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Arthroplasty in patients with rare conditions

Total knee arthroplasty in multiple sclerosis

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ABSTRACT

We present a case report of total knee arthroplasty complicated by spasticity and contractures in a patient with multiple sclerosis (MS). Four previous case reports in the literature describe adverse outcomes after total knee arthroplasty in persons with MS secondary to severe spasticity. Preoperative, intraoperative, and postoperative considerations for persons with MS, which may help to improve functional outcomes, are discussed. Prospective research is needed among persons with MS to help determine the timing and selection of persons for arthroplasty and to minimize complications related to spasticity.

Introduction

Multiple sclerosis (MS) is a chronic, degenerative inflammatory disease of the central nervous system. It is estimated that 2.3 million people worldwide have MS with the highest prevalence rates reported in North America and Europe [1]. The etiology of MS is not fully understood, involving autoimmune mechanisms in genetically susceptible individuals [2]. The prevalence of arthritic comorbidity among persons with MS is still an evolving area of research and is estimated to be in the range of 16%-26% [3,4]. Although total knee arthroplasty (TKA) may lead to enhanced function for selected persons with MS, to date, the literature highlights only case reports with adverse outcomes and limited follow-up. Here, we present the 2-year follow up of a 75-year-old woman with primary progressive MS who received a right TKA for osteoarthritis 18 years after the initial onset of MS symptoms.

Case history

Informed consent was obtained for the case report. MS onset was at age 57 involving nonremitting right hand weakness and numbness followed by progressive symptoms of right spastic toe flexor posturing and foot drop. These symptoms occurred over the course of 12 months. She fulfilled diagnostic criteria for primary progressive MS [5] with periventricular brain T2 lesions on magnetic resonance imaging, positive oligoclonal bands in the cerebrospinal fluid, and disease progression for 1 year. She experienced a gradual decline in her mobility in the absence of relapsing symptoms over time. Fourteen years after MS onset, she progressed to needing a gait aid (cane or walker) intermittently for community mobility.

Fifteen years after MS onset, the patient experienced progressive right knee pain consistent with osteoarthritis. Over the course of 3 years, she failed conservative measures for pain relief, including intra-articular knee corticosteroid injections, acetaminophen and naproxen. She remained ambulatory with a single straight cane for at least 100 m but began to use a wheelchair largely for community mobility. The patient experienced a fall, which did not result in serious injury but did provoke a fear of future falls. The surgeon's notes detail the patient experiencing pain with weight-bearing during transfers. The patient elected to proceed with knee arthroplasty. Preoperative radiographs showed severe lateral and mild-to-moderate medial osteoarthritis of the right knee (Fig. 1).

Medical history included thyroid disease and depression. Preoperative lower extremity strength was grade 3 bilaterally for hip flexion and grade 4 for all other muscle groups. Tone was mildly increased in both lower limbs with preserved full range of motion. There was nonsustained clonus at both ankles. Preoperative medications were baclofen 10 mg/day and oxybutynin 5 mg/day.

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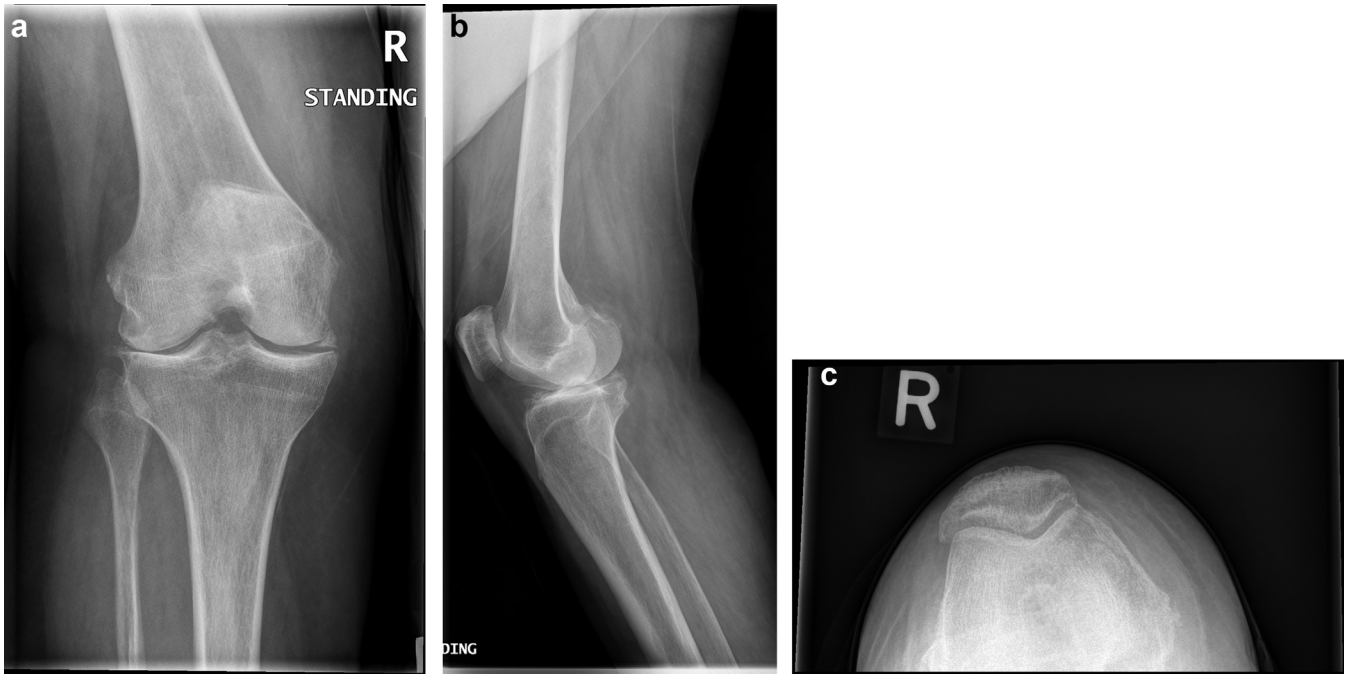

