Background: Patients with rheumatoid arthritis (RA) are at increased risk for venous thromboembolism (VTE), including deep vein thrombosis (DVT) and pulmonary embolism (PE) (1). Several established risk factors of VTE, such as age, immobilization and comorbid conditions, occur more often patients with RA (2). In addition, inflammation may in itself also increase VTE risk by upregulating procoagolatory factors and causing endothelial damage (3). Recent reports indicate an increased risk of VTE in RA patients treated with JAK-inhibitors (4), pointing to the need to better understand how inflammation measured as clinical RA disease activity influences VTE risk.
Objectives: To investigate the relationship between clinical RA disease activity and incidence of VTE.
Methods: Patients with RA were identified from the Swedish Rheumatology Quality Register (SRQ) between July 1st 2006 and December 31st 2017. Clinical rheumatology data for these patients were obtained from the visits recorded in SRQ, and linked to national registers capturing data on VTE events and comorbid conditions. For each such rheumatologist visit, we defined a one-year period after the visit and determined whether a VTE event had occurred within this period or not. A visit followed by a VTE event was categorized as a case, all other visits were used as controls. Each patient could contribute to several visits. The DAS28 score registered at the visit was stratified into remission (0-2.5) vs. low (2.6-3.1), moderate (3.2-5.1) and high (>5.1) disease activity. Logistic regression with robust cluster standard errors was used to estimate the association between the DAS28 score and VTE.
Results: We identified 46,311 patients with RA who contributed data from 320,094 visits. Among these, 2,257 visits (0.7% of all visits) in 1345 unique individuals were followed by a VTE within the one-year window. Of these, 1391 were DVT events and 866 were PE events. Figure 1 displays the absolute probabilities of a VTE in this one-year window, and odds ratios for VTE by each DAS28 category, using DAS28 remission as reference. The one-year risk of a VTE increased from 0.5% in patients in DAS28 remission, to 1.1% in patients with DAS28 high disease activity (DAS28 above 5.1). The age- and sex-adjusted odds ratio for a VTE event in highly active RA compared to RA in remission was 2.12 (95% CI 1.80-2.47). A different analysis, in which each patient could only contribute to one visit, yielded similar results.

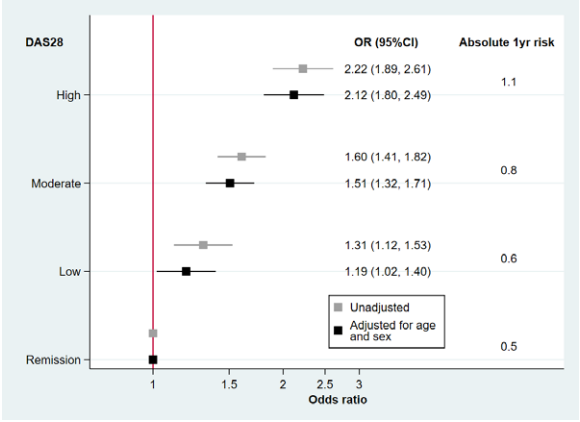

Figure 1. Odds ratios (OR) comparing the odds of VTE for DAS28 activity categories versus remission. Grey estimates are from unadjusted logistic regression models, black estimates are from logistic regression models adjusted for age and sex. Absolute one-year risk of VTE are estimated from unadjusted models.

Conclusion: This study demonstrates a strong association between clinical RA inflammatory activity as measured through DAS28 and risk of VTE. Among patients with high disease activity one in a hundred will develop a VTE within the coming year. These findings highlight the need for proper VTE risk assessment in patients with active RA, and confirm that patients with highly active RA, such as those recruited to trials for treatment with new drugs, are already at particularly elevated risk of VTE.
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OP0035 EXAMINATION OF INTERSTITIAL LUNG DISEASE IN PATIENTS WITH RHEUMATOID ARTHRITIS – PREVALENCE, TIME TO ONSET, AND CLINICAL CHARACTERISTICS

J. Zhuo[1], Q. Zhang[2], K. Knapp[3], Y. Wang[2], C. Gutierrez[2], D. He[2], L. Xie[2], S. Lama[1], G. Craig[3,4]. *[1]Bristol-Myers Squibb, Lawrenceville, NJ, United States of America; [2]STATinMED Research, Ann Arbor, MI, United States of America; [3]Discus Analytics, Spokane, WA, United States of America; [4]Arthritis Northwest, PLLC, Spokane, WA, United States of America*

