

Complications of Knee Arthroscopy Performed by Rheumatologists

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ABSTRACT. *Objective.* To evaluate the complication rate of knee arthroscopy as performed by rheumatologists.

Methods. A prospective study of complication rate in sequential patients having knee arthroscopies performed by rheumatologists at University of California Los Angeles (UCLA) over an 8 year period.

Results. A total of 342 knee arthroscopies were performed. There were 6 complications (1.8%), including one each of seizure, gout, portal cellulitis, ankle pain, inadequate knee drainage, and vasovagal symptoms. There was no longterm morbidity or mortality secondary to the procedures.

Conclusion. Knee arthroscopy performed by experienced rheumatologists trained in arthroscopy has a low rate of complications, which are mostly minor. (J Rheumatol 2001;28:1871-3)

Key Indexing Terms:
ARTHROSCOPY

KNEE

The role of arthroscopic examination of the joints in diagnosis and treatment of rheumatic diseases has grown significantly since its introduction in 1913. Initially, Bircher examined cadaveric knee joints using cytosopes to diagnose meniscal injuries¹. In the 1970s, Watanabe was able to develop arthroscopy into an intervention tool by improving optics and making refinements². Arthroscopy subsequently became widespread in the orthopedic domain, in large part due to decreased perioperative morbidity, rehabilitation time, and expense compared to similar procedures performed by arthrotomy³. By 1990, therapeutic arthroscopy had become the most frequently performed orthopedic procedure in North America, with an estimated 1.4 million arthroscopies⁴.

In the last decade, the diagnostic and therapeutic potential of this procedure as well as the introduction of smaller diameter arthroscopes and associated improvement in hand-held and motorized instruments have generated interest in rheumatologists to carry out this procedure in an office based setting⁵⁻⁸. Specific procedures utilized by arthroscopists include diagnostic visualization and grading, loose body removal, synovectomy, synovial biopsy, and therapeutic lavage.

To increase the use of office based arthroscopy, we must also evaluate and attempt to lower the complication rates

associated with the procedure. In 1995, Szachnowski, *et al* reported major and minor complication rates as 1.2% and 12.8%, respectively, in a study of 335 knee arthroscopies in an office based setting⁹. Subsequently, few data have been published regarding quality assurance and complication rates of this potentially morbid procedure.

We present complication data from the University of California, Los Angeles, Division of Rheumatology arthroscopy experience, where we found that our techniques have shown much lower complication rates.

MATERIALS AND METHODS

Arthroscopies were performed in 3 settings from September 1, 1992, through September 1, 2000, by 2 rheumatologists. Both rheumatologists were trained in knee arthroscopy following American College of Rheumatology guidelines (50 supervised procedures). The initial arthroscopies (n = 65) were performed in an office suite. The office suite is located in the Internal Medicine suite and is used for minor outpatient medical procedures. The next 207 arthroscopies were performed in a dedicated procedure room that provided a sterile environment for procedures including arthroscopy, bronchoscopy, and endoscopy. Subsequent arthroscopies (n = 70) were performed in an operating suite. These rooms are dedicated to outpatient medical procedures; they have laminar flow and staff including a nurse anesthetist, scrub nurse, and circulating assistant. In all 3 settings sterile technique was optimized. Sterile surgical scrub was performed for 3 to 5 minutes. Additional measures included use of sterile gloves, gowns, and masks.

All patients consented to the procedure according to guidelines established by the University of California.

Prior to the procedure, the surgical nurse placed an intravenous catheter. The patient was put on a cardiac and pulse oxygen monitoring system. Conscious sedation anesthesia was given in the form of midazolam hydrochloride (Versed) 0.5-3 mg. Patients were put into the supine position with the target knee flexed to 90°. The target leg was washed with betadine in the normal surgical fashion from mid quadriceps distally to the toes. A sterile stockinette was placed over the leg to a point just distal to the knee. Sterile drapes were placed. Anterolateral and/or anteromedial arthroscopy portals were anesthetized with 5 ml of 1% lidocaine without epinephrine. Thirty milliliters of 0.5% bupivacaine and 30 ml of 1% lidocaine were instilled into the joint. A 1 cm incision was performed at the anteromedial

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and/or anterolateral portal sites with a #11 surgical blade. Routinely, only one portal (typically the anteromedial) was used. A second portal was necessary only when a synovial biopsy or synovectomy was performed. A second portal was not used routinely for probing the cartilage. The knee was then placed into extension. A cannula with a sharp trochar was inserted into the portal site through the capsule. The trochar was removed and a dull trochar was inserted whereupon the cannula system was inserted into the suprapatellar pouch. The trochar was removed and a 2.7 mm arthroscope (Dyonics, Andover, MA, USA) was placed through the cannula system.

