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FRI0554 DEVELOPMENT OF A DISEASE ACTIVITY INDEX FOR RA PATIENTS USING HANDSCAN.

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Background: Disease activity in RA patients is usually measured by DAS28,¹ a composite measure consisting of 28 swollen and/or tender joint counts (SJC28/TJC28), an acute phase reactant (APR, e.g. ESR/CRP) and patient's general health typically using a visual analogue scale (VAS). Particularly assessment of joint counts is time consuming, requires a trained health professional and its inter-observer variability is high. The HandScan is developed to measure inflammation in hand joints using optical spectral transmission (OST, score 0 to 66) without taking time of a health professional.² The correlation between DAS28 and a single measurement of OST is moderate.³ We hypothesised that a composite measure including OST (representing joint inflammation), VAS and APR would lead to an appropriate disease activity index.

Objectives: To establish a method for assessing disease activity in RA patients using HandScan +/- other disease activity parameters, with cut-offs for remission and low disease activity (LDA).

Methods: RA patients, visiting the outpatient clinic of Máxima Medical Center Eindhoven, were eligible for inclusion. Inclusion criteria were: (1) RA according to classification criteria, (2) at least one HandScan and DAS28 measurement performed at the same visit, and (3) aged ≥18. Data was extracted from medical records. A random sample of 2/3 of included patients was used as development cohort, the remaining 1/3 was used as validation cohort. In the development cohort, linear regression analyses were performed to create a formula for an OST index (DASost). In these, DAS28 was the outcome variable and, OST, ESR and VAS were predictors. Also other parameters were tested in the model to see if they increased the fit of the model or modified the association between OST and DAS28. A final model was derived, based on statistical significance of predictors and improvement of model fit (adjusted R-square). Agreement of DAS28 with DASost was tested with the random one-way intraclass correlation coefficient (ICC). DAS28 based remission and LDA were calculated for DASost using the established DAS28 cut-offs (i.e. DAS28<2.6 and DAS28<3.2). A cut-off for DASost for Boolean remission was defined using receiver operating characteristic (ROC) curves and Youden's index. In the validation cohort, diagnostic values were calculated for DASost using the cut-offs as defined above.

Results: Data of 3358 observations within 1505 unique RA patients were extracted. Patients' demographic and clinical data are shown in Table 1. The formula for DASost derived in the development cohort was: $-0.44 + (OST \times 0.03) + (male \times 0.11) + (LN(ESR) \times 0.77) + (VAS \times 0.03)$. The optimal cut-off on DASost found for Boolean remission was 2.2. The ICC was 0.88 (95%CI 0.87 - 0.89). The explained variance of DASost in the validation cohort was 78%. Diagnostic accuracy of DASost in the validation cohort for DAS28 based remission, LDA and Boolean remission are shown in Table 2.

Table 1. Patients' demographics and clinical data

Patient demographics	
Number of patients	1505 (100%)
Females	976 (65%)
Age (year)	65.5 (12.1)
duration of RA (year)	11.5 (8.3)
Seropositivity	1068 (71%)
Clinical data	
Number of observations	3358
DAS28	2.5 (1.3)
ESR (mm/hr)	9.0 (5.0 – 21.0)
SJC	0 (0 – 2)
TJC	0 (0 – 2)
VAS	30.0 (10.0 – 50.0)
OST	12.6 (5.0)

Data are n (%), mean (SD), or median (IQR).

Table 2. Diagnostic values of DASost

Disease activity state	AU ROC	Sensitivity	Specificity	PPV	NPV	accuracy
Remission	0.93	89%	83%	88%	84%	86%
LDA	0.92	91%	67%	89%	73%	85%
Boolean remission	0.87	91%	95%	39%	98%	94%

AU ROC= area under the receiver operating characteristic curve, PPV= positive predictive value, NPV= negative predictive value.

Conclusion: The HandScan could be used as a tool to quickly assess disease activity in RA patients, if OST is combined with other disease activity parameters into an index.

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Epidemiology, risk factors for disease or disease progression

FRI0555 DO TNF INHIBITORS DECREASE RISK OF INCIDENT PSORIATIC ARTHRITIS IN PSORIASIS PATIENTS COMPARED TO THOSE TREATED WITH METHOTREXATE ALONE?

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Background: Psoriatic arthritis (PsA) is a chronic inflammatory arthritis characterized by joint and enthesal inflammation seen in 30% patients with psoriasis (Pso). In 90% of patients, Pso precedes PsA. Inhibitors of tumor necrosis factor (TNFi) are efficacious treatment options for both, though whether they prevent development of incident PsA in Pso patients is unknown.

Objectives: To determine if the use of TNFi reduces the risk of developing psoriatic arthritis in Pso patients compared to those treated with methotrexate alone.

