15 Hemophilic Arthropathy: Arthroscopic Joint Debridement

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15.1 Introduction

Open or arthroscopic surgical knee and ankle debridement in the treatment of hemophilic arthropathy has been reported to give the patient years of life without pain [1–4]. Other authors, however, have reported that arthroscopic knee debridement (AKD) and arthroscopic ankle debridement (AAK) have a limited benefit for undiscriminated degenerative osteoarthritis (mechanical or inflammatory causes) [5].

According to Ogilvie-Harris and Sekyi-Otu arthroscopic ankle debridement (AAD) can offer relief to about two-thirds of patients with ankle osteoarthritis, but the degree of improvement is limited [6]. Fitzgibbons stated that AAD should only be used in patients with minimal to no degenerative ankle osteoarthritis [7]. Some authors have reported that arthroscopically treated impingement ankles have an excellent prognosis, while osteoarthritic ankles had a less favored prognosis, with a high percentage requiring further surgery [8]. Other authors, however, have reported that lesions associated with ankle osteoarthritis, such as impinging osteophytes and loose bodies, can be treated effectively with arthroscopy [9].

In the later stages of ankle hemophilic arthropathy AAD can help to improve the joint function, even in the presence of articular cartilage damage (loose pieces of cartilage or anterior osteophytes) [10–12].

The purpose of this chapter is to describe the results of AKD and AAD with the aim of determining whether it is possible to delay TKR and ankle fusion or total ankle replacement (TAR) for painful moderate hemophilic arthropathy of the knee and ankle in adult patients.

15.2 Arthroscopic Knee Debridement

In a14-year period (1998–2011) 27 patients (27 knees) affected with severe hemophilia A (less than 1% of coagulation factor VIII) were treated by AKD because of knee joint involvement (hemophilic arthropathy) [13]. No patient developed an inhibitor against the deficient coagulation factor. Their average age at operation was 28.6 years (range 26–39 years) and the average follow-up 7.5 years (range 2–14 years).

Indications for AKD (inclusion criteria) were: more than 90° of knee flexion, flexion deformity <30°, good axial alignment of the knee, good patellar alignment, and pain >60 points in a visual analogue scale (0-no pain to 100 points). The axial alignment of the knee was assessed before surgery by means of long-length standing AP

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radiographs; more than 5° of varus or more than 10° of valgus was considered as malalignment in this study. In order to get bleeding control, secondary hematological prophylaxis was given for 3 months before operation. If there was increasing pain and disability and this conservative treatment failed, an AKD was indicated despite radiological involvement [13].

Each patient was admitted to hospital for 4 days and given factor VIII as summarized in Table 15.1. All the procedures were performed under general anesthesia. At operation, menisci tears were trimmed to a stable rim. Using a thermal ablation device on a low-intensity setting, we brushed the surface to remove the inflamed portion of the synovium (that was always inflamed and hypertrophic). Infrapatellar plica and suprapatellar plica were also removed. Chondroplasty was performed as needed, and loose bodies were removed. Anterior osteophytes often blocked full knee extension, so they were removed with a burr or shaver. That means that all components of the arthroscopic debridement procedure were performed in a combined fashion at surgery. Portals used were anteromedial and anterolateral. A tourniquet was used with tourniquet time being 64.5 min on average (range 55–75 min) [13].

The patients were mobilized on the second day after operation and were allowed partial weight-bearing (two crutches). On the third week after operation patients were allowed full weight-bearing. Rehabilitation (physiotherapy) was started on the second day after operation and then given during a 3-month period under hematological secondary prophylaxis. The principal goals of the rehabilitation program included the maintenance of joint volume and the prevention of scar reformation while preserving joint mobility. Regaining strength was a secondary goal. The rehabilitation program excluded exercises that elicit significant pain, and postoperative regimens are specifically tailored to each patient. Full activity was resumed after 12 weeks [13].

