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Original Article

Subclinical Synovitis in Systemic Lupus Erythematosus: Ultrasound Insights.

Asmaa Khalifa Ahmed, Ahmed Roshdy Al-Agamy ,
Aya Abdel-Sabour Abdel-Baset Mohammed, Radwan Abdullah Radwan

*Department of Rheumatology and Rehabilitation, Faculty of Medicine, Sohag University

Abstract

Background: Systemic Lupus Erythematosus (SLE) is a chronic inflammatory autoimmune disorder associated with a wide range of symptoms and physical findings. Joint involvement is one of the most common features of SLE. In routine clinical practice, joint involvement is usually assessed with physical examination and radiographical studies.

Objectives: the purpose of this study was to assess the prevalence of the subclinical synovitis in small joints of hand and wrist joints of the SLE patients using ultrasonography (US), compare the findings with healthy controls, and correlate them with disease activity and various disease parameters.

Methods: A cross-sectional case–control study was conducted on 57 cases with SLE diagnosed according to the 2019 ACR/EULAR classification criteria for SLE and 50 age and sex matched healthy controls. Clinical, laboratory and ultrasonographic data were recorded. Disease activity was assessed using the SLE Disease Activity Index (SLEDAI).

Results: SLE patients (mean age 31.3 ± 8.9 years, 80.7% females) showed a significantly higher prevalence of grey-scale synovitis (22.8% vs. 4%, p = 0.005) and tenosynovitis (15.8% vs. 0%, p = 0.003) compared to controls. Patients with MSUS-detected synovitis had significantly longer disease duration (p = 0.021), higher ESR (p = 0.012), increased 24-hour urinary protein (p = 0.045), and higher SLEDAI scores (p = 0.036). Alopecia and anti-dsDNA positivity were also significantly related. Logistic regression identified elevated ESR, positive anti-dsDNA and alopecia as independent risk factors predicting subclinical synovitis.

Conclusion: Subclinical synovitis and tenosynovitis are common in SLE and can be effectively detected by Musculoskeletal Ultrasound (MSUS), even in the absence of clinical arthritis, highlighting the value of MSUS in routine SLE evaluation for early detection and monitoring of musculoskeletal involvement. Higher ESR, positive anti-dsDNA, and alopecia may serve as useful predictors of subclinical synovitis in SLE.

Keywords: Systemic lupus erythematosus, subclinical arthritis, synovitis, ultrasound.

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Corresponding Author: Asmaa Khalifa Ahmed **E-mail**: asmaakhalifa86@yahoo.com

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Introduction

Systemic Lupus Erythematosus (SLE) is a chronic inflammatory autoimmune disorder associated with a wide range of symptoms and physical findings. It is characterized by loss of tolerance to self-antigens, formation of immune complexes, and an activated type I interferon system. [1-4] Joint involvement is one of the most common features of SLE, with up to 95% of patients experiencing arthralgia or arthritis during the course of their disease.[5] The presence of this manifestation significantly impacts on the patient's quality of life and affects daily life activities.[6]

Traditionally, SLE arthritis is considered to be mild, reversible and non-erosive, with only 5–15% of cases progressing to deforming arthropathy, either erosive as in rhupus syndrome (an overlap of SLE with rheumatoid arthritis (RA)) or non-erosive as in Jaccoud's arthropathy. [7]

In routine clinical practice, joint involvement is usually assessed with physical examination and radiographical studies.[8] In accordance with established classification criteria, lupus-associated joint involvement is defined as the presence of synovitis in two or more joints, demonstrated by edema, pain, or joint effusion along with at least 30 minutes of morning stiffness. [9]

The clinical importance of US is closely related to many advantages compared with other imaging techniques such as safety; a patient-friendly, noninvasive modality; limited contraindications; no ionizing radiation; and relative low cost in comparison with MRI .[10]

Joint and tendon inflammation has been documented in musculoskeletal ultrasound in patients without any signs of arthritis, thus suggesting the role of ultrasound in the evaluation of patients with nonspecific musculoskeletal manifestations such as arthralgia. And detection of the presence of underlying subclinical inflammatory changes.[11,12]

Although there is evidence that US PD is a valuable technique in the evaluation of musculoskeletal symptoms in SLE, the prevalence of subclinical joint abnormalities in SLE remains to be defined.[13]The aim of this study was to assess the prevalence of US abnormalities of the hand and wrist in asymptomatic patients with SLE, while comparing these findings with healthy controls and correlate them with various disease parameters.