Methods: Records on all Pso patients seen at dermatology clinic at our University from January 2006 - June 2019 were reviewed. Patients with any musculoskeletal symptoms were referred to rheumatology and were considered to have PsA if they were diagnosed by a rheumatologist. We used Student's t-test to compare continuous covariates and Pearson's chi-squared test or Fisher's exact test to compare categorical covariates. Variables that were found to be significantly associated with PsA diagnosis were included as potential confounders in the multivariate model. We used Cox proportional hazards models to compare the risk of incident PsA diagnosis for those who initiated TNFi compared to those who initiated methotrexate. A propensity score of TNFi therapy compared to methotrexate therapy was calculated using variables associated with treatment choice and adjusted for in the model. Variables that were associated with both treatment choice and PsA risk were not included in the propensity score. We used backwards stepwise variable selection to build the final model.

Results: Out of 154 Pso patients who did not have PsA at baseline, and were started exclusively on a TNFi or methotrexate during the study period, 85 (55.2%) initiated methotrexate and 69 (44.8%) initiated a TNFi. Mean duration of therapy for those on TNFi was 3.95 (standard error: 0.50) years while mean duration of therapy for those on methotrexate was 1.93 years (standard error: 0.28). Mean follow-up time for those on TNFi was 5.18 years (standard error: 0.49) and for those on methotrexate was 2.71 years (standard error: 0.37). Seventy nine (51.3%) of the cohort were women. Thirty five (22.7%) of subjects developed PsA over the course of the study. After adjusting for propensity score, nail pitting, body surface area (BSA) involved in psoriasis, and depression, TNFi did not significantly reduce the risk of PsA as compared to methotrexate (HR: 0.68 [95% CI: 0.32, 1.41]).

Conclusion: Use of TNFi was not associated with a statistically significant decreased risk of incident PsA compared to methotrexate in this study, but a larger cohort with longer follow up will have better power to estimate the true association.

Table 1. Characteristics of the psoriasis cohort starting exclusively TNFi or methotrexate

	Incident PsA n = 35	PsA negative n = 119	p-value
Treatment [n (%)]			0.37
TNFi	18 (51.4)	51 (42.9)	
Methotrexate	17 (48.6)	68 (57.1)	
Sex [n (%)]			0.24
Female	21 (60.0)	58 (48.7)	
Male	14 (40.0)	61 (51.3)	
Age [median (IQR)]	47.0 (39.4, 59.7)	48.9 (35.3, 61.7)	0.71
Pso manifestations [n (%)]			
Nail pitting	27 (77.1)	51 (42.9)	<0.01
Scalp psoriasis	31 (88.6)	105 (89.0)	0.95
Inverse psoriasis	14 (40.0)	37 (31.09)	0.33
BSA [median (IQR)]	6 (3, 15)	12 (5, 22)	0.06
BMI [median (IQR)]	31.7 (25.9, 40.4)	29.1 (26.3, 34.7)	0.30
Therapy duration (years)			
TNFi [median (IQR)]	4.38 (1.34, 8.13)	2.26 (0.76, 5.82)	0.29
Methotrexate [median (IQR)]	2.44 (0.06, 3.44)	0.94 (0.27, 2.39)	0.43

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FRI0556

INCREASED RISK OF MORTALITY AND CANCER IN SYSTEMIC LUPUS ERYTHEMATOSUS: RESULTS FROM A LUPUS COHORT STUDY FROM 1998 TO 2015

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Background: Systemic lupus erythematosus (SLE) is a chronic systemic autoimmune inflammatory disease with increased risk for mortality and cancers possibly because of the effects of systemic inflammation and immunodeficiency due to disease itself and/or cytotoxic agents for SLE management. Although there has been improvement in the prognosis of SLE over decades with the treatment advance including standardized treatment strategy for lupus nephritis and less cytotoxic agents, the improvement also is fixed nowadays.

Objectives: In this study, we are to investigate the mortality and cancer of SLE patients in a longitudinal SLE cohort and compare the mortality ratio and incidence of cancer with general population over time.

Methods: This study was conducted in Hanyang BAE lupus cohort during the period of 1998 to 2015. Mortality data and malignancy data were derived in connection with data from the Korean National Statistics Office and the Korea Central Incidence Database, respectively. The Standardized Mortality Ratio (SMR) and Standardized Incidence Ratio (SIR) was estimated yearly by dividing the observed number deaths/cancers by the expected number of deaths/cancers of age- and sex- matched general population from matched year.

