



DIAGNOSTIC VALUE OF SYNOVIAL BIOPSY IN A TUNISIAN INSTITUTION: ABOUT 43 CASES

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ABSTRACT

Introduction: histopathological study of synovial biopsy is one of the most valuable means for the diagnosis of joint diseases, as clinical diagnosis has its own limitations. **Aim:** to evaluate the reliability of the synovial biopsy in the etiological diagnosis of mono- and oligo-arthropathies. **Methods:** our retrospective study concerned 43 synovial biopsies collected at the department of pathology of the university hospital Mongi Slim La Marsa hospital over a three-year period (March 2015- March 2018). **Results:** the average age of our patients was 56.18 years with extremes ranging from 24 to 80 years old. In our series, synovial biopsies were performed exclusively in large joints. They interested in order of frequency the knee (79%), the hip (9%), the elbow (7%) and the ankle (5%). Histopathological examination classified synovial biopsies into septic arthritis (n=23), mechanical arthropathy (n=5), rheumatic synovitis (n=5), reactive synovitis (n=7), chondrocalcinosis (n=1) and metastatic adenocarcinoma of synovium (n=1). The definitive diagnosis was based on a set of arguments including clinical, biology, radiological examination, histology and evolution data. The pathological examination was consistent with the suspected clinical diagnosis in 90% of the cases. **Conclusion:** Synovial biopsy is an important and final tool for definitive diagnosis of joint disorders. Correlation with clinical, radiological, and serological findings helps to arrive at an accurate diagnosis.

KEYWORDS: Synovial, biopsy, arthritis, synovitis, pathology.

INTRODUCTION

The synovial biopsy occupies nowadays a place of choice in the etiological diagnosis of mono- or oligo-arthropathy. The diagnostic value of synovial biopsy has been assessed by several studies which have attempted to demonstrate the reliability of this technique in the etiological diagnosis of mono- and oligo-arthropathies.^[1] In this paper, we report our experience with synovial biopsies over the past two years. Our aim was to evaluate the reliability of the synovial biopsy in the etiological diagnosis of mono- and oligo-arthropathies.

METHODS

We undertook a retrospective study of 43 patients who underwent synovial biopsy at the orthopedic surgery department of Mongi Slim hospital of Tunis between March 2015 and March 2018. One case was excluded from this study because clinical data were lacking. The cases were retrieved from the files of the registry of pathology of the same hospital. Diagnosis was based upon clinical, imaging and histopathological findings. All specimens were obtained via biopsy. Tissues were fixed in 10% phosphate buffered formaldehyde. They were embedded in paraffin and sections were prepared for routine light microscopy after staining with

hematoxylin and eosin. Immunohistochemical analysis was performed using the avidin-biotin complex technique with antibodies against CK7,19,20 and TTF1. Patient confidentiality was maintained.

RESULTS

Clinical findings

Our study group included 20 male and 23 female patients (sex-ratio M/F = 1.15) between 24 and 80 years of age (mean = 56.18 years). Past medical history was significant for sickle cell disease (n=2), diabetes (n=1), osteosarcoma (n=1), juvenile chronic arthritis (n=1), elbow fracture (n= 1), fracture of the patella (n=1), fracture of the femoral neck (n=1) and rheumatoid arthritis (n=4). In our series, synovial biopsies were performed exclusively in large joints including the knee (n=34) (79%), the hip (n=4) (9%), the elbow (n=3) (7%) and the ankle (n=2) (5%) (Table 1).

Pathologic findings

Histopathological examination classified synovial biopsies into (Table 1): septic arthritis (n=22) (Figure 1), mechanical arthropathy (n=5), rheumatic synovitis (n=5) (Figure 2), reactive synovitis (n=7), tuberculous arthritis (n=1) (Figure 3), pigmented villonodular synovitis (n=1),

chondrocalcinosis (n=1) (Figure 4) and metastatic adenocarcinoma of synovium (n=1).

In the latter, immunohistochemical study showed positive immunostaining of tumour cells with CK7, but they were negative for CK19, CK20 and CK19.

The definitive diagnosis was based on a set of arguments including clinical, biology, radiological examination, histology and evolution data. The pathological examination was consistent with the definitive diagnosis in 90% of the cases in our series. Histological findings of synovial biopsies and their respective locations are summarized in table I.

