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ORIGINAL ARTICLE

C. E. Gibbons · H. S. Gosal · J. Bartlett

Long-term results of arthroscopic synovectomy for seropositive rheumatoid arthritis: 6–16 year review

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Abstract We prospectively studied a consecutive series of 25 knees (21 patients) treated with arthroscopic synovectomy for seropositive rheumatoid arthritis. All patients had pain and swelling and were in the early stages of the disease process (Larsen grade 2 or less). Three patients were lost to follow-up. At a mean of 8 years from operation two knees underwent total knee replacement with another two knees required a further arthroscopic synovectomy. One patient continued to experience intermittent mild synovitis. The range of movement was maintained or improved by surgery in 73% of cases but radiological evidence of degenerative change was seen in all knees. We discuss the technical difficulties associated with arthroscopic synovectomy that were associated with a small complication rate. In appropriately selected patients unresponsive to medical therapy, arthroscopic synovectomy can give safe and reliable results.

Résumé Nous avons étudié une série consécutive de 25 genoux (21 malades) traités par une synovectomie arthroscopique pour polyarthrite rhumato séro-positive. Tous les patients avaient douleurs et èpenchement et étaient dans les stades précoces de la maladie (Larsen stade 2 ou moins). Trois patients ont été perdus de vue. À une moyenne de 8 ans aprés l'opération deux genoux ont eu une prothèse totale et deux genoux nécessitent une synovectomie arthroscopique supplémentaire. Un patient reste avec une synovite intermittente de faible intensité. L'amplitude de mouvement a été maintenue ou améliorée par la chirurgie dans 73% de cas, mais tous les genoux ont des signes radiologiques dégénératifs. Nous discutons les difficultés techniques de la synovectomie arthroscopique qui a été associée à un faible taux de complications. Chez les patients mauvais répondeurs à la thérapie médicale la synovectomie arthroscopique peut donner, avec peu de risques, des résultats fiables.

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C.E. Gibbons (✉)
42 Shortlands Road, Kingston-upon-Thames,
Surrey, KT2 6HE, UK
e-mail: c.agibbons@totalserve.co.uk
Tel.: +44-208-541-0965

H.S. Gosal
Austin and Repatriation Hospital, Victoria, Australia

J. Bartlett
Warringal Private Hospital, Victoria, Australia

Introduction

Open [2, 3] and arthroscopic [4] synovectomy has been previously described for early active rheumatoid arthritis with good results. Long-term studies using the open technique are well documented but few papers describing the arthroscopic technique involve studies longer than 5 years [8]. The advantages of the arthroscopic technique include small scars resulting in a more rapid postoperative rehabilitation, and some reports record a greater postoperative range of movement [6, 12]. Disadvantages include technical difficulties in accessing certain areas of inflamed synovium in the knee and are associated with a steep learning curve for this procedure.

Synovectomy has been reported to be useful in the early stages of rheumatoid disease before marked laxity or bony deformity occurs [10]. In this consecutive group of patients the indications for operation included pain and swelling due to inflamed synovium unresponsive to medical therapy, with preoperative radiological confirmation of early disease (Larsen grade 2 or less). The decision for synovectomy was made jointly with the referring rheumatologists. Patients with marked joint laxity or bony deformity were not deemed suitable for synovectomy. No patients were treated with radiation synovectomy in this study.

Materials and methods

A consecutive series of 25 knees in 21 patients with seropositive rheumatoid arthritis underwent arthroscopic synovectomy for the

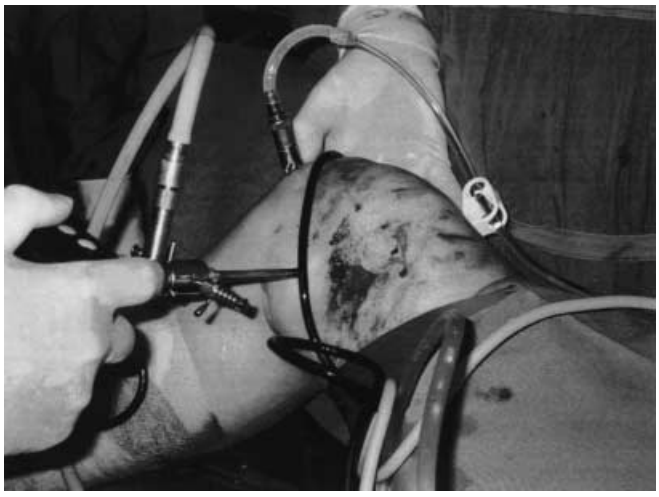

Fig. 1 Posteromedial portal placement for arthroscopic synovectomy

Table 1 Preoperative patient details

Mean age (years)	44 (22–64)
Sex (M:F)	6:15
Radiological grading of knees	
Larsen 0	5
Larsen 1	12
Larsen 2	8

Table 2 Pre- and postoperative mean Knee Society scores

Score	Preoperative	Postoperative	*P* value
Clinical	56	79	0.0001
Function	58	72	0.0026

indications above. Mean age was 44 (22–64) years; 15 patients were women (Table 1). All patients were preoperatively assessed both by the surgeon and rheumatologist, and preoperative radiographs performed with grading of the standing AP view according to Larsen [5]. The Knee Society Scoring system [1] was used to record clinical and function scores before operation (Table 2).

