

Ultrasonographic Assessment of Lower Limb Enthesopathy in Systemic Lupus Erythematosus Patients

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Abstract

Patients with systemic lupus erythematosus often have musculoskeletal complications [SLE]. While synovial tissue has long been thought to be the primary site of inflammation in lupus, entheses have not previously been considered potential disease targets. In order to evaluate enthesitis in people with systemic lupus and arthritis, researchers at the Medical College of Wisconsin examined the entheses included in the Madrid ultrasonographic enthesitis index [MASEI] in a case control study including 50 SLE patients and 30 healthy controls. The patellar tendon, rather than the quadriceps, was more often affected by the clinical enthesitis that was observed in 97 of 100 knees [97 percent] of patients. There were 58 abnormalities detected by US in asymptomatic right and left knees and 103 abnormalities detected via US in knees experiencing pain, edoema, and restricted motion. MSUS has high diagnostic specificity for enthesitis in SLE patients. SLE patients often have enthesitis, as seen by clinical observation and ultrasonography.

Keywords: SLE; MSUS and Enthesitis.

Background

The autoimmune illness systemic lupus erythematosus mostly affects reproductive-aged women [those between the ages of 15 and 45], and it has complex genetic, environmental, and hormonal origins. [1] Musculoskeletal symptoms might be moderate [non-erosive synovitis, tenosynovitis, avascular necrosis] or severe [diffuse myositis, myasthenia gravis, fibromyalgia]. [2] Enthesal involvement does not seem to be one of the typical foci of SLE research. Rheumatologists may use musculoskeletal ultrasound [MSUS] to better assess their patients with inflammatory arthritis and find early signs of joint, tendon, and enthesal inflammation. Crystal deposition as CPPD as pseudotopaceous in achilles, triceps, and obturator tendon, as well as diabetes, endocrine dysfunction, tendonitis, infection, and cancer were all seen in patients with enthesitis. New information on SLE's musculoskeletal effects is provided in this research.

1. Aim of the work

The purpose of this research is to learn whether and how systemic lupus erythematosus is linked to enthesopathy of the lower limbs.

2. Methods

Eighty persons participated in the study; 50 of them had SLE, while the other 30 were age- and sex-matched healthy controls. Patients were accepted into the Benha University Department of Rheumatology, Rehabilitation, and Physical Medicine's outpatient clinic from April 2019 through

December 2021. There is a minimum age requirement of 18 years old under the EULAR/ACR 2019 classification criteria for SLE. A fourth section detailing your medical background and test results:

Each patient underwent the following

History-taking is an integral part of clinical examination.

Full medical evaluation

Investigation of the locomotion apparatus.

Immunological testing [ANA-antiDNA] employing immunofluorescence; SLE Illness Activity Score evaluation of disease severity [SLEDAI]. *Damage evaluation based on the SLICC/ACR Severity of Disease Index for Patients with Lupus. [6]

For the purpose of detecting enthesopathy, *real-time ultrasonography was carried out, using a liner high frequency 6-15 MHz probe on a Korean-manufactured LOGIQ P9 ultrasound device.

All operations carried out by the Benha University Medical Ethical Review Board [IRB no. 17100568] complied with the ethical norms of the 1964 Helsinki declaration.

Statistical analysis

All statistical analysis was done in SPSS 22 [Statistical Package for the Social Sciences] [SPSS, Chicago, IL, USA]. If the quantitative variable was normally distributed, its description was given as a mean SD, and if it was not normally distributed, its description was given as a median [range]. Quantitative and percentage descriptions were used for qualitative variables. Mann-Whitney

Quantitative variables that did not follow a normal distribution were compared using the U test. The χ^2 test or Fisher's exact test was used to analyse qualitative variables when the predicted frequency was less than 5. P values below 0.05 are regarded significant, while those below 0.01 are considered very so.

3. Results

Both SLE patients and control groups were compared regarding baseline socio-demographic data and there were no statistically significant differences between them **Table (1)**.

Table (1) Demographic data of study group.

Age, mean [S.D.], years 41.8 [14.0]

variable	Mean [SD%]
Control group	
Age mean[S.D.]	23 ,2 years [8 %]
Female/male	24/6
BMI	24.7[5,1]
SLE patients	
Age mean [S.D.],	29.38 years [10.8 %]
Female/male	47/3
BMI kg/m ²	23.3 [2.2]
Disease duration	6.6 years [4.1]
SLEDAI-2k, mean [S.D.]	7.2 [4.7 %]
Arthritis	47 [44%]
Proteinuria	37[74]
Neuropsychiatric lupus	10[20]
Total MASEI	
musculoskeletal-BILAG	A 0 [0]
musculoskeletal -BILAG	B 22[44]
musculoskeletal-BILAG	C 9 [18]
musculoskeletal -BILAG	D 16 [32]
musculoskeletal -BILAG E	3 [7]

The study included 3 males and 47 females, with a mean age of 29,3 years were enrolled in the study. The average BMI was 23.3.