Table I: Histological findings of synovial biopsies and their location.

Histological diagnosis		Number of cases	Joint(s) affected			
			knee	hip	elbow	ankle
Septic arthritis	Common microbes	22 (51%)	14	3	3	2
	Tuberculosis	1 (2%)	0	1	0	0
Rheumatic synovitis		5 (12%)	5	0	0	0
Reactive synovitis		7 (17%)	7	0	0	0
Chondrocalcinosis		1 (2%)	1	0	0	0
Mechanical arthropathy		5 (12%)	5	0	0	0
Synovial tumour	Villonodular synovitis	1 (2%)	1	0	0	0
	Metastatic adenocarcinoma	1 (2%)	1	0	0	0
Total		43 (100%)	34	4	3	2

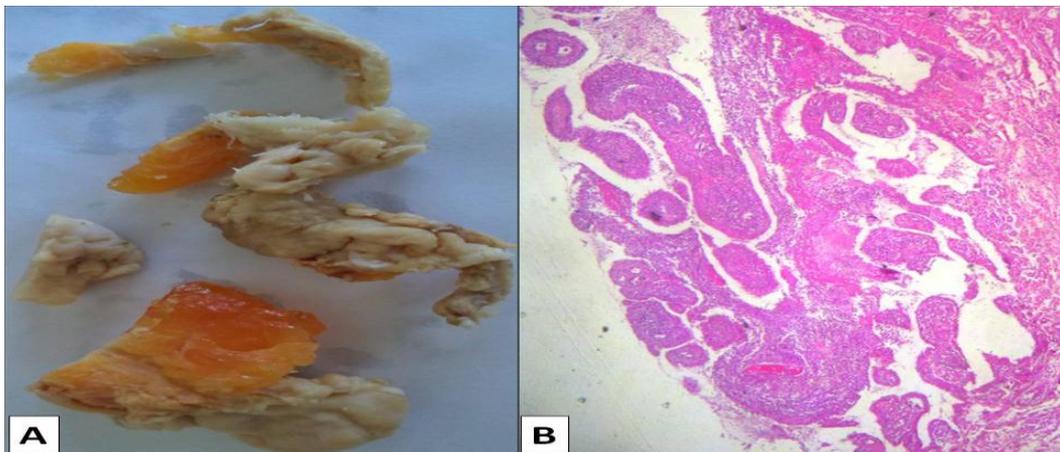


Figure 1: (A) Gross specimen of synovial biopsy. Fibroadipose synovial tissue. (B) Synovium showing neutrophilic infiltration and debris in a case of septic arthritis. (Hematoxylin and eosin, magnification $\times 100$).

