JMSCR Volume||03||Issue||01||Page 3760-3766||January 2015

www.jmscr.igmpublication.org Impact Factor 3.79
ISSN (e)-2347-176x

IGM Publication Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

A Study of Arthroscopic Synovial Biopsy in Chronic Synovitis of Knee Joint

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ABSTRACT

Background: *Synovial inflammatory conditions of knee joint is one of the most common non traumatic disorders of knee joint. Diagnosis of synovial inflammatory conditions by advance methods like Arthroscopic guided selective biopsy and histopathological examination of synovial tissue provides accurate diagnosis without any complications.*

Methods*: A prospective study was performed on 40 patients at Government General Hospital, Kurnool Medical College ,Kurnool for 2 years from 2011 to 2013. The age of the patients ranged from 20 to 50 years. We have used standard Arthroscopic equipment with all the necessary accessory instruments.*

Results: *Among 40 cases ,25 cases were diagnosed chronic non-specific synovitis,6 cases as Tuberculosis,5 cases of Rheumatoid synovitis,1 is Crystal synovitis, 1 is Pigmented villonodular synovitis,1 is Synovial chondromatosis,1 is Synovial sarcoma. Among 6 cases of TB synovitis 4 cases are associated with arthritis,2 cases with Medial menisceal tear.*

Conclusion: *Arthroscopic operation is a qualified method of treatment with low morbidity. The rate of intra and postoperative complications are less. Post-operative pain is very less, functional restoration of knee joint movement is quick. However execution of arthroscopic procedure is technically demanding, it requires comprehensive knowledge and vast experience in the field of arthroscopy.*

Key Words: *Synovitis, arthroscopy, biopsy,villonodular*

INTRODUCTION

Synovial inflammatory conditions of knee joint is one of the most common non traumatic disorder of nee joint. The common causes of synovial inflammation are Non specific synovitis, Tuberculosis which is endemic in India, Rheumatoid synovitis, Pigmented villonodular synovitis,crystal synovitis are rare.

The technology for arthroscopic synovial biopsy for synovial conditions of knee joint have evolved for the past 35 years. Progress in the arthroscopic surgery has been rapid especially in the past 15 years. The arthroscopy has dramatically changed the orthopaedic surgeons approach in the diagnosis and treatment of various inflammatory conditions of knee joint.A high degree of clinical accuracy combined with low morbidity, has encouraged the use of arthroscopy to assist in diagnosis .Progressive improvements in the lens systems of arthroscope and fiberoptic system in miniaturization and in the accessory operative instruments have made possible advanced operative techniques for multiple joints of both upper limbs and lower limbs. This study is intended to evaluate to evaluate the results of arthroscopic synovial biopsy and to discuss the diagnostic importance of arthroscopic selective synovial biopsy in synovial inflammatory conditions.[7]

MATERIALS AND METHODS

Our study is based on 40 patients selected for diagnostic arthroscopy at Government General Hospital. Kurnool from 2011 to 2013 year Of these patients 25 were males and 15 were females with age range of 20-50 yrs While doing this study the permission Ethical committe of KURNOOL MEDICAL COLLEGE WAS TAKEN. Standard arthroscopic equipment including a 4mm diameter athroscop with a 30 degree oblique lens used.But to see corners the knee joint, angle of inclination should be between 70-90 degrees Fiber optic cables linked to light source and arthroscope are used. 300-350 watts light source is used. Camera system is connected to arthroscope to visualize in a monitor. Different types of instruments like basket forceps, probing hook,grasping forceps etc .are used. Irrigation and distension of the joint are essential to all arthroscopic procedures. Normal saline is used for irrigation.Tourniquet with a leg holder is used. All the patients were given epidural anaesthesia, 5 patients required General Anaesthesia. All the procedures were done by standard Anterolateral portal entry of arthroscope.[4]Surgical Technique: All the patients were given per operative injection of Cephalosporins. After the scope is entered by Anterolateral approach, probing hook entered by a Anteromedial approach to probe joint at all corners and Synovial hypertrophy is visualized. Grasping forceps is passed through superomedial approach and synovial biopsy is done, taking out few bits of synovium from all the corners of knee joint. All the biopsy tissues of all the patients were sent to histopathalogical examination.

