



Original Research Article

Interpretation of synovial biopsy –A retrospective study

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ABSTRACT

Introduction: The synovial membrane is a layer of specialized connective tissue that lines the cavities of joints, tendon sheaths and bursae; it secretes synovial fluid into the joint cavity. The joint diseases are common orthopedic problems. This can lead to widespread disability and morbidity. Synovial biopsy is a procedure where a sample of joint lining or synovial membrane is taken. The evaluation of synovial biopsy is an important part of investigative procedure in patients presenting with joint problems. This study aims to observe the spectrum of lesions affecting the synovial membrane of the joint.

Materials and Methods: This is a type of case control study with retrospective analysis of synovial biopsy over a period of 10 months from the data collected from archives of Department of Pathology of our institution.

Result: In this study increased incidence of chronic nonspecific synovitis was diagnosed. The synovial biopsy was most commonly taken in males and among the 41-50 age groups.

Conclusion: Synovial biopsy is a very important diagnostic tool for early detection of the joint pathologies. This helps in better prognosis and patient care.

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1. Introduction

The synovial membrane is a specialized connective tissue that lines the inner surface of capsules of synovial joints and tendon sheaths. They secrete synovial fluid inside the joint cavity. The fluid has a lubricating action and is made up of hyaluronic acid and lubricin, proteinases and collagenases. The synovial biopsy is a simple procedure in which a sample of joint lining or synovial membrane is taken for diagnostic and therapeutic purpose in patient with joint pathologies. There are three different methods in which the biopsies are done: 1) Needle biopsy, 2) Arthroscopic biopsy, 3) Open biopsy.

The biopsy provides tissue that is available for immunochemistry, cytochemistry, cultures and molecular biology which helps in determining the pathophysiological mechanism of the underlying disease. The common indications for synovial biopsy are inflammation, infective synovitis, autoimmune and degenerative diseases, crystal

induced synovitis, metabolic and inherited synovitis, amyloidosis, sarcoidosis, tumor lesions and in evaluation of treatment. The joint pathologies are becoming common in adults nowadays and it increases the diagnostic value of synovial biopsy.

This study is mainly to find out the incidence of the common joint pathology among the patients suggested for a synovial biopsy and to correlate each type of joint pathology diagnosed with other clinical parameters.

2. Materials and Methods

This is a case control study of retrospective analysis. All cases related to synovial biopsy sent for analysis over a period of 10 months (Feb 2018 – Dec 2018) to Department of Pathology in our Institution (Saveetha Medical College and Hospital) were taken in this study.

All the synovial biopsy specimens received in the Department of Pathology were included in the study and the biopsy specimens with inadequate material were excluded from the study.

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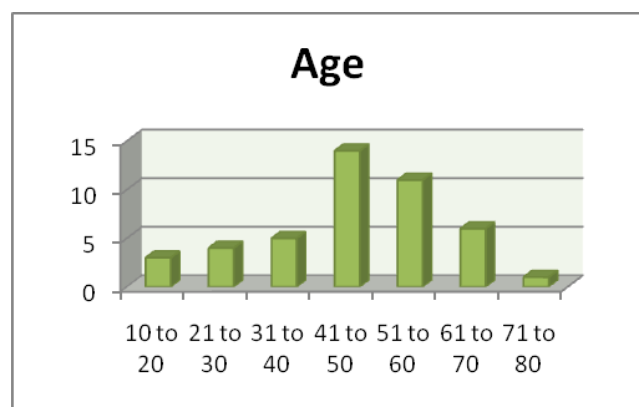
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Histopathological diagnosis and findings of synovial biopsy specimens were collected from archives of Pathology and correlation of these findings with other clinical parameters (Age and Sex) was carried out.

3. Results

This retrospective study was done in Department of Pathology of Saveetha Medical College with a sample size of 44 cases. All these patients had their sample of synovial tissue sent for histopathological diagnosis to the laboratory. The following observations were noted:

It was found that the synovial biopsy was taken commonly in patients of age group 41- 50 years and the next common age group is 51-60 as shown in Graph 1.



