Medical Arthroscopy — Emerging Era of Rheumatological Intervention

V Chaturvedi*, GS Chopra **, V Dutta***, VK Singal#, ML Chawla+, R Rai++, JR Bharadwaj##, AK Lahiri^, BN Shahi^^

Abstract

Objective: To evaluate the safety and diagnostic value of arthroscopy performed by a rheumatologist.

Methods: Decisions for performing arthroscopy were taken when detailed clinical history and relevant rheumatological investigations failed to arrive at a definite diagnosis. Arthroscopies were performed under local anesthesia as a daycare procedure. Synovial biopsies taken during procedures were subjected to histopathological examination (HPE).

Results: Of the 50 patients enrolled, 39 were males while 11 were females with mean age of 35.5 years. In lower limb oligoarthritis group of patients, three had macroscopic picture of crystal arthropathy, rest of the 29 patients revealed gross picture indicative of non-specific synovitis. While in polyarticular group of eight patients, three had macroscopic picture suggestive of crystal arthropathy (probably polyarticular gout) while five were indicative of rheumatoid arthritis. In monoarticular disease pattern (n=10) macroscopic picture findings were as follows- crystal arthropathy-two, tubercular-three, synovial chondromatosis-one and non-specific synovitis-two. HPE of synovium did not correlate in many cases.

Conclusion: Arthroscopy using a 4mm scope under local anesthesia in the hands of rheumatologists is a safe daycare procedure. In few cases arthroscopy helped in arriving at a final diagnosis but many patients remained undiagnosed. Both the rheumatologists and the pathologists require further experience in this field. ©

INTRODUCTION

It has become clear in recent years that the synovium is the primary site of inflammation and a major effector organ in a variety of joint diseases including rheumatoid arthritis (RA).5 Unfortunately, very little work has been done to study the synovium in various joint diseases. It has been shown in many studies that it is possible to influence the features of synovial inflammation by antirheumatic drug treatment.6,7 The present study was primarily carried out to assess the initial experiences of arthroscopy in terms of safety of this procedure in the hands of a rheumatologist and also the utility of the procedure in diagnosing various joint diseases.

MATERIAL AND METHODS

This retrospective analysis was based on review of record of medical arthroscopy performed between November 2001 & March 2003. Fifty patients who fit the following criteria were included for analysis.

Inclusion criteria – all patients with chronic arthritis of atleast six weeks duration, involving the knee joint with/ without other joints, in whom detailed clinical evaluation and relevant rheumatological investigations had failed to give a definite diagnosis.

Exclusion criteria included - history of intraarticular steroid injections during the past three months, infection of the overlying skin, age less than 16 years, hypertension & diabetes inadequately controlled with drugs and a history of allergy to local anesthetic agents.

Initial assessment included detailed clinical history and relevant diagnostic tests for rheumatic diseases including synovial fluid analysis. Routine blood count, bleeding time, clotting time and biochemical parameters were also done for all patients.

Procedures were carried out in the minor operation theatre (OT) under local anesthesia using standard aseptic
precautions. After obtaining written informed consent, arthroscopy of the affected knee was performed as an outpatient procedure using a 4mm arthroscope (Stryker, Model 2001) with 0 degree, and 30 degree angle of viewing. Inj Xylocaine 2\% and Inj Bupivacaine 0.5\% were used as anesthetics for skin portal and intraarticular anesthesia respectively. Joint irrigation was achieved by continuous flow of Ringer’s lactate solution through sheath portal. The joint was visualized through the scope and the appearance recorded on videotape for later analysis. Synovial biopsies were taken from suspicious areas during the procedure, suspended in sterile normal saline and transported to the laboratory for histopathological examination by a pathologist.

Inj Ciprofloxacin (200 mg IV) was infused immediately before the procedure as a prophylactic antibiotic. This was followed up subsequently with oral ciprofloxacin for five days. A tourniquet, commonly used during surgical arthroscopy, was not used by us during the procedure as we did not expect much bleeding. Skin portals were not sutured but covered with sterile dressings and under a pressure bandage. Patients were sent home after bed rest for half an hour. Wound was inspected and dressings changed every alternate day until the wound healed.

Patients were followed up regularly for a minimum period of six months to look for evidence of early or late infection, restriction of joint movement and degree of pain relief. Treatment was modified based on the diagnosis made by direct arthroscopy or on histopathological examination.

**RESULTS**

The total number of patients were 50 (Male-39, Females-11) with mean age of 35.5 years. Table 1 shows macroscopic findings during medical arthroscopy. Table 2 compares pre and post procedure diagnosis. None of the patients developed any complication during arthroscopy or during six months of follow up.