Table (2) Clinical data of SLE patient.

Clinical Data	N.[%]
Malar rash	29 [58%]
Oral ulcers	37 [74]
Discoid rash	14 [28]
Photosensitive rash	25[50]
Pancytopenia	33 [66]
Serositis	30 [60]
Lupus nephritis and proteinuria	37 [74]
Knee arthritis	36 [72]
Neuropsychiatric lupus	10 [20]
Enthesitis KNEE	94
Arthritis	Mean SD47 [44%]
Proteinuria	37[74]
Neuropsychiatric lupus	10[20]

Table (2) showed that there were 37 patients presented with oral ulcers and only 10 patients presented with neuropsychiatric lupus in form of stroke or convulsion.

Table (3) Comparison of the study groups regarding different tendons thickness.

		Cases [n=50]		Control [n=30]		p-value
		Mean	S.D	Mean	S.D	
Quadriceps thickness	Right	0.78	0.82	0.57	0.04	0.1
	Left	0.65	0.11	0.57	0.08	<0.001*
Patellar tendon	Right	0.51	0.12	0.39	0.07	<0.001*
	Left	0.51	0.13	0.39	0.05	<0.001*
Tibial tuberosity	Right	0.49	0.10	0.37	0.04	<0.001*
	Left	0.50	0.09	0.38	0.06	<0.001*
Achilles-thickness	Right	0.55	0.09	0.51	0.11	0.1
	Left	0.57	0.10	0.46	0.08	<0.001*
Planter facia	Right	0.40	0.09	0.41	0.08	0.4
	Left	0.48	0.56	0.35	0.05	0.1
Triceps	Right	0.46	0.12	0.39	0.07	0.001*
	Left	0.48	0.12	0.38	0.06	<0.001*

Table (3) showed that the patellar tendon thickness at the inf pole of the patella and the tibial tuberosity on both sides were significantly different between the SLE group

and the control healthy group, while the Achilles tendon thickness on the left side and the triceps tendon bilaterally had P values of 0.001, 0.001, 0.001, and 0,001, respectively

Table (4) correlation between MASEI score ,SLEDAI and SLICC.

Total MASEI score	Pearson correlation[r]	P value
SLEDA	0.309	0.02
SLICC	0.222	0.12

Table (4) show there is statistically significant correlation between MASEI score and SLEDAI While there is insignificant correlation between MASEI score and damage index.

Table (5) Correlation between MADRID score and other variables.

	MADRID score	
	r	p-value
SLEDAI	0.319	0.024*
dis_duration	0.423	0.002*
BMI	0.357	0.011*
Age	0.349	0.013*

Table (6) showed that there was a statistically significant relation between MASEI score and SLEDAI ,disease duration, body mass index [BMI] and MASEI score.

Table (6) frequency of doppler signals in studied enthesis.

Doppler	Yes	No
Quadriceps	11 [22.9%]	37 [77.1%]
Rt inf pole	13 [27.1%]	35 [72.9%]
Rtachillis	4 [8.7%]	42 [91.3%]
Rt planter	1 [2.2%]	45 [97.8%]
QT	3 [25%]	36 [75%]
Lt patellar	34 [70.8%]	14 [29.2%]
Lt achillis	14 [30.4%]	32 [69.6%]

