SAT0685

TEMPERATURE AND SMALL PARTICULATE MATTER POLLUTION ARE ASSOCIATED WITH ORGAN SPECIFIC LUPUS FLARES: A SPATIO-TEMPORAL ANALYSIS

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Background: Understanding the role of environmental exposures in the development of SLE and their association with SLE activity may help identify modifiable risk factors and potential etiological mechanisms. Cluster detection is an essential tool in public health which has the goal of detecting anomalous clusters of disease cases.

Objectives: We performed a spatial-time cluster analysis of the Johns Hopkins Lupus cohort with the goal of identifying potential spatial-time clusters of SLE organ specific disease activity related to temperature changes and fine particulate matter pollution (PM2.5).

Methods: 1261 patients who fulfil 4 of the 11 American College of Rheumatology classification criteria for SLE and who had recorded home addresses were included in the analysis. Disease activity was expressed as Physician Global Estimate (PGA), and included rash, joint, serological, neural, renal, pulmonary, and haematological flare-ups. The area utilised in this analysis was a 350 kilometre radial buffer around the Johns Hopkins Lupus Centre. This area was considered due to the high and consistent density of study participants. The data ranged from January 1999 to February 2009. Average temperature and PM2.5 exposure over a period of 10 days prior to patient visit was obtained from the United States Environmental Protection Agency, and county level demographics were obtained from the US census. Univariate, multivariate, and multilevel models were built in order to study the association of these variables with lupus flare-ups. The models were adjusted for age, sex, income, racial distribution, and rural vs. urban patient residence.

Results: Rash (OR=1.0075 for 1 degree Fahrenheit(F) increase), neurologic (OR=1.0096 for 1 degree F increase), and joint (OR=1.011 for 1 degree F increase) flares were statistically significantly associated with an increase in temperature in univariate and multivariate analysis. Renal flares were negatively associated with increases in temperature (OR=0.996 for 1 degree F increase) in both univariate and multivariate analysis. Serositis flares were found to be associated in both univariate and multivariate analysis with increases in PM2.5 concentration (OR=1.024 for an increase of 1 ug/m3), as were hematologic flares (OR=1.019 for an increase of 1 ug/m3), and joint flares (OR=1.011 for an increase of 1 ug/m3). Maps were generated highlighting the study area and the flares. After adjusting for temperature and PM2.5, rash, neurologic, and renal flare-up clusters changed spatially and temporally, suggesting that the adjustment variables could be contributing causes to the original clusters of these kinds of flare-ups.

Conclusions: An increase in temperature was found to be significantly associated with skin, joint, and neurologic flares and inversely associated with renal flares, while increase in fine particulate matter pollution was significantly associated with serositis and hematologic flares. Spatiotemporal cluster adjustment for PM2.5 and temperature changed the neurologic, renal, and rash flare up clusters both spatially and temporally further supporting that these variables could be contributing causes to the original flare clusters. The clusters that remained unchanged indicate areas of unexplained variation that requires further study.

Disclosure of Interest: None declared

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SAT0686

ARE MRI-DETECTED EROSIONS IN PATIENTS WITH UNDIFFERENTIATED ARTHRITIS PREDICTIVE FOR THE DEVELOPMENT OF RHEUMATOID ARTHRITIS? A LARGE LONGITUDINAL STUDY

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Background: Radiographic erosions are a clear hallmark of rheumatoid arthritis (RA) and the presence of radiographic erosions according to the EULAR definition is sufficient to classify patients as RA. Recently, the use of MRI has been recommended to detect erosions since it is more sensitive than radiography. To determine the specificity of MRI-detected erosions, we recently compared hand and foot MRI of patients presenting with RA with those of symptom-free persons and

patients presenting with other arthritides. This revealed that many MRI-detected erosions were not specific for RA but a few erosion features were identified as specific for RA. These were grade ≥ 2 erosions (defined as $>10\%$ of bone eroded), erosions located in MTP5, and erosions located in MTP1 in persons aged <40 . These results were derived by comparing patients that already received their final diagnosis. A clinically relevant question is whether MRI-detected erosions in patients presenting with undifferentiating arthritis (UA) are valuable in predicting future progression to RA.

Objectives: To determine whether MRI-detected erosions in patients presenting with UA are valuable in predicting future progression to RA.