RESULTS

All the patients had pain and swelling ,with wasting of quadriceps muscle .Some had limping of the affected knee joint.Of the 40 patients the

following observations were made. ARTHROSCOPIC VIEW OF SYNOVIUM: Some patients on arthroscopic view had congested appearance of synovium with purpuric spots and thickening of synovium. Some patients had degenerated menisci with Chondromalacia changes of patella.Some had grossly oedematous synovium with gross thickening. One case had red brown folds, finger like projections and nodules in the congested synovium. Histpathological examination report: (Table1).[1].25 patients: Proliferating synovium with round cell infiltration. Synoviocytic hyperplasia and histiocytic infiltrates are present indicating Chronic non specific synovitis.2]6 patients: Typical granuloma with central caseous necrosis and scattered giant cells surrounded by lymphocytes and histiocytes indicating Tuberculous synovitis.(Figure1).[3] 5 patients: Prolifeating synovium with round cell infiltration and fibrinoid particles.Infiltration of synovial stroma infiltrated with perivascular inflammatory cells consisting of CD4 CELLS, B-cells and helper T cells indicating Rheumatoid synovitis.(Figure3)[.4]1 patient: Polyhedral, moderately sized cells. Haemosiderin deposits present. Foamy macrophages seen. Zones of sclerosis seen suggesting Pigmented Vilonodular synovitis.(Figure2).[5]1 patient: Crystal deposition with plenty of leucocytes seen.[6]:1 patient: Synovio cytic hyperplasia present and histiocytic synovial infiltrates present suggesting Synovial chondromatosis of knee joint.[7]1 patient] Classical biphasic spindle cells,epithelial like cells are present. Glandular like synoviocytes are present.

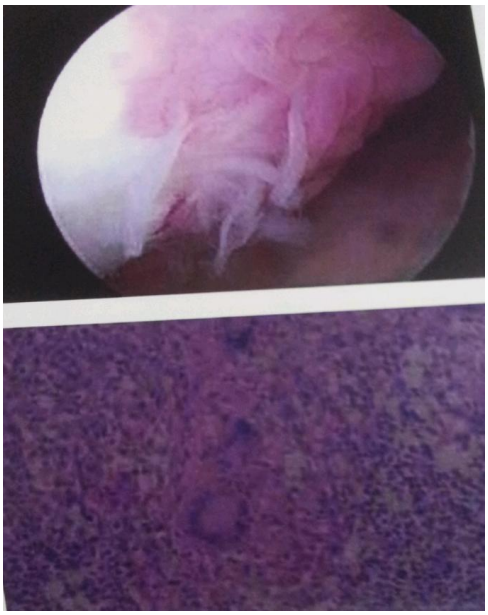


Figure 1; Arthroscopic and HPE pic of TB synovium.

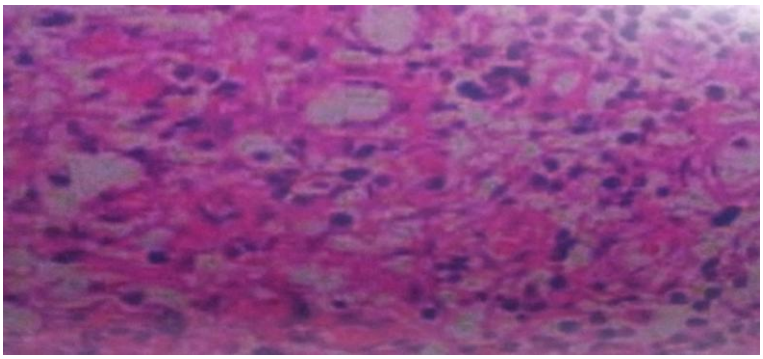
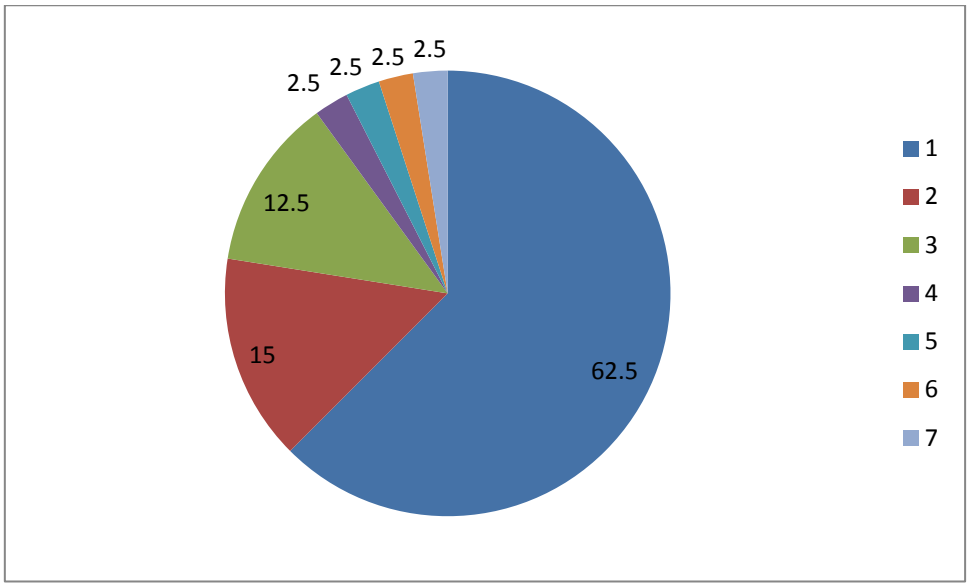


Figure 2: HPE of Rheumatoid Synoviuum

Figure 3: Arthroscopic view of Pigmented villonodular synovitis.