Results: Mortality data were available in 1284 patients and total 71 deaths were observed. The most common cause of death was SLE itself (52.1%) followed by infection (18.3%), cerebrovascular disease (8.5%) and suicide (7.0%). The total age and sex adjusted SMR was 3.4 [95% CI (Confidential Interval) 2.6-4.1]. When we conduct subgroup analysis by age, the sex-adjusted SMR was significantly increased in young and middle aged adult patients: the SMR in patients younger than 20 was 12.2, but it was not significant due to the small number of young patients (observed death 3, expected death 0.3, 95% CI 0-26.0). The adjusted SMR in patients aged 20-39, aged 40-59 and aged over 60 were 9.8 (observed death 35, expected death 4.8, 95% CI 6.5-13.0), 3.7 (observed death 24, expected death 11.5, 95% CI 2.2-5.2), and 1.0 (observed death 9, expected death 10.3, 95% CI 0.3-1.6), respectively. Compared with alive patients, died patients had more serositis and more neurologic disorder according to American

College of Rheumatology classification criteria for SLE despite the shorter observational period (5.6 years vs. 9.4 years).

Malignancy data were available in 1,020 patients and 56 primary cancers were diagnosed. Solid tumor was developed in 51 patient and hematologic malignancy was developed in 5 patients (3 non-Hodgkin's lymphoma, 1 solitary plasmacytoma and 1 acute lymphoblastic leukemia). Thyroid cancer was the most common solid cancer (24 patients) followed by colorectal (5 patients), breast (4 patients), cervical cancer (4 patients) and hepatocellular carcinoma (3 patients). The total age and sex adjusted SIR was 1.1 (95% CI 0.8-1.4).

Conclusion: Patients with SLE had higher risk of mortality than general population and the younger patients had the higher risk of mortality. The leading cause of death was SLE itself followed by infection and cerebrovascular disease. The risk for cancer in patient with SLE was similar with that of general population.

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FRI0557

IN INDIVIDUALS AT-RISK OF RHEUMATOID ARTHRITIS, ULTRASOUND BONE EROSIONS AT THE V METATARSOPHALANGEAL JOINTS ARE THE MOST PREDICTIVE FOR THE DEVELOPMENT OF CLINICAL ARTHRITIS.

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Background: While the central role of bone erosions in the pathogenesis and diagnosis of patients with rheumatoid arthritis (RA) is widely recognized, their prevalence, pattern, and relationship with subclinical synovitis in individuals at-risk of RA (positive autoantibodies without clinical arthritis) is not well understood.

Objectives: To investigate, in individuals at-risk of RA, the prevalence and distribution of ultrasound (US) bone erosions, their correlation with subclinical synovitis at joint level, and their association with the development of inflammatory arthritis (IA).

Methods: Baseline US scans of 2nd generation anti-cyclic citrullinated peptide (CCP) positive at-risk subjects with musculoskeletal symptoms (without clinical arthritis) taking part in the Leeds CCP study were analyzed. The presence of bone erosions was evaluated in the classic sites for RA damage: the II and V metacarpophalangeal (MCP) joints, and the V metatarsophalangeal (MTP) joints¹. US synovitis was defined as synovial hypertrophy (SH) ≥ 2 or SH ≥ 1 + power Doppler signal ≥ 1 ². Only subjects with ≥ 1 follow-up visit were included in the progression analysis (n=400). Progression to IA was defined as the development of clinical synovitis in ≥ 1 one joint.

Results: US bone erosions: prevalence, distribution, and association with sub-clinical synovitis

A total of 2514 joints, in 419 subjects were evaluated.

Bone erosions were found in ≥ 1 joint in 41/419 subjects (9.8%), in 55/2514 joints (2.2%). The prevalence of bone erosions was significantly higher in the V MTP than

Table 1.

	Ever		At 1 year		At 3 years	
	HR (95%CI)	P value	HR (95%CI)	P value	HR (95%CI)	P value
Presence of bone erosion in ≥ 1 joint (any joint)	3.98 (1.82-8.7)	<0.01	3.57 (1.7-7.5)	<0.01	3.48 (1.63-7.4)	<0.01
- in the II MCP joints	2.4 (0.52-11.08)	0.26	1.07 (0.2-5.76)	0.94	1.67 (0.38-7.04)	0.5
- in the V MCP joints	1.37 (0.06-31)	0.85	0 (N/A)	1	0 (N/A)	1
- in the V MTP joints	4.79 (1.97-11.63)	<0.01	5.23 (2.32-11.8)	<0.01	5.43 (2.28-12.92)	<0.01
Presence of bone erosion and synovitis in the same joint (any joint)	3.9 (1.19-12.77)	0.02	6.03 (2.07-17.55)	<0.01	3.91 (1.29-11.85)	0.02
Presence of bone erosion and synovitis in the same V MTP joint	5.08 (1.37-18.9)	0.02	7.03 (2.28-21.71)	<0.01	4.89 (1.48-16.19)	<0.01
Presence of bone erosion in >1 joint (any joint)	10.63 (1.87-60.42)	<0.01	5.68 (1.66-19.5)	<0.01	7.26 (1.67-31.66)	<0.01

IA free survival rates are showed in Figures 1 and 2.