A specialized irrigation and distention system was used, entailing a series of one way valves in which fluid could be instilled only, instilled and removed simultaneously, or removed only. Irrigation fluid consisted of normal saline. The amount of irrigation fluid utilized varied by patient; however, most received within the range of 500 to 1500 cc.

The knees were examined in the following areas: suprapatellar pouch, patellofemoral compartment, medial gutter, medial tibiofemoral compartment, intracondylar notch, lateral tibiofemoral compartment, and the lateral gutter. Synovial biopsy or irrigation was performed as indicated.

If synovial biopsy was necessary, a 2.9 mm motorized shaving unit (Dyonics) was placed into a portal and the shaving was undertaken using visualization by triangulation with the arthroscope.

Upon completion of the procedure, suction was applied to remove distention fluid and then the arthroscope was removed. The knee was "milked" to remove remaining fluid. The cannula was removed, and the area was cleaned and bandaged. Bacitracin ointment was applied to the portal sites. Steri-strips were applied and the knee was bandaged with 4 × 4" sterile cloths held in place by a Kerlix wrap.

In the event of excessive bleeding, 5–10 ml of 1% lidocaine with epinephrine was instilled into the joint. If local anesthesia was inadequate, 25–75 mg meperidine (25 mg/ml) was utilized intravenously to achieve acceptable anesthesia. Corticosteroids were never injected into the knee during or immediately after the procedure.

Patients were observed for 30 to 60 minutes after the procedure. Patients received postoperative instructions and were discharged. Patients were instructed to return in one week for reevaluation.

RESULTS

A total of 342 diagnostic and therapeutic arthroscopies were performed. Two hundred forty-nine patients had the diagnosis of osteoarthritis (72.8%) (Table 1). Seventy patients had rheumatoid arthritis (20.5%), 5 had systemic lupus erythematosus (1.5%), 17 had other inflammatory arthritides (5%), and one had hemarthrosis (0.3%). Of the 342 procedures, 39 (11.4%) were diagnostic arthroscopies, 210 (61.4%) arthroscopic irrigation, 66 (19.3%) synovial biopsies, 25 (7.3%) limited synovectomies, and 2 (0.6%) were for removal of a loose body (Table 2).

The overall rate of complications was 1.8% (Table 3). The rates of serious and minor complications were 0.3% and 1.5%, respectively. Minor complications included one case each of postoperative gout, inadequate knee drainage, ankle pain, vasovagal episode, and portal cellulitis. The diagnosis of gout was established by arthrocentesis of a knee that became acutely inflamed 12 h post procedure. Gram stain and culture of this fluid was negative. Polarized microscopy revealed the presence of negatively birefringent crystals. The patient with inadequate drainage was operated early in the arthroscopy experience. On normally scheduled followup the patient complained of pain and swelling in the affected joint. A second procedure revealed retained mate-

Table 1. Diagnosis of patients who had knee arthroscopy.

Diagnosis	N (%)
Osteoarthritis	249 (72.8)
Rheumatoid arthritis	70 (20.5)
Systemic lupus erythematosus	5 (1.5)
Other inflammatory arthritides	17 (5)
Hemarthrosis	1 (0.3)

Table 2. Type of arthroscopic procedure performed.

Procedure	N (%)
Diagnostic	39 (11.4)
Irrigation	210 (61.4)
Synovial biopsy	66 (19.3)
Limited synovectomy	25 (7.3)
Removal of loose body	2 (0.6)

Table 3. Complications associated with knee arthroscopy.