The senior author performed all operations using general anaesthesia and tourniquet control. Up to six portals were used [anteromedial, anterolateral, superolateral, superomedial, posteromedial (Fig. 1), and direct posterior] with a minimum of three portals used in all cases. An arthroscopic 5.5 mm full-radius shaver was used to remove the superficial layer of inflamed synovium with care taken to avoid breaching the capsular fibres. A systematic approach to synovectomy was used, progressing from the intercondylar notch, to the infrapatellar fat pad, to the medial recess and suprapatellar pouch, and to the lateral and popliteal recesses. A posterior portal was used in two knees for decompression of popliteal cysts. In one of these cases a posteromedial incision was subsequently performed to excise the cyst and close the defect in the capsule. A pressure dressing was applied over suction drainage and early mobilization commenced using a continuous passive mobilizing machine. All patients received antithrombotic control with low-dose Heparin.

Patients were reviewed at a mean of 8 years from operation; three patients were lost to follow-up. Further radiographs were performed and knee scores repeated. Statistical analysis was performed using the paired Student's *t*-test, with significance accepted at $P<0.05$.

Fig. 2 Follow-up knee radiograph of patient at 8 years from operation demonstrating secondary degenerative changes

Results

At a mean follow-up of 8 (6–16) years two out of 22 knees had a total knee arthroplasty performed at 1 and 2 years postsynovectomy for progression of disease. Knee scores were available prior to arthroplasty for these patients as the senior author performed both knee replacements.

Four knees had a further arthroscopic assessment with two requiring a repeat limited synovectomy for mild recurrent synovitis and two requiring arthroscopic lavage for degenerative disease.

The clinical and function Knee Society scores improved at follow-up by 23 and 14 points respectively (Table 2), including the two patients prior to knee arthroplasty ($P<0.05$). The mean range of movement also increased from 9–109° to 4–127° postoperatively ($P<0.05$).

Although two patients underwent repeat arthroscopic synovectomy and two total knee arthroplasties were performed, only one patient had evidence of mild synovitis at follow-up, which was being controlled by medical therapy.

All preoperative radiographs showed absent or early signs of rheumatoid disease according to the Larsen classification. At 8 years follow-up all the knees showed some progression of degenerative change from initial films (Fig. 2).

No peroperative complications were recorded. One patient underwent a posteromedial incision for excision of a large popliteal cyst filled with dense fibrinoid tissue. Two postoperative complications were seen; one patient developed a bloodstained discharge from the surgical

wounds resulting in a prolonged hospital stay of 5 days. Another patient developed stiffness of the knee, which required manipulation under anaesthesia at 3 months. The mean length of stay after arthroscopic synovectomy was 3 days.

Discussion

Synovectomy of the knee was first advocated by Volkmann in 1877 for the treatment of tuberculous arthritis [7]. The use of both open [10] and arthroscopic [9] synovectomy has since been described for inflammatory conditions of the knee, including rheumatoid arthritis.

The use of arthroscopic synovectomy in rheumatoid arthritis allows the removal of inflamed synovium with minimal morbidity and decreased hospital stay [6]. Ogilvie-Harris has reported the results of arthroscopic synovectomy on 96 knees with rheumatoid arthritis, with 76% of knees being free from moderate or severe synovitis and with a significant reduction of pain at 4-year follow-up. We found the incidence of synovitis was only 5% (one knee) at 8 years from operation, although two patients underwent total knee replacement for progression of disease and two knees required a further limited synovectomy for mild recurrent synovitis. Klug et al., in a multicenter study of 81 patients, also reported no evidence of synovitis in 80% of the patients at 33 months from operation [4].

As with other studies using the arthroscopic technique we found that the range of movement of the operated knee was maintained or improved in 73% of cases. This also corresponded to an increase in the clinical and function scores, which were significantly increased ($P<0.05$). Radiological assessment using an AP weight-bearing radiograph of the knee did, however, show a deterioration in Larsen grading in four knees and development of degenerative changes in all nonresurfaced knees – although the degenerative changes were mild or moderate in all but one case.

In this series synovectomy was performed using a full-radius 5.5 mm arthroscopic shaver. In 21 out of 25 knees three to four anterior portals were used and the posteromedial portal used to further clear the posteromedial compartment when necessary. The knee must be flexed in the figure-four position and the knee distended with fluid prior to this portal placement. Ogilvie-Harris et al. have reported complications using the posteromedial portal, including pain and numbness due to neuroma formation [9]. We did not use the posterolateral portal in this series of patients, but direct posterior portals were used for decompression of two popliteal (Bakers) cysts.

In this long-term study two knees underwent knee replacement due to progression of disease with increased pain and deformity. Both these patients had severe synovitis and pain prior to synovectomy with Larsen grade 2 changes on the initial radiographs. Both synovectomy and medical therapy failed to halt the inflammatory process and arthroplasty was performed within 2 years of the initial synovectomy. Two knees required a further limited arthroscopic synovectomy – at 16 and 20 months respectively – and both patients have remained well with no evidence of synovitis at follow-up. It is to be emphasized that all patients in this series suffered from seropositive rheumatoid arthritis and were referred for consideration of surgery by their treating rheumatologist who also supervised medical care after wound healing.

In conclusion, this long-term study confirms that arthroscopic synovectomy can be beneficial in patients with early rheumatoid arthritis (Larsen grade 2 or less) with pain and swelling due to synovitis. Two knees failed to improve after synovectomy, with rapid progression of disease and bony deformity requiring knee replacement within 2 years. The complication rate was small, and further arthroscopic synovectomy can be performed for recurrence of synovitis. However, synovectomy in this series of patients did not prevent radiographic secondary degenerative changes, which were present in all knees at follow-up. The surgery involved can be time-consuming and technically demanding, but adequate synovectomy can be performed in the majority of patients with safe and reliable results at long-term review.

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