Summary

Total knee arthroplasty in the rheumatoid patient presents unique challenges, including the systemic nature of the patient’s disease, the presence of significant soft-tissue deformities and osteopenic bone, and an increased risk of complications such as wound healing and persistent contractures. In order to maximize the probability of a successful outcome, the surgeon must optimize the patient’s pre-operative medical status, pay meticulous attention to soft-tissue balancing and contracture release in the operating room, and closely monitor the patient’s postoperative course. Adherence to these principles optimizes the results of total knee arthroplasty in the rheumatoid patient, making this a very rewarding procedure for both patient and surgeon.

Introduction

The knee joint is affected in approximately 90% of patients with chronic rheumatoid arthritis [1]. Total knee arthroplasty (TKA) provides the rheumatoid patient with substantial alleviation of pain and deformity. However, the rheumatoid knee presents several challenges to the surgeon in the operating room as well as in the pre- and postoperative stages. Rheumatoid arthritis is a systemic disease that affects multiple organ systems, and rheumatoid patients frequently take several immunosuppressive medications that must be addressed in the perioperative period. The surgeon encounters several important issues when planning knee arthroplasty, including the timing of knee surgery relative to other arthritic joints and the choice of anesthesia. At the time of surgery, the rheumatoid knee is characterized by osteopenic bone, valgus deformity with a frequently incompetent medial collateral ligament, and soft-tissue contractures. The level of constraint of the prosthesis is an important decision. Extreme care must be given to soft-tissue balancing. Postoperatively, the rheumatoid patient may be affected by wound-healing problems, infection, and loss of full extension. This chapter discusses the issues of importance to the surgeon performing knee arthroplasty in the rheumatoid patient.

Preoperative Considerations and Planning

The systemic involvement in rheumatoid patients is an important issue in the preoperative period. Several organ systems are affected by the disease as well as by the immunosuppressive medications commonly used to treat it. Approximately 10% of rheumatoid patients undergoing total knee arthroplasty are taking maintenance corticosteroids [1].

Systemic Manifestations of Rheumatoid Arthritis

Rheumatoid patients should routinely undergo a complete medical evaluation prior to knee arthroplasty. This evaluation should also include a complete blood count, urinalysis, urine culture, electrolytes, and an electrocardiogram [2]. The evaluation should include examining the patient for remote sites of potential infection such as the oral cavity. The skin over the knee in rheumatoid patients may be thin and atrophic secondary to chronic steroid therapy or as a manifestation of the disease process. Rheumatoid arthritis is considered to be a catabolic, wasting disease. Therefore, many rheumatoid patients may be malnourished even if they are not clinically underweight [3].

Management of Corticosteroids

It has been common practice to administer stress-dose steroids at the time of surgery to patients who take chronic maintenance steroids. The purpose of this is to prevent adrenal insufficiency, particularly in patients who take relatively high doses of steroids (more than 20-30 mg hydrocortisone daily) [2]. It is our practice to administer 100 mg hydrocortisone iv before surgery and then Q8H for three doses after surgery. However, the need for routine exogenous steroid administration has been questioned in one study. Friedman et al. [4] reported on 28 patients taking chronic steroids who underwent 35 major orthopedic procedures. The authors found no significant difference in the postoperative course of patients taking steroids compared to those not taking steroids.
Management of Other Immunosuppressive Medications

There exists conflicting evidence regarding the decision to discontinue non-steroid rheumatoid medications at the time of surgery. Grennan et al. [5] described a prospective randomized study of 388 rheumatoid patients undergoing orthopedic surgery. The study found that certain remittive agents such as penicillamine, hydroxychloroquine, and cyclosporine were associated with statistically significant increased risk of wound problems. However, patients who continued to take methotrexate had no increase in wound complications and experienced fewer rheumatoid flares than those who did not receive methotrexate. In contrast, Bridges et al. [6] reported on 38 rheumatoid patients undergoing elective orthopedic surgery. There were four infections in 19 procedures performed on patients who took methotrexate around the time of surgery, compared with no complications in 34 procedures for patients who discontinued methotrexate 4 weeks before surgery. Other sources recommend discontinuing methotrexate and other similar agents 1–2 weeks before surgery and restarting them 1–2 weeks after surgery [2]. It remains our practice to discontinue these medications for 2 weeks before surgery and to restart them 1 week thereafter.

There is scant information in the literature about the treatment of the newer anticytokine agents such as etanercept in the perioperative period. One case report [7] describes disseminated joint infections and fatal septic shock in a rheumatoid patient on etanercept who had a history of bilateral hip and knee prostheses. The authors caution that etanercept may mask the signs of acute infection and inflammation, and that a patient on this agent should be monitored closely for early symptoms of infection and be treated aggressively.

Timing of Knee Arthroplasty Relative to Other Orthopedic Surgery

The rheumatoid patient presenting with end-stage knee arthritis may also suffer from joint pain and deformity in the spine, upper extremities, hips, and feet.

Cervical Spine. It is important for the arthroplasty surgeon to evaluate the rheumatoid patient for evidence of cervical spine disease. It is estimated that 88% of rheumatoid patients have some degree of cervical spine involvement [8]. The most common manifestations of this are atlantoaxial subluxation, basilar invagination, and subaxial subluxation. The surgeon should obtain a thorough history, looking for worrisome signs such as neck pain extending to the head, upper or lower extremity weakness, urinary or bowel incontinence, dysphagia, and loss of fine motor coordination. The physical examination should include neurological motor and sensory testing of the upper and lower extremities. Any positive finding should be further investigated with cervical spine radiographs including AP, flexion and extension lateral, and odontoid views. Because of the devastating complications that may arise from spinal instability, stabilization of the cervical spine takes first priority in the rheumatoid patient. It is important to note that despite the progressive nature of cervical rheumatoid disease, only 15% of rheumatoid patients require cervical spine surgery [9]. Our practice has been to obtain cervical spine radiographic series if there are any concerns in the history or physical, and subsequently refer the patient for orthopedic spine evaluation if the radiographs demonstrate instability. Finally, cervical spine involvement complicates the options for anesthesia as discussed below.

Upper Extremity. It is usually advisable for the rheumatoid patient to undergo lower extremity joint reconstruction before shoulder or elbow reconstruction to avoid stressing upper extremity prosthetic joints with the use of crutches or a walker. Furthermore, addressing lower extremity joints promptly may spare the debilitated patient from becoming wheelchair bound and preserve mobility. Occasionally, a rheumatoid patient may have such severe limitation of upper extremity or hand function that use of assistive devices after knee arthroplasty may be impossible. In these cases, we turn our attention to the upper extremity first.

Hip Versus Knee Reconstruction. When both the hip and the knee need surgical reconstruction, it is usually preferable to begin with the hip [3, 8]. Rehabilitation of a hip arthroplasty may proceed with a diseased ipsilateral knee more effectively than rehabilitation of a knee with a diseased ipsilateral hip. However, there are important exceptions. First, a rheumatoid knee with severe valgus deformity would jeopardize the stability of an ipsilateral hip because of the resulting hip internal rotation and adduction. In this circumstance, it may be safer to proceed with knee arthroplasty first. Second, a patient with severe bilateral knee flexion contractures would have difficulty standing erect until both knees are reconstructed. Such a patient would be a good candidate for bilateral knee arthroplasty if medically appropriate. We have found that in selected cases, simultaneous ipsilateral hip and knee arthroplasty could be given consideration as well.