Table 15.1 Recommended plasma factor trough levels and duration of administration in patients with hemophilia A undergoing arthroscopic knee debridement (AKD) and arthroscopic ankle debridement (AAD) [13, 14]

	Level (IU/dl)	Duration (days)
Preoperative	80–100	
Postoperative	60–80	1–3
	40–60	4–6
	30–50	7–14

We assessed the clinical outcome before surgery and at the time of latest follow-up using the Knee Society Score (KSS), pain (100 points maximum—excellent, 0 points minimum—worst result) and function (100 points maximum—excellent, 0 points minimum—worst result), and the range of motion (ROM) in degrees. Radiographic assessment was undertaken before operation and at follow-up as recommended by the World Federation of Hemophilia (WFH), with the minimum score of 0 (normal joint) and a maximum of 13 points (fully deteriorated joint) [15]. All patients had between 4 and 7 points (4.5 on average). That means that arthroscopic debridement was performed only for patients with moderate radiographic changes. Statistical analysis was conducted using the SPSS 11 program. All comparisons between variables at the end follow-up were made by means of McNemar test. A value of $p < 0.05$ was considered statistically significant [13].

Mean length of follow-up was 7.5 years (range: 2–14 years). Knee Society pain scores improved from 39 preoperatively to 66 postoperatively ($p < 0.05$), and function scores improved from 36 to 52 ($p < 0.05$). ROM improved on average from −15° of extension and 90° of flexion before surgery to −5° of extension and 110° of flexion at the last follow-up ($p = 0.03$). Radiographic deterioration was 2.8 on average (range 3–5). There were two cases (7.4%) of postoperative hemarthrosis resolved by means of joint aspiration. Only one patient (3.7%) required a TKR after 12.5 years [13].

The efficacy of AKD is a controversial topic in current literature. A report published by the Cochrane Library on AKD in osteoarthritis in 2008 stated that the procedure has no benefit for undiscriminated osteoarthritis (mechanical or inflammatory causes) [5]. However, a recent systematic review of the literature showed that AKD results in an excellent or good outcome in approximately 60% of patients in approximately

5 years [16]. Another recent report found that most patients with knee osteoarthritis associated with unstable cartilage or meniscal injuries reported good-to-excellent symptomatic results at the short- and mid-term follow-ups [17]. It has been reported that in hemophilia, open surgical knee debridement gives years of life without pain [1, 2].

TKR is an operation frequently needed by hemophilia patients which greatly improves their quality of life. TKR, however, carries a higher risk of bleeding and infection for hemophiliacs than it does for osteoarthritis sufferers. The life span of TKA in hemophilic patients is shorter than in patients with osteoarthritis because of the increased infection rate [14].

AKD does not jeopardize the possibility of subsequent surgery and can delay the need for TKR. Although our series is small, the results suggest that AKD should be considered as worthwhile treatment which may give the patient years of life without intense pain. In conclusion, AKD should be considered in the adult hemophiliac to delay TKR.

15.3 Arthroscopic Ankle Debridement

In a 12-year period (2000–2011) 23 patients (24 ankles) affected with hemophilic arthropathy were treated by AAD [18]. Twenty-two were suffering from hemophilia A (deficit of factor VIII) and one had hemophilia B (deficit of factor IX). No patient developed an inhibitor against the deficient coagulation factor. Their average age at operation was 25.3 years (range 21 to 36 years) and the average follow-up 5.4 years (range 2–14 years). All were severely affected, with a level of factor VIII <1%. Inclusion criteria were: pain >6 points (VAS-visual analogue scale from 0 to 10 points), more than 90° of ankle motion, and good axial alignment of the ankle (increased varus or valgus angulation was a contraindication for AAD) (Fig. 15.1).

Medical treatment, including secondary hematological prophylaxis and rehabilitation (physiotherapy), was given for 3 months before operation. If there was increasing pain and disability and this conservative treatment failed, the possibilities considered were AAD, ankle fusion, or TAR. We preferred not to consider ankle fusion or TAR without attempting AAD.

Radiographic assessment was undertaken before operation and at follow-up as recommended by the Orthopedic Advisory Committee of the World Federation of Hemophilia, with the minimum score of 0 and a maximum of 13 points [15]. All patients had >7 points. Each patient was admitted to hospital for 4 days and given factor VIII or IX as summarized in Table 15.1.

All the procedures were performed under general anesthesia. At operation, arthroscopic synovectomy, debridement, removal of loose bodies, and resection of anterior osteophytes were carried out.