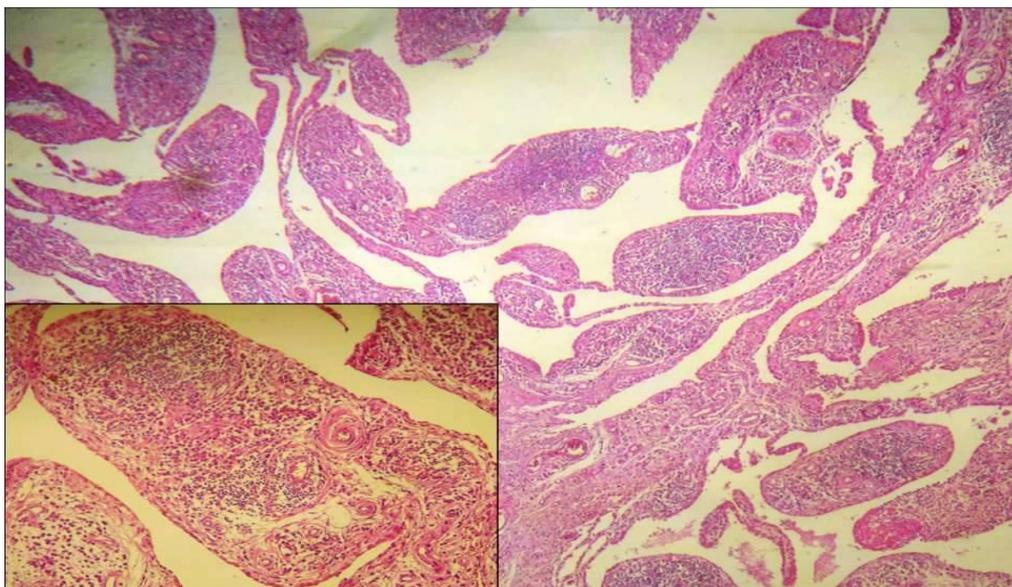


Figure 2: Histopathology of rheumatoid arthritis synovitis. Inset photo shows a higher magnification of the lymphoid aggregate (Hematoxylin and eosin, magnification $\times 400$).

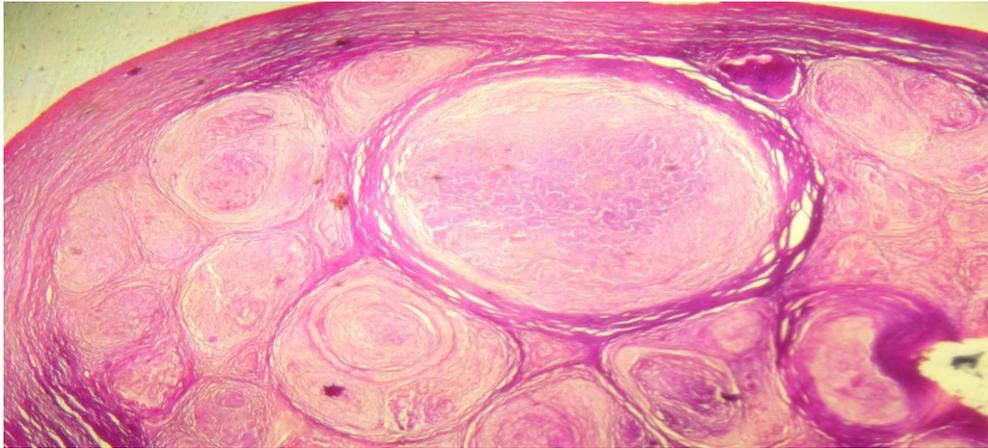


Figure 3: Tuberculous synovitis showing caseo-fibrous granulomas. (Hematoxylin and eosin, magnification $\times 100$).

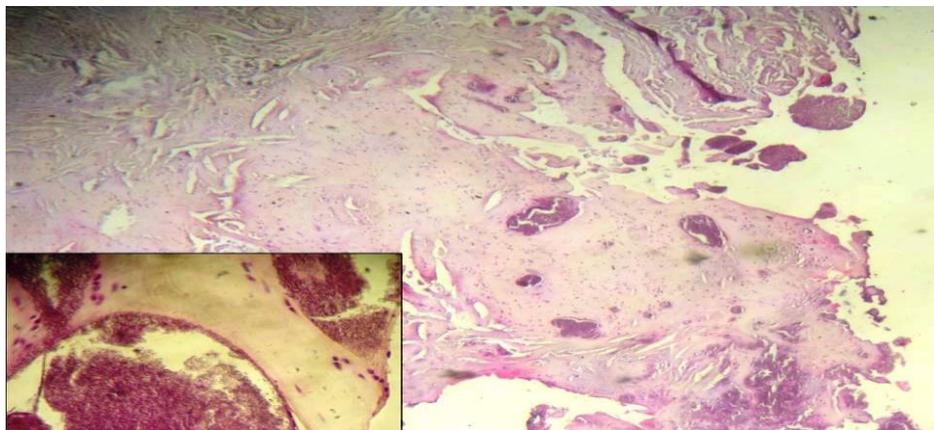


Figure 4: Deposition of calcium pyrophosphate dihydrate crystals in synovial tissue (Hematoxylin and eosin, magnification $\times 40$). Inset photo shows a higher magnification of the crystals (Hematoxylin and eosin, magnification $\times 400$).

