of rapid progression of hip disease in the absence of other causes. Patients all had severe hip pain with rapid degenerative changes on radiographs (>2 mm in 1 year or 50% joint-space narrowing in 1 year, often accompanied by bony erosion of the femoral head and/or acetabulum). They had no clinical, laboratory, or pathological evidence of other conditions with rapid progression, such as infection or Charcot arthropathy. Superior bony destruction of the acetabulum occurred in two cases. One patient with bilateral

RDO had bilateral developmental hip dysplasia, a condition not otherwise associated with rapid hip destruction. The diagnosis was made by the treating surgeon (CWC, KAE, and/or AK).

The series was comprised of seven women and one man. The mean age and standard deviation at the time of surgery was 70 ± 9 years (range, 60 to 86 years). All surgeries were performed via a posterolateral approach with an intact trochanter. Nine hips in seven patients were treated with total hip arthroplasty with a hybrid configuration. The acetabular components consisted of non-cemented Trident PSL (Stryker, Mahwah, NJ, USA) or the oblong S-ROM Arthropor II (Johnson and Johnson, Raynham, MA, USA), which was used in two cases with superior bone loss. The cemented femoral components were either an Omnifit C-stem or a J-EON (Stryker). Third generation cementation techniques were used, with vacuum mixing and pressurization. In one hip, a non-cemented Super Secur-Fit Plus (Stryker) femoral component was used.

The Harris hip score, SF-12, and hip range of motion were used to clinically evaluate the patients postoperatively. Clinical parameters were collected by the operating surgeon. Anteroposterior and lateral radiographs of the hips were also evaluated for implant migration, osteolysis, and periprosthetic lucencies using the classifications of DeLee and Charnley and of Gruen. Hips were also evaluated for progression of bony destruction in the femur and acetabulum. All radiographs were viewed by a single observer (SP) who was blinded to operating surgeon and preoperative diagnosis.

Results

Two patients died without current clinical and radiographic follow-up. One died 11 years after surgery and the other died 4 years after surgery. According to their families, neither patient had complications or revision hip surgery. One patient (two hips) is 98 years old, non-verbal, and severely demented. According to her family and primary care provider, she had no complications or additional hip surgeries. Eleven and 14 years after her surgeries, she was ambulatory for 60 ft with a walker. The six arthroplasties in the five remaining patients were evaluated at an average of 6 years (range 4 to 12 years) after surgery. The mean age at follow-up was 69 years and all were women.

At final follow-up, the clinical outcomes as assessed by the HHS and SF-12 were good to excellent in this series of patients. The mean Harris hip score was 85.7 with an average function score of 38.2. Two hips had excellent results (90 to 100), three hips had good results (90 to 100), and one hip with a loose femoral component had a poor result (<70). The average postoperative SF-12 Physical Component Summary was 47.8 and the average SF-12 Mental Component Summary was 54. Scores for the SF-12 are normative, with a mean value of 50. Postoperative range of motion averaged 87° of flexion, 4° of extension, 43° of abduction, 13° of adduction, 29° of external rotation, and 20° of internal rotation.

Radiographic results were also good. There was no progression of bony destruction in any of the patients. Radiographically, none of the acetabular components, including the two oblong cups, had evidence of loosening or osteolysis, with no component migration or radiolucent lines. No asymmetric wear was noted in any of the liners. One cemented femoral component had evidence of loosening. This femoral component was implanted 12 years previously and showed distal implant migration of 9 mm with lucencies in zones 1, 2, and 7 and varus malalignment. The patient was informed of this and offered revision; however, she declined.

Discussion

Our goal was to determine the clinical and radiographic results of hybrid and non-cemented total hip arthroplasty for RDO. Despite the rapid progression of disease and preoperative bony destruction in this set of patients, hybrid and non-cemented total hip arthroplasty were effective and safe treatments for RDO. No progression of the erosive process occurred following surgery, with ingrowth of all acetabular components and stable retention of all but one femoral component.

The major limitations of this report are its small sample size as well as its retrospective nature. For instance, only one non-cemented arthroplasty was included. Therefore, the observed results may not be applicable to a wider population. However, given the extremely low incidence of RDO in our patient population (less than 1% of hips), larger series would be difficult to obtain.

Our results compare favorably with the previously published reports of cemented total hip arthroplasty for RDO. In a series of 51 hips with RDO treated with either McKee–Farrar or Charnley prostheses with follow-up of up to 3 years, Postel and Kerboul concluded that the clinical results were similar to arthroplasties performed for ordinary hip osteoarthritis [3]. Due to bone loss, however, they noted increased technical difficulties and reported radiographic loosening in four sockets. In a series of 100 cases of RDO treated with cemented Charnley–Kerboul prostheses, 95 hips had very good or excellent function using the Merle d'Aubigné classification after a mean follow-up of 7 years and 10 months [5]. Evidence of loosening was seen in six acetabular components and three femoral components.

Clinically, our results are comparable to hybrid total hip arthroplasty performed for other conditions. For instance, in a report of 100 patients undergoing hybrid total hip arthroplasty predominantly for osteoarthritis (69%), rheumatoid arthritis (15%), or osteonecrosis (8%), patients had an average Harris hip score of 86 at a mean follow-up of

5 years [7]. All patients received the cemented Harris–Precoat femoral component and the non-cemented Harris–Galante-I acetabular component. Two cups had evidence of migration and two femoral components were definitely loose.

Multiple conditions can lead to rapid hip destruction, including infection, malignancy, neuroarthropathy, inflammatory arthritis, osteonecrosis, hemophilia [8], and ochronosis [9]. Total hip arthroplasty alone is contraindicated in the first three conditions. Since RDO is an idiopathic condition with no single diagnostic laboratory, pathological, or radiographic finding, a complete preoperative work-up for other causes of hip disease should be performed prior to arthroplasty for suspected RDO. Our patients were without evidence of these conditions and responded well to total hip arthroplasty, with overall good clinical and radiographic results. At a mean follow-up of 6 years, four of the five patients (five hips) had good-to-excellent Harris hip scores. The patient with a poor result had groin pain and a loose femoral component, but declined revision. This report supports the use of hybrid and non-cemented total hip arthroplasty for this subset of patients.

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