Methods

A cross-sectional case control study was conducted at Rheumatology and Rehabilitation Department, Sohag university hospital enrolled 57 cases with SLE diagnosed according to the 2019 ACR/EULAR classification criteria for SLE.[14] and 50 healthy volunteers recruited from the community as age and sex matched controls.

All cases were subjected to: Full medical history: age, sex, disease duration and complete general examination.

laboratory investigations, routine [CBC, ESR (Westergren method) , ALT/AST , serum creatinine, A/C ratio , 24-hour protein], immunological [ANA (IF), Anti dsDNA (ELISA) , C3 ,C4] and renal biopsy.

Assessment of disease activity using the systemic lupus erythematosus disease activity index (SLEDAI). SLEDAI Scoring: Use the SLEDAI scoring system, which assigns specific points to each manifestation of SLE. The presence of each manifestation within the past 10 days is given a score based on its severity and impact. [15]

Musculoskeletal Ultrasound Assessment: Musculoskeletal ultrasound (MSUS) was performed bilaterally on the small joints of hands {Metacarpophalangeal joints (MCPs), proximal interphalangeal (PIPs) joints}and wrists using a General Electric LOGIQ 5 system with a linear high-frequency probe (7.5–12 MHz). Examinations were done with patients seated, hands resting on the table, and without probe compression. All ultrasound examinations were performed by a single experienced rheumatologist who was blinded to the patients' clinical findings and laboratory data. Both gray-scale (GS) and power Doppler (PD) modes were applied following EULAR–OMERACT guidelines[16]. GS synovitis was defined as non-compressible hypoechoic synovial hypertrophy, while PD activity indicated active inflammation. Tenosynovitis, bone erosions, and carpal tunnel changes were also assessed. Subclinical synovitis was defined as ultrasound-detected synovial hypertrophy or effusion in the absence of clinical arthritis.[17]

Ethical consideration: The study was approved by the Scientific Ethical Committee (Soh-Med-23-01-06) of Faculty of Medicine, Sohag University. An informed written consent was taken from all of the participants in the study. Clinical trial registration number: NCT05844917.

Statistical analysis

Statistical package for social sciences (IBM-SPSS), version 25 IBM- Chicago, USA (August 2017) was used for statistical data analysis. Data expressed as mean, standard deviation (SD), number and percentage. Mean and standard deviation were used as descriptive value for quantitative data, while number and percentage were used to describe qualitative data. Student t test was used to compare the means between two groups. Pearson Chi square was used to compare percentages of qualitative data. The level of significance (P-value) can be explained as: No significance $P > 0.05$, significance $P < 0.05$ and high significance $P < 0.001$.

Results

A total of 57 patients with systemic lupus erythematosus were included in the study with 50 healthy controls , Systemic lupus patients were predominantly females 46 (80.7%) with a mean age of 31.28 ± 8.86 years, The median disease duration was 3.50 years (range 2-8 years) and the mean SLEDAI score was 16.79 ± 5.93, most patients (77.2%) had High or Very High disease activity (High: 42.1% - very High: 35.1%), Moderate activity was present in 19.3% of cases and only 3.5% had Mild disease activity as shown in figure (1).

Common clinical manifestations included fever (49.1%), malar rash (45.6%), oral ulcers (38.6%), alopecia (36.8%), and photosensitivity (35.1%). Neuropsychiatric symptoms (headache, seizures, psychosis) were less frequent. The most widely used treatments were hydroxychloroquine (89.5%), azathioprine (52.6%), and corticosteroids (50.9% as shown in table (1).