The patients were mobilized on the second day after operation and were allowed partial weight-bearing (two crutches). On the third week after operation patients were allowed full weight-bearing. Rehabilitation (physiotherapy) was started on the second day after operation and then given during a 6-week period under hematological secondary prophylaxis. The principal goals of the rehabilitation program included the maintenance of joint volume and the prevention of scar reformation while preserving joint mobility. Regaining strength was a secondary goal. The rehabilitation program excluded exercises that elicit significant pain, and postoperative regimens are specifically tailored to each patient. Full activity was resumed after 8 or 10 weeks.

The American Orthopedic Foot and Ankle Society (AOFAS) Ankle-Hindfoot Scale was used evaluation [19]; an excellent result scored 85–100 points, good 70–84, fair 60–74, and poor less than 60. The average score in our patients was 35.4 before and 79.2 after operation. The average range pain score was 6.6 (range 6–9) before and 2.3 (range 1–3) after operation.

Clinical results in patients were excellent in 13 (54.2%), good in 9 (37.5%), and fair in 2 (8.3%). Radiographic deterioration was 1.7 on average (range 1–3). There were two cases

Fig. 15.1 Radiographs showing hemophilic arthropathy before arthroscopic ankle debridement (AAD) and 7 years later: (**a**) Anteroposterior preoperative view. (**b**) Preoperative lateral radiograph of the ankle. Note the anterior osteophyte (arrow) to be removed. (**c**) Anteroposterior view 7 years after operation. (**d**) Lateral radiograph 7 years after AAD. Note that the anterior osteophyte was removed in a satisfactory way (arrow). The clinical result was excellent

(8.3%) of postoperative hemarthrosis resolved by means of joint aspiration. Three patients (12.5%) required an ankle fusion.

The efficacy of AAD is a controversial topic in current literature. In a report AAD offered relief to approximately two-thirds of patients with ankle osteoarthritis, but the degree of improvement was limited [6]. Some authors have stated that AAD should only be used on those patients with minimal to no degenerative osteoarthritis [7]. Hassouna et al. reported that arthroscopically treated impingement ankles have an excellent prognosis, while osteoarthritic ankles had a less favored prognosis, with a high percentage requiring further surgical procedures [8]. Other authors have reported that lesions associated with ankle osteoarthritis, such as impinging osteophytes and loose bodies, can be treated effectively with arthroscopy [9].

Regarding ankle hemophilic arthropathy, some authors have reported that advanced ankle hemophilic arthropathy AAD can help to improve the joint function, even in the presence of articular cartilage damage [10–12].

Ankle fusion and TAR are surgical procedures frequently needed by hemophiliacs which greatly improve their quality of life. TAR, however, carries a higher risk of bleeding and infection for hemophiliacs than it does for osteoarthritis patients. The life span of TAR in hemophilic patients is shorter than in patients with osteoarthritis because of the higher risk of infection [20].

AAD does not jeopardize the possibility of subsequent surgery and can delay the need for ankle fusion or TAR. Our results suggest that AAD should be considered as worthwhile treatment which may give the patient years of life without pain [18].

In conclusion, when advanced ankle hemophilic arthropathy is present, AAD appears to be an effective method and is an alternative to ankle fusion or TAR, but when AAD fails to relieve pain ankle fusion or TAR must be considered. However, we have shown that the benefits of AAD are lasting.

15.4 Conclusions

In hemophilia, AKD gives years of life without pain. AKD does not jeopardize the possibility of subsequent surgery and can delay the need for TKR. AKD should be considered as worthwhile treatment which may give the patient years of life without intense pain.

Regarding ankle hemophilic arthropathy, some authors have reported that AAD can help to improve the joint function, even in the presence of articular cartilage damage. AAD does not jeopardize the possibility of subsequent surgery and can delay the need for ankle fusion or TAR. Our results suggest that AAD should be considered as worthwhile treatment which may give the patient years of life without pain.

In conclusion, when advanced knee and ankle hemophilic arthropathy is present, AKD and AAD appear to be an effective method and are an alternative to TKR and ankle fusion or TAR, but when AKD and AAD fail to relieve pain TKR, ankle fusion or TAR must be considered.

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