Graph 1: Age distribution

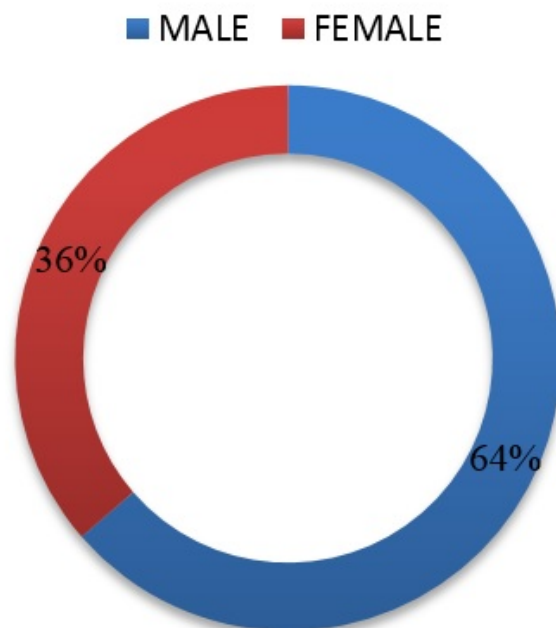
Majority of them were males (64%, 28/44) in comparison to females (36%, 16/44) as shown in Graph 2.

The age and sex correlation imply that the synovial biopsy is commonly taken in both males and females of the age group 41-50 in our study as shown in the Graph 3.

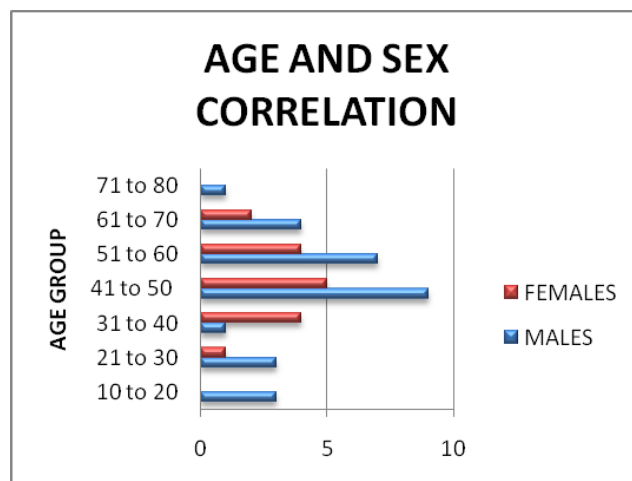
Histopathological Findings in the sample suggest that 35 cases out of 44 (80%) suffer from chronic nonspecific synovitis microscopically showed sheets of chronic inflammatory cell infiltrate of lymphocytes and plasma cells. One case (2%) showed acute on chronic inflammation. Out of 44, 3 cases (7%) showed features of suppurative arthritis which was characterized by sheets of neutrophils.

Tuberculous arthritis seen in 3 cases (7%), out of which 2 cases microscopically showed caseating granulomas and it was positive for acid-fast bacilli demonstrated by Ziehl-Neelsen staining. And the remaining 1 case had features of non-necrotizing granulomatous inflammation with negative acid-fast bacilli.

One case (2%) of rheumatoid synovitis which was characterized by pannus formation, synovial cell hyperplasia and dense lymphoplasmacytic infiltrate with germinal center formation. And one more case (2%) was identified as synovial chondromatosis characterized by the clusters of



Graph 2: Sex distribution



Graph 3: Age and sex correlation

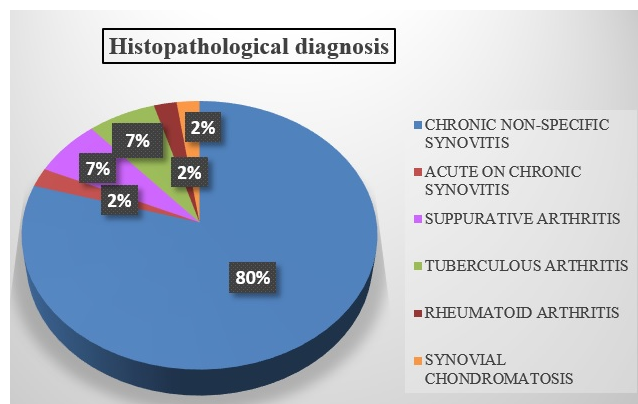
chondrocytes arranged in lobules.