Synovial fluid analysis done in twenty-five cases was inconclusive except in two case of monoarthritis suspected to be tubercular where PCR for tuberculosis was positive and one case of septic arthritis where culture was positive for staphylococci.

**DISCUSSION**

In recent years, it has become clear that the synovium is the primary site of inflammation and also a major effector organ in variety of rheumatic diseases.

Synovial biopsy and systematic analysis of synovial tissue can provide valuable insight into pathophysiological mechanisms associated with etiology, disease status and prognoses in various rheumatic diseases.

In this retrospective analysis out of total 50 patients, the lower limb oligoarthritis and monoarthritis seems to be preferred indication. This is probably due to an ease of technique of knee arthroscopy and undifferentiated nature of this pattern of rheumatic diseases.

<table>
<thead>
<tr>
<th>Table 1: Macroscopic findings during medical arthroscopy</th>
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<tbody>
<tr>
<td>Findings</td>
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<tr>
<td>Club-shaped villi with marked increase in vascularity in all the fields.</td>
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<tr>
<td>Thin delicate villi with relatively less Vascularity.</td>
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<tr>
<td>Shiny deposits in synovium at multiple site (Fig 1) (Beach ball appearance), chalky material deposition at posterior surface of patella.</td>
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<tr>
<td>Completely avascular sheets of extensive adhesions.</td>
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<tr>
<td>Frank pus oozing out diffusely from synovium in all the fields.</td>
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<tr>
<td>Non-specific unclassifiable findings of mixed nature</td>
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</table>

Although diagnosis of gout is mostly made on clinical presentation and synovial fluid analysis but there are few cases of gout with atypical presentation, where the diagnosis was inconclusive even after synovial fluid analysis. These cases could be singled out up by this procedure (Fig 1).

Finality could be reached in all cases of monoarthritis (10/10). Although macroscopic findings are only suggestive of the specific conditions and initial experiences will gradually take a definitive shape with more data emerging in this field from different centers in the world. The arthroscopic diagnosis was further supported by specific therapeutic interventions with satisfactory results. All three patients with suggestive diagnosis of tuberculosis responded to anti-tubercular therapy and gouty arthritis cases responded to colchicine.

The histoplasmosis of the joint is probably the 1\textsuperscript{st} case in the medical literature to be reported upon (Fig 2). This patient with pyrexia of unknown origin with monoarthritis, testicular swelling, hiliar lymphadenopathy and skin nodules demonstrated disseminated histoplasmosis in biopsies of different tissue. There was excellent response to anti-fungal therapy.

Response to disease modifying anti-rheumatoid drugs was satisfactory in all but one case of rheumatoid arthritis. In osteoarthritis synovial villi are thin and delicate with relatively less vascularity.\textsuperscript{4} The gross picture suggestive of tuberculosis was avascular sheets of extensive adhesions with no synovial villi. These gross appearances on video pictures however are not very specific and further experience in this field is required.

Large number of patient (58\%) still remain undiagnosed even after this procedure and most of the histopathological report suggested non-specific chronic synovitis (29/50).

It seems both rheumatologists and pathologists have to gain more experience in this field. May be multiple biopsies from different sides are required in future studies.

Probably the most striking finding of this retrospective study is safety of this procedure in the hands of rheumatologists. There were no complications whatsoever.
including bleeding and infection during or after the procedure. In fact, most of them after six months of follow-up felt a vague sense of comfort and persistent relief on the side which was scoped when compared to the other side. There was no reported case of sepsis although the procedures were done in minor OT and patient was sent home one hour after the procedure. Ciprofloxacin seems to be a good prophylactic antibiotic for these minor procedures. The study also revealed that there is no requirement of tourniquet during medical arthroscopy as has been the practice during surgical arthroscopy. The study also revealed that the portal need not be stitched and probably if left open, may be providing adequate drainage.

All 50 patient medical arthroscopy data was recorded on video tapes and on proforma. Except for beach ball appearance in cases of gout, club-shaped vascular villi in rheumatoid arthritis and delicate synovial villi in cases of osteoarthritis, the macroscopic pictures of synovium on video tapes were not helpful. Repeated viewing on tapes and collaborating with patient history may give us clue in future.

**CONCLUSIONS**

Medical arthroscopy using a 4mm scope in the hands of rheumatologists is a safe daycare procedure. It can be performed without tourniquet. Local anesthetic agents Bupivacaine provide an excellent local anesthesia. In few cases medical arthroscopy helped in arriving at a final diagnosis but many patients remained undiagnosed. Both the rheumatologists and the pathologists require further experience in this field.

Globally diagnostic arthroscopy is an emerging field and may evolve into a more serious relationship between rheumatologist and this tool. With rheumatologists having legitimate use for the arthroscope in the diseases they encounter, along with plans to develop and utilize the technique in a manner quite different from most orthopedic applications, there is reason to hope that current efforts to establish the arthroscope as a tool of the rheumatologists will be successful.