Table (1) demographic and clinical characteristics of SLE patients

Item	Value
Age Mean ± SD Median (range)	 31.28 ± 8.86 30 (17-56)
Sex Male Female	 11(19.3%) 46(80.7%)
Disease duration/year Mean ± SD Median (range)	 3.89 ± 1.73 3.50 (2-8)
SLEDAI Mean ± SD Median (range)	 16.79 ± 5.93 16 (7-29)
Clinical	
Malar rash	26 (45.6%)
Photosensitivity	20 (35.1%)
Discoid Lupus Erythematosus	4 (7%)
Alopecia	21 (36.8%)
Oral ulcers	22 (38.6%)
Fever	28 (49.1%)
Pleurisy	2 (3.5%)
Pericarditis	4 (7%)
Psychosis	2 (3.5%)
Seizures	4 (7%)
Blurred vision	6 (10.5%)
Headache	4 (7%)
Treatment	
Steroid	29 (50.9%)
Hydroxychloroquine	51 (89.5%)
Azathioprine	30 (52.6%)
Cyclophosphamide	28 (49.1%)
Cyclosporin	1 (1.8%)
Mycophenolate mofetil	12 (21.1%)
Rituximab	1 (1.8%)
Calcium	26 (45.6%)
Vitamin D	24 (42.1%)

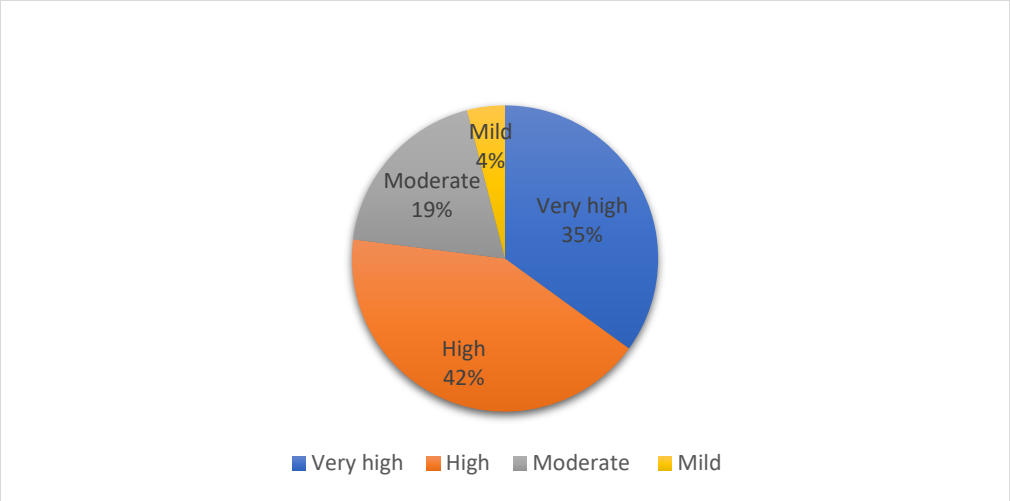

Figure 1 SLEDAI level in SLE patients

In the current study the laboratory findings revealed that Leukopenia was common, with mean WBCs: 5.95 ± 3.28 x10⁹/L, median: 4.9 (range 1.9–21), Anemia was frequent: mean Hb: 10.64 ± 1.56 g/dL, Platelet count averaged 248.7 ± 99.3 x10⁹/L, with wide variation (21–577), suggesting thrombocytopenia in some patients. ESR was elevated: mean 46.25 ± 25.52 mm/hr . ANA are positive in all SLE patients and the most frequent patterns were Speckled: 49.1% Homogenous: 47.4 Nucleolar/Other: 3.5%. Regarding renal Parameters, Serum Creatinine was normal in most patients: mean 0.90 ± 0.48 mg/dL. 24h urinary protein was elevated (mean: 1092 mg/day), Urine dipstick showed ≥2+ proteinuria in 49.1% of patients. Casts were found in 36.8% (mostly granular). Renal biopsy (performed in 26 patients) showed LN Class IV most frequently (17.5%). ALT and AST were within normal range. Coomb's test was positive in 10.5% Low complement levels were seen in: C3: 36.8% and C4: 22.8%, as shown in table (2).