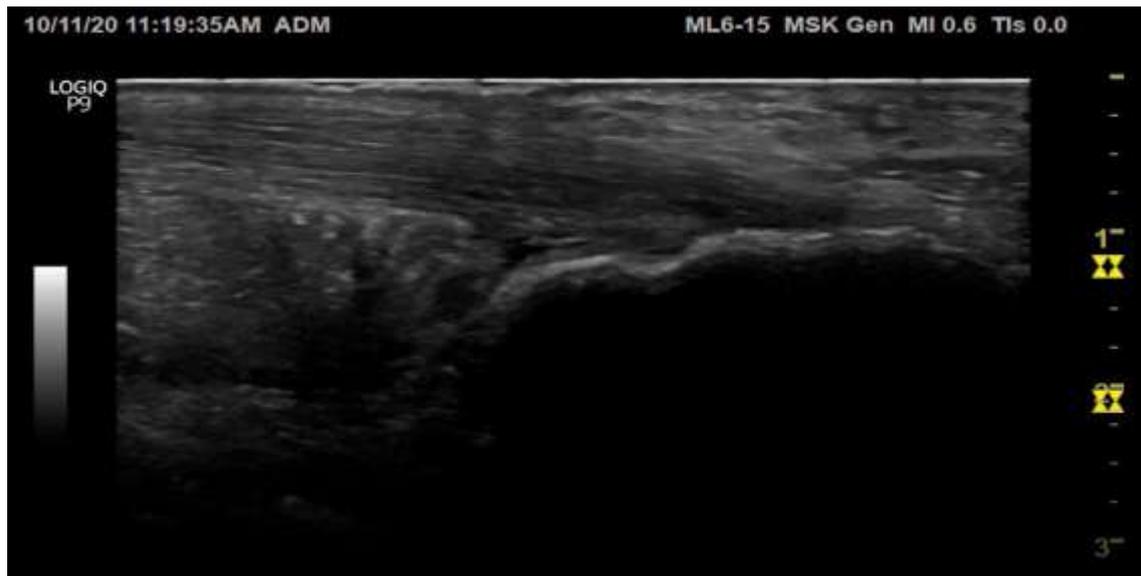


Fig. (1): Achilles tendon enthesis showing focal increase thickness at the insertion, loss of fibrillar pattern, retrocalcaneal bursae, calcaneal erosions and increase kegel fat pad echogenicity.



Fig. (2): shows right planter fascia with hypoechoicity and increased thickness.

4. Discussion

Of the 50 individuals with SLE, 46 [92% were female and 8% were male] [. Patients had a median age of 32.5 [10.8] years, and their diseases had lasted an average of 6.6 [4.1] years. The median [IQR] values for both BMI and SLEDAI-2K were 23 and 2,2 respectively, and 18 and 9, respectively [11,9].

- Fifty percent of people had clinical knee synovitis.
- 97% of patients' knees had clinical enthesitis, with the patellar tendon being more affected than the quadriceps tendon

[the mean was 20.8 percent vs. 19,9 percent respectively].

- 58 detected in pain-free right and left knees, but 103 detected in knees with discomfort, edoema, and restricted motion.
- The most striking observation was the high prevalence of hypoechoogenicity in tendons [76% Rt, 30% Lt] and increased thickness [60% Rt, 70% Lt].
- The majority of the US traits identified in SLE patients were those classified as suggestive of active enthesitis or inflammation by the OMERACT US group.

- In our investigation, 47 out of 50 individuals [97%] and 470 out of 500 entheses [97%] had at least one abnormality detected by US inspection [5 right and 5 left].
- The insertion of the patellar tendon at the tibial tuberosity was the most often afflicted tendon. Afterwards came the insertion of the quadriceps tendon at the superior pole of the patella, then the origin of the patellar tendon at the inferior pole of the patella, the Achilles tendon, the triceps, and finally the planter fascia.
- In a study comparing the thickness, erosion, calcification associated with erosion, doppler signals, and deep infrapatellar bursae at the distal patellar tendon insertion of the case group and the control group, the p values for the difference between the two groups were 0.0001, 0.0001, 0.01, 0.04, and 0.0001.
- Our study found that the 251 findings at the patellar tendon insertion at the tibial tuberosity were distributed as follows: hypoechoogenicity [76% R. 30% L], calcification [10% R. 2% L], erosion [54% R. 48% L], doppler signals [28% R. 18% L], superficial and deep bursae [26% R. 27% L], and thickened tendon [26% R. 27%].
- SLEDAI, illness duration [r=0.423, p=0.002], and body mass index [BMI] [r=0.357, p=0.011] were all linked with the MASEI score. patient age [r=0.349, p=0.013].
- Right and left power doppler signals at the quadriceps tendon did not vary significantly [Rt p=0.31, Lt p=0.7], however there was a positive association between SLEDAI 2K and total doppler signal [p=0.03, r=0.002], suggesting that future research would benefit from a larger sample size.
- Small sample size and cross-sectional design were among the study's weaknesses. Because of the importance of these easily determined parameters on disease activity and their role in the management of this disease with multisystem affection that is sometimes serious and potentially life threatening, more research is needed with larger sample size and longitudinal design including follow up of clinical as well as laboratory blood count parameters.

5. Conclusion

MSUS has high diagnostic specificity for enthesitis in SLE patients.

Clinical and ultrasonic evidence of enthesitis suggests it is a prevalent symptom of systemic lupus erythematosus.

The patellar tendon enthesitis is the most often impacted.

Older people with SLE are more likely to develop clinical enthesitis. Age and the SLEDAI-2K score both positively associated with allergic rhinitis.

A sign of active SLE illness is the development of enthesitis.

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