Methods: 302 patients consecutively presenting with UA (not fulfilling the 2010-criteria) between 2010 and 2016 were studied. At baseline 1.5T MRI of the 2nd –5th metacarpophalangeal(MCP)- and 1 st –5th metatarsophalangeal(MTP)-joints was performed. Erosions were scored according to the RAMRIS system by 2 readers (ICC >0.93); an erosion was considered present if both readers scored ≥ 1 . First the presence of any MRI-detected erosion was evaluated. Then the presence of RA-specific erosions, defined as grade ≥ 2 erosions, erosions in MTP5 and erosions in MTP1 in persons aged <40 , was evaluated. Patients were followed up for 1 year on the development of RA (according to the 2010-criteria) and/or on the start of DMARDs.

Results: Of the 302 UA-patients 144 (48%) developed RA and/or started DMARDs. MRI-detected erosions were observed in 57% of the 2010 UA-patients but their presence was not predictive for the development of RA (OR 1.3, 95% CI 0.8–2.0, PPV 50%). RA-specific erosions (either a grade ≥ 2 erosion, erosion in MTP5 and/or erosion in MTP1 in persons aged <40) were present in only 8% of the 2010 UA patients and were also not associated with RA-development (OR 0.9 95% CI 0.4–1.9, PPV 44%). The observed PPVs were comparable to the prior risk of 48%. Similar findings were obtained when studying the individual RA-specific erosions separately.

Conclusions: MRI-detected erosions were frequently present in UA-patients. In contrast, RA-specific MRI-detected erosions were rare in UA. Since MRI-detected erosions were not associated with an increased risk on progression to RA, the present data indicate that evaluation of MRI-detected erosions is not prognostically relevant in UA-patients.

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SAT0687

SILICONE BREAST IMPLANTS AND THE RISK OF AUTOIMMUNE DISEASES: REAL WORLD ANALYSIS

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Background: Previous reports have suggested an association between silicone breast implants (SBIs) and connective tissue disorders. However, several epidemiological studies have produced inconsistent results.

Objectives: To evaluate the association between SBIs and the most clinically relevant auto-immune diseases (ADs) using a large, population based database.

Methods: In this cross-sectional study, we used the computerised databases of Maccabi Healthcare Services (MHS) which include up to 20 years of data on 2 million members. Women with SBIs were identified by procedure and diagnosis codes, clinical breast examinations and mammography referrals. ADs were identified using the International Classification of Diseases 9th revision (ICD-9) codes. SBIs-free women were matched by age group and socio-economic status (SES) in a ratio of 1:4. Multivariable logistic regression and Cox's proportional hazards models were performed.

Results: We included 24,651 SBI recipients and 98 604 matched SBIs free women in our study. The association between SBIs and AD was significant ($p<0.05$) (adjusted OR 1.21, 95% CI 1.17–1.26). The strongest association with SBIs (OR >1.5 , $p<0.001$) was recorded for systemic sclerosis (SSc) and sarcoidosis (OR of 1.99 and 1.67, respectively). Similar results were calculated when analysis was limited to cancer free women. Multivariable Cox regression model yielded a HR of 1.45 (95% CI 1.21–1.73) for being diagnosed with at least one AD in women with SBI compared to those without.

Proportions and OR for ADs among SBI recipients in comparison to SBI-free women				
	SBI free women n=98,604 n (%)	SBI recipients n=24,651 n (%)	Unadjusted OR (95% CI)	Adjusted OR* (95% CI)
Any auto-immune disease	22 634 (22.95)	6510 (26.41)	1.20 (1.17–1.24)	1.21 (1.17–1.25)
Ankylosing spondylitis	155 (0.16)	41 (0.17)	1.06 (0.75–1.49)	1.24 (0.85–1.80)
Fibromyalgia/Chronic fatigue syndrome	6106 (6.19)	1997 (8.10)	1.34 (1.27–1.41)	1.33 (1.25–1.40)
Hyperthyroidism	2945 (2.99)	870 (3.53)	1.19 (1.10–1.28)	1.17 (1.07–1.27)
Hypothyroidism	10 870 (11.02)	2979 (12.08)	1.11 (1.06–1.16)	1.11 (1.05–1.16)
Multiple sclerosis	303 (0.31)	93 (0.38)	1.23 (0.97–1.55)	1.43 (1.12–1.82)
Psoriasis	4594 (4.66)	1293 (5.25)	1.13 (1.06–1.21)	1.13 (1.05–1.21)
Psoriatic arthritis	201 (0.20)	54 (0.22)	1.07 (0.80–1.45)	1.17 (0.85–1.61)
Rheumatoid arthritis	970 (0.98)	278 (1.13)	1.15 (1.00–1.31)	1.17 (1.01–1.36)
Sarcoidosis	187 (0.19)	93 (0.38)	1.99 (1.55–2.56)	1.95 (1.49–2.57)
Sjogren's syndrome	344 (0.35)	123 (0.50)	1.43 (1.17–1.76)	1.55 (1.24–1.94)
Systemic lupus erythematosus	457 (0.46)	117 (0.47)	1.02 (0.84–1.26)	1.03 (0.83–1.28)
Systemic sclerosis (Scleroderma)	242 (0.25)	101 (0.41)	1.67 (1.33–2.11)	1.63 (1.26–2.11)
Vasculitis	115 (0.12)	32 (0.13)	0.90 (0.61–1.33)	1.23 (0.80–1.89)