Table (2) Routine laboratory investigations of SLE patients

Item		Mean ± SD	Median (range)
CBC	WBCs	5.95±3.28	4.9(1.9-21)
	HB	10.64±1.56	10.6(7.6-15.8)
	MCV	82.37±6.91	83(67-98)
	PLT	248.7±99.3	252(21-577)
Acute phase reactants	ESR	46.25±25.52	40(9-125)
ANA pattern		Homogenous Speckled Nucleolar/other	27(47.4%) 28(49.1%) 2(3.5%)
ANA positivity			57(100%)
Anti dsDNA positivity			30(52.6%)
Renal	Creatinine	0.90±0.48	0.8(0.27-2.47)
	24H protein/urine	1092±2017	707(60-7080)
	Urine A/C ratio	382.3±732.2	32(3.2-2677)
	Pus cells in urine	32.36±26.79	22.5(6-100)
	RBCs in urine	37.77±35.78	25(5-100)
	Urine Dipstick	Non	18(31.6%)
		Trace	5(8.8%)
		+	6(10.5%)
		++	16(28.1%)
		+++	11(19.3%)
		++++	1(1.8%)
	Casts	Hyaline	3(5.3%)
		Hyaline + granular	6(10.5%)
		Granular	12(21.1%)
		Non	36(63.2%)
	Renal biopsy	LN-II	4(7%)
		LN-II/III	1(1.8%)
		LN-II/V	1(1.8%)
		LN-III	2(3.5%)
		LN-III/IV	2(3.5%)
		LN-IV	10(17.5%)
		LN-IV/V	2(3.5%)
		LN-V	3(5.3%)
		Interstitial nephritis	1(1.8%)
		Negative/Not done	31(54%)
Liver	ALT	18.88±10.22	17(6-55)
	AST	20.04±8.89	17(8-56)
Other labs	Coomb's test	Positive	6(10.5%)
Complement	C3	Consumed	21(36.8%)
	C4	Consumed	13(22.8%)

Among 57 patients with systemic lupus erythematosus and 50 healthy controls, no significant differences were observed in age ($p = 0.073$) or sex distribution ($p = 0.288$). Musculoskeletal ultrasound (MSUS) revealed a significantly higher prevalence of synovitis in grey scale in SLE patients than controls (22.8% vs. 4%, $p = 0.005$) and tenosynovitis in grey scale (15.8% vs. 0%, $p = 0.003$). Among SLE patients, Grade I synovitis was identified in 8 cases (14.0%) and Grade II synovitis in 5 cases (8.7%), whereas in the control group, only Grade I synovitis was observed in 2 subjects (4.0%), No power Doppler (PD) signal or bone erosions were observed. Carpal tunnel syndrome was more frequent in SLE patients (8.8% vs. 2%) but did not reach statistical significance ($p = 0.128$), as shown in table (3).

Table (3) Characteristics and sonographic findings of SLE patients and controls

		Cases (No=57)	Controls (N=50)	P value
Age		31.28 ± 8.86	34.6 ± 10.08	0.073
Sex	**Male**	11(19.3%)	14 (28%)	0.288
	Female	46(80.7%)	36 (72%)	
MSUS findings	**Synovitis (GS)** **Grade I** **Grade II**	13 (22.8%) 8 (14%) 5 (8.7%)	2 (4%) 2(4%) 0(0%)	0.005*
	Synovitis (PD)	0(0%)	0(0%)	-
	Tenosynovitis (GS)	9 (15.79%)	0 (0%)	0.003*
	Tenosynovitis (PD)	0(0%)	0(0%)	-
	Erosions	0(0%)	0(0%)	-
	CTS	5 (8.77%)	1 (2%)	0.128
prevalence of subclinical synovitis	Yes	13(22.8%)	2 (4%)	0.005*
	No	44(77.2%)	48 (96%)	