Type of Complication	N
Seizure	1
Gout	1
Inadequate knee drainage	1
Ankle pain	1
Vasovagal symptoms	1
Portal cellulitis	1

rial in the knee, which was removed with good results. After this experience, a new drainage technique with more sufficient suction was utilized for all subsequent procedures. The case of vasovagal symptoms was transient and did not require medical treatment. The case of portal cellulitis involved erythema and tenderness at the portal site. There was no evidence of joint involvement. No culture was performed and a short course of oral dicloxacillin was prescribed, resulting in resolution of symptoms. The only serious complication was a seizure, which occurred one day after a procedure. This patient had a 30 year history of seizures, and at the time of the procedure was in the process of being tapered from anticonvulsants after a long seizure-free interval. One day after the procedure she had a generalized seizure and anticonvulsant therapy was reinstituted, with no further seizures.

DISCUSSION

Only one publication has addressed the prevalence of complications of arthroscopy of the knee in a rheumatologic population⁹. Szachnowski, *et al* reported in 1995 on the complication rates of office based arthroscopy of the knee in 2 clinical rheumatology practices. They reported a major

complication rate of 1.2%, with no longterm morbidity or mortality, and a minor complication rate of 12.8%. The most common complication reported in this study was hemarthrosis (25.5% of all complications).

The complication rate of knee arthroscopy in the orthopedic literature ranges from 1.8% to 8.2%¹⁰⁻¹⁵. Sherman, *et al* reported the results of a retrospective study of 3261 arthroscopic procedures on the knee¹⁰. There were 216 complications (8.2%). Sherman, *et al* used multiple regression analysis to show that the only 2 factors that were predictive of complications were patient age and the length of time that a tourniquet was in place. Small reported the results of a 19 month prospective study of 21 experienced arthroscopists¹¹. In that study, there were 162 complications in 8741 knee arthroscopies (1.8%). The most common complications in this study were hemarthrosis (1%), infection (0.2%), and thromboembolic disease (0.1%).

In a prospective study of 4840 patients, Dahl, *et al* determined that the annual incidence of deep venous thrombosis after diagnostic knee arthroscopy is 0.6%¹⁶. Williams, *et al* showed that the incidence of deep venous thrombosis may be higher when compression ultrasound is performed in all patients after knee arthroscopy¹⁷. They found that 3 of 85 patients (3.5%) developed asymptomatic deep venous thrombosis after knee arthroscopy. Other complications after arthroscopy of the knee have been reported, but are exceedingly rare¹⁸⁻²⁰.

Szachnowski, *et al* speculated that the main difference that their complication rate was slightly higher than those reported by Sherman, *et al* and Small was the age difference between the populations studied (mean age in Szachnowski's series was 60.2 yrs vs 30.8 yrs in Small's series)⁹⁻¹¹.

We report complications in knee arthroscopies performed at the UCLA Division of Rheumatology. Our overall complication rate was 1.8%, with a serious complication rate of 0.3%. The average age of our patients was 60 years. The only serious complication in our experience was one patient who had a seizure on the day after the procedure. This patient was in the process of tapering anticonvulsants at the time.

We had no patients with hemarthrosis in our series. Szachnowski, *et al* reported 12 patients with hemarthrosis, 25.5% of all their complications⁹. However, these results are not comparable, since Szachnowski, *et al* performed invasive procedures including meniscectomies and synovectomies much more frequently than in our experience. The absence of hemarthrosis as a complication in our study may also be explained by our cautious decision to have all patients discontinue all nonsteroidal antiinflammatory drugs at least 7 days prior to arthroscopy and because we utilized intraarticular epinephrine when bleeding was noted.

We observed a very low and minor complication rate of knee arthroscopy performed by rheumatologists. Despite

our older patient population, our complication risk compares favorably to that described in the orthopedic literature^{10,11}. We were able to show a much lower overall complication rate than the previous study of knee arthroscopy in a rheumatologic population⁹. We have shown that arthroscopy performed by rheumatologists in an older rheumatologic population is safe, with relatively few, minor complications, whether it is performed in an office suite, medical procedure suite, or standard surgical suite, as long as appropriate sterile surgical techniques are employed.

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