*Adjusted for: age/socio-economic status/birth country/smoking status/breast cancer.

P-value from log rank test < 0.001

Note: SB = silicone breast implants

Abstract SAT0687 – Figure 1. Kaplan-Meier plot for diagnosis with an auto-immune among SBI recipients and SBI-free women (n=8906). P-value from log rank test <0.001. Note: SB=silicone breast implants

Conclusions: SBIs seems to be associated with higher likelihood of auto-immune disease diagnosis.

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SAT0688 PROGRESSIVE DRIFT OF PATIENT POPULATIONS IN RHEUMATOID ARTHRITIS CLINICAL TRIALS OVER TIME

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Background: Rheumatoid arthritis (RA) is among the most intensively studied chronic inflammatory musculoskeletal diseases. Over the past two decades numerous new compounds have been tested in RA. Although the results from any new clinical trial in RA is usually interpreted in the context of existing data from previous trials, it is not clear whether trial populations are necessarily historically comparable.

Objectives: To understand secular trends and drifts in characteristics of patient populations enrolled in RA clinical trials.

Methods: We performed a systematic literature review of randomised, controlled, double-blind trials, investigating biological therapies in RA. Reports were identified using PUBMED, EMBASE and the Cochrane Library. Populations were stratified into conventional disease modifying anti-rheumatic drug (cDMARD) naïve, cDMARD inadequate responders (IR), and biological DMARD IR. The following variables at baseline were extracted from reports: swollen and tender joint counts (SJC, TJC), pain, patient and evaluator global (PGA, EGA), acute phase measures (erythrocyte sedimentation rate, ESR and C-reactive protein, CRP), as well as the Health Assessment Questionnaire Disability Index (HAQ). In addition, we obtained the year of publication and the inclusion criteria of each trial. We then performed a mixed model meta-regression of year of publication on each of the mentioned baseline variables.

Results: Out of 697 abstracts selected for screening, 73 studies were chosen as relevant; 3 studies with mixed populations were excluded, resulting in 70 studies included for analysis. Table 1 shows the observed medians and quartiles for the baseline characteristics. Meta-regression showed a significant decrease of SJC ($\beta = -0.415; p \leq 0.001$), TJC ($\beta = -0.378; p \leq 0.001$), and CRP ($\beta = -0.123; p \leq 0.001$) over the years (figure 1); for all other core set measures, there was no trend or significance. Inclusion criteria showed similar trends over time for SJC ($\beta = -0.154, p \leq 0.001$), TJC ($\beta = -0.243, p \leq 0.001$), and CRP ($\beta = -0.065, p \leq 0.001$).

	DMARD NAIVE	csDMARD IR	bDMARD IR
No of trials (n)	13	48	9
No of study arms (n)	39	180	25
No of patients (n)	8894	23 752	4584
Year of publication (YYYY)	2014 (2009–2016)	2008 (2003–2012)	2013 (2008–2016)
CRP (mg/dL)	2.59 (2.27–3.26)	2.08 (1.67–3)	2.1 (1.08–3.11)
ESR (mm/h)	49.4 (42–52.8)	45.95 (40.2–49.9)	46.85 (39.2–48.2)
Swollen Joints (0–66)	16.65 (16–20.3)	17.95 (15.59–20.4)	17.1 (16.2–19)
Tender Joints (0–68)	28.05 (25.5–31)	28.1 (25.88–31.7)	28.75 (25.6–31.2)
Patient global assessment (0–100)	63.9 (61.8–66)	61 (58–65)	66.5 (63–69.7)
Evaluator global assessment (0–100)	63.6 (62–65.6)	62.05 (59.7–65)	66.45 ^{62–67}
Patients pain assessment (0–100)	62.5 (60.9–64.6)	60.29 (56.66–65)	65 (62–69)
Health assessment questionnaire (0–3)	1.54 (1.5–1.63)	1.51 (1.41–1.66)	1.7 (1.6–1.74)