Among 57 SLE patients, those with MSUS-detected synovitis (n=13) demonstrated significantly longer disease duration compared to those without synovitis (n=44) (4.58 vs. 3.31 years, p=0.021) in addition to higher ESR (55.92 vs 43.39 ± 23.20; p = 0.012), 24-hour urinary protein was significantly increased in the synovitis group (2957 ± 3575 mg/day vs. 392.6 ± 338.9 mg/day; p = 0.045). The SLEDAI was significantly higher in the synovitis group (18.6 vs. 15.2, p=0.036). No statistically significant differences were observed between the groups regarding age, WBCs, HB, MCV, PLT, serum creatinine, liver enzymes (ALT, AST), or urinary sediment parameters (pyuria, hematuria, urine A/C ratio) (p > 0.05 for all), as shown in table 4.

Table (4) Comparison between cases with subclinical synovitis and those without regarding the quantitative variables (age, disease duration and labs**)**

	MSUS Synovitis N=13	MSUS No synovitis N=44	T test	P value
Age	27.62±6.55	32.36±9.21	1.728	0.090
Disease duration	4.58 ± 2.07	3.31 ± 1.58	2.37	0.021
WBCs	5.97±3.18	5.95±3.35	0.018	0.986
HB	11.16±1.76	10.49±1.49	1.369	0.177
MCV	82.00±7.90	82.47±6.69	0.215	0.831
PLT	242.8±68.2	250.4±107.4	0.242	0.810
ESR	55.92±31.28	43.39±23.20	2.577	0.012
Creatinine	0.98±0.65	0.88±0.43	0.697	0.489
ALT	19.15±11.96	18.80±9.80	0.110	0.910
AST	21.15±12.01	19.70±7.88	0.513	0.610
Pyuria	36.40±39.43	31.18±23.39	0.375	0.711
Hematuria	35.00±43.78	39.00±34.58	0.178	0.862
A/C ratio	214±326.82	436.8±818.5	0.875	0.387
24 hour proteins in urine	2957±3575	392.6±338.9	2.213	0.045
SLEDAI score	18.6±5.2	15.2±6.1	2.311	0.036

The only clinical manifestations related to the musculoskeletal ultrasound detected arthritis was alopecia, seen in 61.5% of synovitis cases compared to only 29.5% of those without synovitis additionally the synovitis group had a much higher prevalence of anti-dsDNA positivity (85.7% vs. 55.8%, p=0.013) The presence of synovitis, detected

via MSUS, was not significantly associated with sex, other clinical symptoms, complement consumption, or specific treatments ($p > 0.05$ for all), as described in table (5).

Table (5) Comparison between cases with subclinical synovitis and those without regarding the qualitative variables

		MSUS Synovitis	MSUS No synovitis	Chi square	P value
Sex	Male	2(15.4%)	9(20.5%)	0.166	0.684
	Female	11(84.6%)	35(79.5%		
Clinical data	Malar rash	6(46.2%)	20(45.5%)	0.002	0.965
	Photosensitivity	2(23.1%)	17(38.6%)	1.067	0.302
	DLE	1(7.7%)	3(6.8%)	0.012	0.914
	Alopecia	8(61.5%)	13(29.5%)	4.414	0.036
	Oral ulcers	3(23.1%)	19(43.2%)	1.712	0.191
	Fever	8(61.5%)	20(45.5%)	1.039	0.308
	Pleurisy	0	2(4.6%)	0.612	0.434
	Pericarditis	1(7.7%)	3(6.8%)	0.012	0.914
	Psychosis	1(7.7%)	1(2.3%)	0.871	0.351
	Seizures	1(7.7%)	3(7%)	0.008	0.930
	Visual	1(7.7%)	8(18.2%)	1.879	0.208
	Headache	0	4(9.1%)	1.271	0.736
	AntidsDNA positivity	12 (85.7%)	24 (55.8%)	5.200	0.013
Treatment	Steroid	5(38.5%)	24(54.5%)	1.039	0.308
	HCQ	10(76.9%)	41(93.2%)	2.817	0.093
	AZA	5(38.5%)	25(56.8%)	1.356	0.244
	Cyclophos	7(53.8%)	21(47.7%)	0.150	0.698
	Cyclosporin	0	1(2.3%)	0.301	0.583
	MMF	2(15.4%)	10(22.7%)	0.326	0.568
	RTX	0	1(2.3%)	0.301	0.583
	Calcium	6(46.2%)	20(45.5%)	0.002	0.965
	Vit D	4(30.8%)	20(45.5%)	0.888	0.346