Distrubution of chronic synovitis in total 40 knee joint Arthroscopic synovial biopsies (Table1).

Disease	No.patients	Percentage.(%)
1.Non specific synovitis	25	62.5%
D2.TB Synovitis	6	15%.
3.Rheumatoid synovitis	5	12.5.%
4.P.V.N.S.	1	2.5%
5.Gouty synovitis	1	2.5%
6.Sy.Chondromatosis	1	2.5%
7.Sy.Sarcoma	1	2.5%



The above Table 1 and pie chart shows that of all the 40 patients 25 had Nonspecific synovitis, 6 had Tuberculous synovitis,5 had Rheumatoid synovitis, 1 each in Pigmented Villonodular Synovitis, Gouty synovitis, Synovial chondromatosis and Synovial sarcoma.

Age and sex distribution of chronic synovitis of knee joint Table 2:

Disease.	No.of patients	Age in years	Females	%	Males	%
Non specific synovitis	25	20-44	9	36%	16	64%
TB synovitis	6	25-40	2	33.3%	4	66.7%
Rheumatoid synovitis	5	22-45	3	60%	2	40%
P.V.NS.	1	38	1	100%	0	0%
Gouty Synovitis.	1	40	0	0%	1	100%
Synovial sarcoma.	1	48	0	0%	1	100%
Sy.Chondromatosis	1	35	0	0%	1	100%

Postoperative complications: Table 3

Complication	No.patients	Percentage%
Haemarthrosis	4	10
Joint effusion	3	7.5
Sy.fistula.	3	7.5
Wound infection	1	2.5
Knee stiffness	1	2.5

DISCUSSION

Chronic synovitis inflammatory conditions are very common disorders of knee joint. It results in synovial fluid accumulation, thickening of synovium ,eroding aticular cartilage causing severe pain and stiffness of the knee joint. Many etilogical factors are responsible for causing chronic synovitis like Chronic non specific synovitis, Tuberculous synovitis, Rheumatoid synovitis, Crystal deposit synovitis, Pigmented Villonodular synov itis etc. The inability to diagnose the cause of these synovitis conditions accurately by laboratory diagnostic tools pre-operatively, synovial biopsy plays an important role to diagnose the aetiology of chronic synovitis of knee joint.[2]The earlier diagnosis of these conditions would make treatment easy for example in our 6 cases of Tuberculosis, we diagnosed 4 conditions before artcular cartilage is involved, so they were easily treated completely just by starting Anti-tuberculous drugs only. The earlier diagnosis and earlier treatment would prevent knee stiffness and disabling complications of the knee joint. Earlier the synovial biopsy was done by arthrotomy, by this method we couldn't obtain biopsy accurately from the desired areas of the of the synovial tissue of the knee joint. More over this method involved more complications of infection, postoperative stiffness of the knee joint.Since the biopsy couldn't be obtained from the selective areas of the synovium ,the accuracy of diagnosis was questionable.[1]Arthroscopic procedures have revolutionized the diagnostic and therapeutic procedures of all the joints ,especially knee joint. The accuracy of the selective biopsy from the areas of the corners of the knee joint synovium made the diagnosis more accurate. In our study the postoperative complications like haemarthrosis (4cases), knee joint stiffness (1case) , synovial fistula(3cases), and wound infection (1),were minimal when compared to the open procedures. The post-operative stay was just 2 days minimising the hospital stay for the patient (Table3). Arthroscopic synovectomy can be taken up as a therapeutic procedure in synovitis conditions like Pigmented Villonodular Synovitis which can't be treated by drugs, synovectomy also limits the progress of the disease thus restricting the progression of the disease.[6] The arthroscopic procedures are technically very demanding, it needs a comprehensive knowledge of the procedure and vast experience before resorting to this procedure on the part of surgeons.In our study we have done arthroscopic biopsy in 40 patients with an average age of 33.5 years giving various arthroscopic appearances depending up on the aetiology. We had a high patient acceptance rate when compared to open biopsy We have treated 15 patients of our cases by arthroscopic synovectomy after the diagnosis was confirmed by histopathological examination , this gave excellent relief to 12 of the patients in our study.

CONCLUSION

Arthroscpic method is a qualified method for a selective synovial biopsy with low morbidity. The postoperative complications are minimal, high patient acceptancy rate for the procedure. The hospitalization and rehabilitation periods are considerably less when compared to conventional

arthrotomies.The accuracy of the diagnosis will determine the prognosis of the disease. Postoperative pain is less, full joint movement can be restored immediately. The execution of arthroscopic procedures are technically demanding, it requires a comprehensive knowledge and vast experience on the part of the surgeon.

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