Spectrum of synovial lesions and its percentage is shown in Graph 4.

According to our study, joint pathologies like chronic non-specific synovitis, suppurative arthritis and tuberculous arthritis have a higher incidence in males than females. In addition, joint pathologies such as acute on chronic synovitis, rheumatoid arthritis and synovial chondromatosis are common in females than in males. As shown in Table 1.

Table 1: Distribution of synovial biopsy according to sex

Synovial Biopsy Diagnosis	Males (%)	Females (%)
Chronic non-specific synovitis	24 (86)	11 (69)
Suppurative arthritis	2 (7.1)	1 (6.25)
Tuberculous arthritis	2 (7.1)	1 (6.25)
Rheumatoid arthritis	0	1 (6.25)
Acute on chronic synovitis	0	1 (6.25)
Synovial chondromatosis	0	1 (6.25)
Total	28	16



Graph 4: Histopathological diagnosis of synovial biopsy specimens

4. Discussion

The most common method used in our study for the biopsy technique is arthroscopic method. Arthroscopic biopsy has the advantage over closed needle biopsy being minimally invasive, less destructive in normal tissue, quicker recovery and rehabilitation leading to minimal hospital stay and less infection rate.¹ Diseases such as tuberculous arthritis and gout need treatment directed towards specific diagnosis which can be achieved by the use of relatively simple technique of arthroscopic synovial aspiration and biopsy.¹

The maximum number of cases was from the age group 41–50. Increased incidence was seen in males compared to females according to our study. Though the study conducted by Aparna et al.² and Maithali et al.³ showed that females were more affected by joint pathologies than males.

In our present study, a majority (80%, 35/44) showed chronic nonspecific synovitis, followed by suppurative arthritis (7%, 3/44) and tuberculous arthritis (5%, 2/44). In a study by Vijay PM et al.⁴ chronic nonspecific synovitis was the commonest inflammatory synovial lesion followed by tuberculous arthritis whereas in a study by Abhyankar et al.⁵ Tuberculous arthritis was the commonest lesion followed by rheumatoid arthritis and degenerative joint disease.^{4,5}

Also, the incidence of chronic nonspecific synovitis is more in males (68.6%, 24/35) than females (31.4%, 11/35). Similar findings were observed in case study done by

Aparna et al.² and Maithali et al.³ The occurrence of chronic nonspecific synovitis was most common in the 41-50 age groups. Higher distribution of such cases was found in most studies in literature.^{4,6} Acute on chronic synovitis with 2% (1/44) incidence was also observed.

The present study revealed the presence of 7% (3/44) incidence of suppurative arthritis. According to the study conducted by Brewerton et al.⁷, suppurative arthritis is rare but important as the destruction of joint occurs rapidly, and immediate diagnosis and treatment are essential.⁷ The incidence in our study was more in males than in females and all the cases belong to the age group 41-50.

In our study there is 7% (3/44) incidence of tuberculous synovitis. Studies showed higher incidence of non-caseating granulomas than caseating granulomas in tuberculous synovitis.² But in our study both caseating and noncaseating granulomas were present.

Of the total synovial diagnosis 2% (1/44) was of rheumatoid arthritis, it was seropositive arthritis and the patient was a female, belongs to the age group 51-60 years. Literature mentions that rheumatoid arthritis is 2-3 times more common in females than in males with the incidence more in younger age group.^{8,9}

The synovial chondromatosis showed an incidence of 2% (1/44), the patient was a female and belonged to the age group 51-60 age group. By this study we can acknowledge that the evaluation of synovial biopsy can be a very useful diagnostic tool for specific diagnosis in most of the joint pathologies.

5. Conclusion

From this study we conclude that the patients with joint diseases presented in our hospital setup were more in males than females and the maximum number of cases belongs to the age group of 41-50 years. Also, chronic nonspecific synovitis was the most common histopathological diagnosis in the synovial biopsy specimens. Our study implies on the well-planned early treatment of joint diseases that can be diagnosed at the initial stages using synovial biopsy and histopathological examination. Therefore, aiming at better patient care and decreased burden both psychologically and economically to the patients.

6. Funding

None.

Conflicts of interest

The authors declare no conflicts of interest.

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