Based on this logistic regression analysis, Higher ESR, positive anti-dsDNA and Alopecia are significant predictors of subclinical synovitis in this study in table (6).

Table 6: Logistic regression of age, sex and clinical and laboratory findings which showed significant differences for prediction of subclinical synovitis by US

	Odds ratio	95% CI	P value
Age	0.930	0.853-1.013	0.096
Sex	1.414	0.265-7.553	0.685
24 hours protein in urine	1.007	0.996-1.017	0.220
Alopecia	3.815	1.049-13.881	0.042*
Anti-dsDNA Positive	4.74	0.95 - 23.68	0.058
ESR	1.02	1.01 - 1.04	0.005

CI: Confidence interval.

Examples of MSUS finding our systemic lupus erythematosus patients Figure 2

(a) Synovitis of wrist joint in SLE patient.

(b). Synovitis of right 2nd MCP joint.

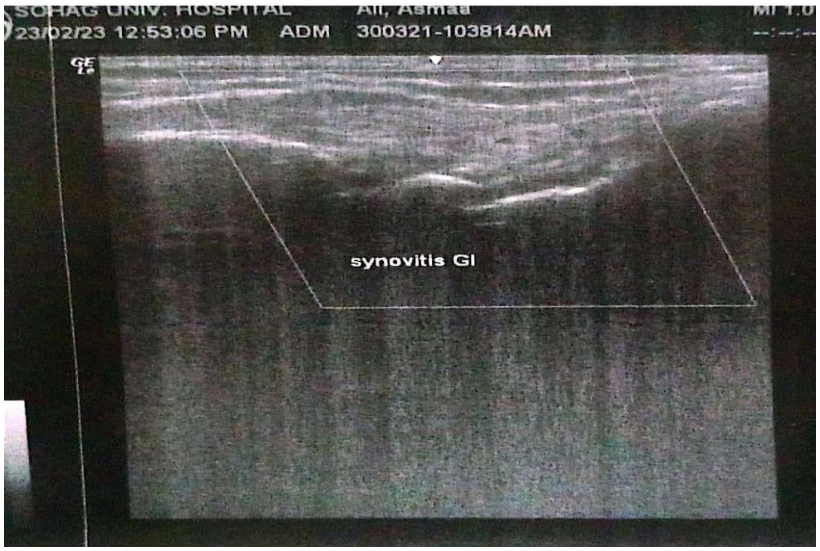

Figure 2 (a): Synovitis of wrist joint.

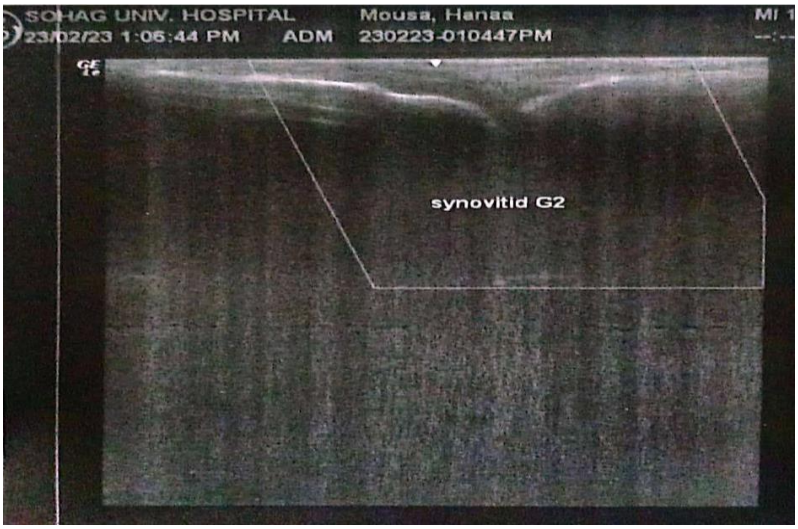

Figure 2 (b): Synovitis of right 2nd MCP joint.