**REFERENCES**

4. Ike R W, Fox DA. Arthroscopy in rheumatology training results from the survey of program directors. *Arthritis Rheum*

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**Table 2: Pre and post procedure diagnosis**

<table>
<thead>
<tr>
<th>No. of Patients</th>
<th>Pre-procedure provisional diagnosis</th>
<th>Suggestive diagnosis after medical arthroscopy based on macroscopic findings</th>
<th>Diagnosis after HPE report of synovial tissue</th>
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<tbody>
<tr>
<td>32</td>
<td>Oligoarthritis lower limb</td>
<td>a) Non-specific synovitis (29)</td>
<td>Non-specific chronic synovitis (32)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Crystal arthropathy (3)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Non-specific polyarthritis</td>
<td>a) Crystal arthropathy (3)</td>
<td>a) Non-specific synovitis (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Rheumatoid arthritis (5)</td>
<td>b) Rheumatoid arthritis (5)</td>
</tr>
<tr>
<td>10</td>
<td>Monoarthritis</td>
<td>a) Crystal arthropathy (2)</td>
<td>a) Non-specific synovitis (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Tubercular (3)</td>
<td>b) Chronic synovitis (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Non-specific synovitis (1)</td>
<td>c) Villonodular synovitis (1)</td>
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<td></td>
<td></td>
<td>d) Synovial chondromatosis (1)</td>
<td>d) Synovial chondromatosis (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e) Non-specific synovitis (1)</td>
<td>e) Histoplasmosis (1) (Fig 2)</td>
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<td></td>
<td></td>
<td>f) Osteoarthritis (1)</td>
<td>f) Osteoarthritis (1)</td>
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<tr>
<td></td>
<td></td>
<td>g) Septic arthritis (1)</td>
<td>g) Septic arthritis (1)</td>
</tr>
</tbody>
</table>

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![Fig. 1: Shiny deposits in synovium at multiple sites (microscopic appearance)](image1)

![Fig. 2: Histoplasmosis in synovium (microscopic appearance)](image2)


**Announcement**

**LECTURESHIP (2005)**

1. Unichem Lectureship in Gastroenterology (2005)
2. Dr. Yodh Memorial and Gwalior Conference Training Fellowship (2005)
4. Shree Krishnaji Govind and Mrs. Pramalabai Bhate Memorial Lectureship in Asthma and Bronchitis (2005)

**LECTURESHIP (2004)**

Dr. Coelho Memorial Lectureship in Experimental Medicine (2006)

The selected candidate has to deliver his/her lecture at the Annual Conference of API 2006.

All the above lectureships need prescribed application forms which are available from the API Office. The completed application forms for the above Lectureship should reach to Dr. Sandhya Kamath, Hon. General Secretary of API, Laud Mansion, 3rd Floor, 21, Maharshi Karve Road, Opp. Charni Road Station (E), Mumbai - 400 004 not later than **31st July, 2004**.

**II. ORATIONS**

Suggestions are invited from members for the following assignments so as to reach Dr. Sandhya Kamath, Hon. General Secretary not than **31st July, 2004**.

5. Hoechst Senior Lectureship in Diabetes (2006)
6. Dr. PJ Mehta Oration (2006)
7. Dr. GS Sainani Oration (2006)
8. Dr. Shurvir Singh Trust Visiting Professorship (2005)

There are no prescribed nomination/application forms for the above orations but, persons are selected from the recommendations received from members of the Association. The recommendations for the above assignments must be accompanied with reasons for recommending a particular person showing the value of his/her research and eight copies each of three of his/her best publications. All relevant papers in connection with the suggestions, such as the bio-data, list of publications etc., should be submitted in 8 sets by the proposer. The recipient of the above awards (except Dr. Shurvir Singh Trust Visiting Professorship) should deliver a lecture pertaining to his/her work at the Annual Conference in January, 2006. As regards Dr. Shurvir Singh Trust Professorship the selected candidate should visit a medical institution as directed by the Hon. Secretary of API during the year 2005.

A person who has received oration in the past is not eligible for any oration.

All lectureships, orations (except the Sarabhai Oration) and awards are open to eminent persons from the discipline of medicine and allied subjects such as Pharmacology, Biochemistry, Pathology and Physiology. The orator in the discipline of medicine should preferably be a member of API.

The members of the Governing Body of API and the Members of the Faculty Council of ICP are not eligible to received any award.

Laud Mansion, 3rd Floor Maharshi Karve Road, Mumbai - 400 004. Tel. (022) 382 9348 Fax : 2389 5297

Dr. Sandhya Kamath
Hon. General Secretary