Figure 1. Preoperative (a) anteroposterior, (b) lateral, and (c) Merchant radiographs.

She received the right TKA 18 years after MS onset under a general anesthetic without administration of nerve blocks. Cefazolin was provided preoperatively. A standard midline approach with a medial parapatellar arthrotomy was used. Significant lateral compartment arthritis and contracture were evident during the surgical procedure. Components were sized, trialed, and cemented into place with Palacos R+G cement (Zimmer, Warsaw, IN). The components were from the Zimmer NexGen LPS total knee system (Zimmer, Warsaw, IN). These components provided good range of motion and soft tissue balancing at the conclusion of the surgery. Aside from the muscle contracture, no other problems were encountered intraoperatively. The bone and soft tissue quality was adequate. The articular capsule was of good quality and there was not any scar tissue noted. The patella was inspected intraoperatively. The articular cartilage was of good quality, and it tracked well after implantation of the components; thus, the decision was made to not resurface the patella. A tourniquet was used and no excessive bleeding was encountered. Excellent hemostasis was achieved at the end of the case.

Postoperatively, the patient developed a significant increase in her lower extremity spasticity and related pain. Postoperative imaging was negative for deep vein thrombosis, joint effusion, or other complications (Fig. 2). She received 4 doses of intravenous morphine 2-3 mg in the recovery room with gabapentin 200 mg followed by scheduled acetaminophen 650 mg every 4 hours, gabapentin 100 mg tid, celecoxib 100 mg bid, and sustained release hydromorphone 3 mg with senna bid postoperatively. Immediate release hydromorphone 1-4 mg was ordered prn and rarely used. Scheduled sustained release hydromorphone was discontinued on postoperative day 7. She assumed a crouch gait on trial of weight bearing.

On postoperative day 19, the patient was transferred to inpatient rehabilitation after developing severe lower extremity tone with bilateral knee contractures. She received range of motion exercises and gait training twice daily. Thirty days postoperative, botulinum (300 IU) was administered into the right medial and lateral hamstrings. She was discharged to the community 75 days postoperatively after achieving an independent gait with a 4-wheeled walker for 40 m and near-full passive range of motion of −15° to 120° of flexion at both knees. Discharge medications were baclofen 10 mg qam and 20 mg qhs. Higher daytime doses of antispasticity medications were not tolerated because of a side effect of generalized weakness.

After discharge to the community, despite reported compliance with a home exercise program, the right knee flexion contracture worsened to 35°. She received repeat botulinum injections of 300 IU divided between the right medial hamstrings and hip adductors at 4 and 7 months postoperatively with minimal improvement. Ambulation status continued to decline over the next year such that walking became limited to 5 m with a walker and an assistant. The patient expressed frustration as she had hoped to regain ambulatory status without aids after the arthroplasty. She began more intense outpatient physiotherapies involving use of a standing frame, assisted platform walking, and range-of-motion exercises. She also accessed services through a community exercise group, which provided specialized support for persons with disability. At 24 months postoperatively, she had improved her walking distance back to short household distances independently with a 4-wheeled walker.

Discussion

In our case, sustained spasticity postoperatively was largely refractory to medical management. Spasticity is part of the upper motor neuron syndrome and is common among persons with MS [6]. Previous MS case reports have also described severe spasticity resulting in adverse short-term outcomes after TKA (Table 1). In our case, at 2 years after arthroplasty and 20 years after the onset of progressive MS, the patient had maintained her ambulatory status with a 4-wheeled walker for household distances. The patient however was not satisfied with her protracted course of rehabilitation or her functional outcome. Finding the optimal timing of knee arthroplasty for persons with MS and identifying additional factors in preoperative, intraoperative, and postoperative TKA care among persons with MS may help to optimize future outcomes.