Discussion

Ultrasound today is probably the most productive and cost-effective method for detecting synovitis in SLE. It is widely accepted that musculoskeletal ultrasound detects a higher number of swollen joints and tendons than the clinical physical examination in inflammatory arthropathies [18, 19]. The use of US in the detection of inflammation in patients without definite clinical signs of synovitis/tenosynovitis, as well as the early identification of a potentially aggressive inflammatory process, is significant from a clinical point of view. US may be helpful in reducing the risk of underestimating both musculoskeletal disease activity and severity with potential implications on treatment strategies [20].

The aim of the current study was to estimate the prevalence of subclinical synovitis among SLE patients in Sohag University Hospitals using musculoskeletal ultrasound.

Comparing the SLE cases as one group (57 cases) to the apparently healthy control subjects (50 participants) in the current study, we found that there were non-significant differences between SLE cases and healthy controls as regards demographic characteristics. Our results were in agreement with the results of Darvish et al. who showed that there was insignificant difference between the studied groups regard age and gender [21]. In agreement with the findings of the study of Refai at al. who reported

that the mean age of cases was 37.48 ± 8.378 years and the mean age of controls was 37.81 ± 9.872 with non-statistically significance [22].

Regarding MSUS findings, nearly 23% of the cases showed the prevalence of subclinical arthritis in comparison to 4% of controls with a significant difference. According to the study of Yoon et al, subclinical arthritis was seen in up to 58% of their cases with no clinical evidence of arthritis [23]. Our study showed that there were no cases had synovitis and tenosynovitis by ultrasound power Doppler may reflecting the effect of immunosuppressive therapy in suppressing overt inflammatory vascular activity in these patients, Additionally, subclinical synovitis in SLE typically shows mild synovial hypertrophy with minimal hyperemia. In contrast to Torrente-Segarra et al. who detected that the main findings in Case Group were: tenosynovitis (39.2%), synovial effusion or hypertrophy (25%) and active synovitis (14.2%) [24]. The absence of erosions in both groups is consistent with the non-erosive character of lupus arthritis, distinguishing it from RA and reinforcing the notion that MSUS is more useful in SLE for detecting active inflammation rather than structural damage.

Regarding demographic characteristics, the study population mean age was around 31 years. This was similar to the study of El genedi et al. where the mean age was around 31±9 years. This study, however, compared SLE cases with clinical arthritis to those with subclinical arthritis. In other words, El genedi et al. who included cases with SLE-associated arthritis, either clinical or subclinical **[25]**. Also, this was similar to the study of Yoon et al. where the mean age was around 35 years **[23]**. The current study population were younger than those of the study that was conducted by Ruano et al. where the mean age was 45 years **[26]**. Most of the cases were females (80.7%). This female predominance was more evident in the study of El genedi et al. who stated that females accounted for 85% of their cases **[25]**. Moreover, the study of Yoon et al. who showed a more than 95% female predominance; which is similar to the study of **[23]**.These demographic features are consistent with global epidemiological trends, as SLE predominantly affects females of reproductive age.

The disease duration ranged from 2 year to 8 years. This was somewhat different from the study of El genedi et al. where the mean disease duration was 5.5±4.2 years **[25]**. The study of Ruano et al. which stated a longer disease duration of around 12 years **[26]**. The mean SLEDAI score ranged from 7 to 29, with a mean of 16.79. In the study of **[26]** the median SLEDAI was much lower (2 only). According to Yoon et al., the mean SLEDAI score was 7.4 with a somewhat standard deviation of 4.3 **[23]**.