DISCUSSION

Synovium is a specialized mesenchymal tissue which is essential for the appropriate function of the locomotor apparatus. It is the site for a series of pathologic processes that are characteristic and in some cases specific, to this distinctive tissue.^[2] Sampling of synovial tissue is a direct approach to defining the pathologic processes that cause swollen, painful joints. In clinical settings, it can be particularly valuable in evaluating an undiagnosed persistent monoarthritis when other investigations, including synovial fluid analysis, have failed to provide a specific diagnosis. More recently, synovial biopsy has been explored as a method for defining the target tissue response to therapeutic agents, particularly targeted biologic therapies.^[3] The presence of large numbers of neutrophils in the synovial tissue stroma is highly suggestive of septic arthritis and in such cases Gram stain may reveal bacteria in the tissue. Because septic arthritis is usually acute in onset, synovial biopsy is rarely required and the diagnosis is by analyzing synovial fluid. The majority of patients with bacterial septic arthritis usually present with acute monoarthritis. The knee is the most commonly involved joint, accounting for about 50% of the cases, but wrists, ankles, and hips are also commonly affected.^[4,5] The

presence of granulomas favors a diagnosis of tuberculous arthritis or sarcoidosis, both of which cause chronic monoarthritis. The synovial granulomas of tuberculosis may be caseating or noncaseating, and staining of the tissue for acid-fast bacilli, culture, and molecular probing can yield a definitive diagnosis in an estimated 50% of cases.^[6] Approximately 10-11% of extrapulmonary tuberculosis involves joints and bones. The spine and hip are the most commonly involved joints followed by knee.^[7] Pigmented villonodular synovitis is an important consideration in patients with chronic monoarthritis of a large joint such as the hip or knee. This disorder has a characteristic MRI appearance caused by hemosiderin deposits in the synovium and large cystic lesions in adjacent bone. Histopathologic examination of the synovium can confirm this diagnosis and shows a diffusely hypervascular proliferative lesion with mononuclear cells of the monocyte/macrophage lineage, foamy multinucleated cells resembling osteoclasts, and hemosiderin deposits.^[8] Rheumatoid arthritis (RA) is an immune-complex-mediated systemic disease that manifests as chronic polyarticular arthritis. It is mostly seen in women during the second and third decades of life. The joints of the feet and hands are nearly always involved. Other joints frequently affected are the elbows,

knees, wrists, ankles, hips, spine, and temporomandibular articulations. Knee is the common site in monoarticular disease.^[9,10] The two characteristic features seen in RA synovitis are hyperplasia of the lining layer and infiltration of the sublining stroma with mononuclear cells. The surface of the lining layer is often covered with fibrin deposits generated from activation of the fibrinolytic system in inflammatory synovial fluid. Occasionally, the synovial lining layer is completely denuded and is replaced by a dense fibrin cap. In RA, the mononuclear cell infiltrate in the sublining stroma can be diffuse but more commonly is arranged in perivascular aggregates that resemble lymphoid follicles. Arthritis resulting from metastatic carcinoma is rare. If there is synovial involvement, it is usually related to direct extension of a metastatic lesion from juxta-articular bone.^[11] Only a few reported cases of metastatic adenocarcinoma to the synovium, without significant adjacent osseous disease, can be found in the literature. The most common primary tumor associated with metastatic carcinomatous arthritis is bronchogenic carcinoma, followed by breast, melanoma, and gastrointestinal carcinomas.^[12,13] Involvement is usually monoarticular,^[13] with the knee being most commonly affected, although the involvement of other joints has been reported.^[12,13] Deposition of crystals within synovium, articular cartilage, and periarticular soft tissue is related to a spectrum of clinical conditions starting from asymptomatic soft tissue aggregates through severe chronic destructive arthropathies.^[14] The three endogenously formed crystals that produce disease are monosodium urate, calcium pyrophosphate dihydrate, and calcium hydroxyapatite. Chondrocalcinosis affects up to 15% of adults older than 65 years, and radiographically detectable deposits are present in the hyaline and fibrocartilage of the knees, symphysis pubis, and wrist. Chondrocalcinosis occurs as a primary idiopathic abnormality in about 90% of affected persons.

In conclusion, our series highlights the various spectrums of joint diseases. Synovial biopsy is an important and final tool for definitive diagnosis of joint disorders. Correlation with clinical, radiological, and serological findings helps to arrive at an accurate diagnosis. In our series, the pathological examination was consistent with the suspected clinical diagnosis in 90% of the cases.

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