Regarding the clinical manifestations of the study group, we found that fever was the most common presentation (49.1%), followed by malar rash (45.6%), oral ulcers (38.6%), alopecia (36.8%) and photosensitivity (35.1%) indicates a widespread, systemic inflammatory process. These are classic features of an SLE flare. In the study of El genedi et al. the most common presentation were lupus nephritis (80%) followed by mucocutaneous (75%) and arthritis (65%) **[25]**.

Regarding the treatment of the study population, the most common drug used was hydroxychloroquine (89.5% of the cases), followed by azathioprine (52.6%) consistent with current guidelines and widespread usage reported globally . According to the study of El genedi et al. who described that 100% of the cases received steroids, 95% received HCQ, followed by CYC (45%), AZA (25%) and MMF (15%) **[23]**. According to the study of Ruano et al., the most commonly used drug was HCQ (100%), followed by steroid (75%), AZA (55%), MMF (20%), CYC (18%) and Rituximab in only one case (3%) **[26]**.

Regarding the laboratory manifestations of the study group, Hematologic abnormalities are the most common manifestations in SLE, with anemia, leukopenia, and thrombocytopenia being well-described, indicating chronic disease activity or bone marrow suppression. ESR showed a very wide variation from 9-125, nonspecific but consistent with active inflammation. All of these data were not much different from the study of Elgenedi et al. **[23]**. The ESR was much lower among cases of Ruano et al. study, and was raised above normal limits in around 40% of their cases only **[24]**. complement was consumed in around one third of the cases (C3: 36.8% and C4: 22.8%). In the study of Ruano et al.

who reported that C3 was consumed in around 40% of the cases and C4 in around 12% of them [26].

ANA is seen positive among all cases followed by Anti-dsDNA (52.6%) often linked to renal disease. According to the study of El genedi et al who reported that 100% of the cases showed positive ANA and 95% of them showed positive anti dsDNA [25]. Also. The study of Ruano et al. who showed 100% ANA positivity, and around 50% anti ds DNA positivity [26]. According to the study of Yoon et al who reported that ANA positivity was seen in around 97.9% of their cases [23].

Cases with ultrasonographic detected synovitis showed significant higher ESR, higher 24 hours protein in urine and higher creatinine compared to the cases with no synovitis. This suggests a possible association between joint inflammation and concurrent renal activity. Although musculoskeletal and renal systems are often affected independently in SLE, emerging data indicate that active synovitis may mirror or precede systemic flares involving other organs The only clinical manifestations related to the musculoskeletal ultrasound detected synovitis was alopecia, seen in 61.5% of cases with subclinical synovitis compared to only 29.5% of those without, may reflect a shared immunopathological mechanism related to disease activity or systemic inflammation . The study of El genedi stated that advanced age and higher systolic blood pressure were both associated with more evident arthritis among SLE patients [25]. According to the study of Rauna et al. who described that none of the clinical or laboratory data of their cases correlated significantly with subclinical synovitis [26]. In the study of Yoon et al. who showed that older age at diagnosis and higher ESR were associated with higher risk for subclinical synovitis among SLE patients [23]. Elevated ESR, positive anti-dsDNA and alopecia were identified as independent predictors of subclinical synovitis in SLE patients. These findings suggest that systemic inflammation and immune complex activity contribute to silent joint involvement.

Conclusion

Musculoskeletal ultrasonography is a sensitive tool for detecting subclinical synovitis and tenosynovitis in SLE patients even in the absence of clinical arthritis. Subclinical joint inflammation correlates with higher disease activity, elevated ESR, anti-dsDNA positivity and alopecia, highlighting the value of MSUS in early detection and monitoring of musculoskeletal involvement in SLE.

Recommendations

We recommend the integration of musculoskeletal ultrasonography into routine evaluation of SLE patients for early detection of subclinical synovitis. Future studies with larger sample sizes are warranted to validate these findings.

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