Background: Interstitial lung disease (ILD) is a known extraarticular manifestation of rheumatoid arthritis (RA). Previous studies have shown variability in the prevalence of RA-ILD, as well as clinical characteristics and risk factors of RA-ILD.
Objectives: To evaluate the prevalence and time to onset of ILD and compare the clinical characteristics between RA patients (pts) with or without ILD using a large US electronic medical record (EMR)-based dataset.
Methods: Pts with an initial RA diagnosis (ICD-9-CM code: 714.0; ICD-10-CM codes: M05 & M06) during the study period (01JAN2009-20SEP2019) were included from the Discus Analytics JointMan database. The initial RA diagnosis date was defined as the index date. Pts with ILD were identified by ICD diagnosis codes or by provider indication in the JointMan record. Pts who developed ILD before RA were excluded from this analysis. The prevalence and time to onset of ILD were reported. Pt demographics, comorbidities, RA characteristics and disease activity scores were compared for 6 months prior to or on the index date (baseline period) for selected adult RA pts with available information.
Results: Among 8,963 identified RA pts, 337 (3.8%) were diagnosed with ILD on or after RA diagnosis. The median time to ILD onset post-RA was 2.3 years, and 47% had ILD within 2 years after RA diagnosis. RA-ILD pts were significantly older than those without ILD (65.8 years vs. 59.1 years; p<0.001; Table 1). At baseline, a higher percentage of RA-ILD pts had history of chronic obstructive pulmonary disease, positive rheumatoid factor, rheumatoid nodules, erosive joint disease, positive anti-cyclic citrullinated peptide antibody, and joint swelling compared to RA-only pts (Table 2). The mean ESR and RA disease activity scores were also significantly higher for RA-ILD pts.

Table 1. Patient Demographics

Patient demographics	RA-ONLY COhort (N = 5,612)	RA-ild coHORT (N = 205)	P-value
Age, Mean ± SD, years	59.1 ± 14.2	65.8 ± 11.8	**<.001**
Male, N (%)	1,375 (24.5%)	72 (35.1%)	**0.001**
Race, N (%)			
White	4,014 (71.5%)	165 (80.5%)	**0.005**
African American	365 (6.5%)	9 (4.4%)	0.226
Other/Missing	1,233 (22.0%)	31 (15.1%)	**0.020**

Table 2. Baseline Clinical Characteristics

Clinical Characteristics	RA-ONLY COhort (N = 3,846)	RA-ild coHORT (N = 115)	P-value
History of Chronic Obstructive Pulmonary Disease, N (%)	102 (2.7%)	8 (7.0%)	**0.006**
Hypertension, N (%)	900 (23.4%)	23 (20.0%)	0.395
Serious Infection, N (%)	38 (1.0%)	3 (2.6%)	0.091
Rheumatoid Factor Positive, N (%)	1,388 (36.1%)	69 (60.0%)	**<.001**
Joint Stiffness, N (%)	1,092 (28.4%)	39 (33.9%)	0.197
Rheumatoid Nodules, N (%)	153 (4.0%)	17 (14.8%)	**<.001**
Erosive Joint Disease, N (%)	459 (11.9%)	23 (20.0%)	**0.009**
Anti-CCP Antibody Positive, N (%)	858 (22.3%)	45 (39.1%)	**<.001**
Joint Swelling*, N (%)	2,861 (58.0%)	123 (68.0%)	**0.008**
Joint Tenderness*, N (%)	3,728 (75.6%)	138 (76.2%)	0.851
ESR**, Mean ± SD, mm/hr	22.0 ± 22.6	30.1 ± 25.5	**<.001**
CRP**, Mean ± SD, mg/L	22.5 ± 13.0	60.6 ± 25.0	0.086
CDAI, Mean ± SD	16.4 ± 12.3	18.9 ± 15.7	**0.044**
DAS28-CRP, Mean ± SD	2.6 ± 1.2	3.1 ± 1.4	**<.001**
DAS28-ESR, Mean ± SD	3.3 ± 1.4	3.9 ± 1.5	**<.001**
SDAI, Mean ± SD	20.2 ± 29.3	28.6 ± 40.2	**0.048**

* A total of 4,929 non-ILD and 181 ILD patients had joint swelling and tenderness data.
** Variables were calculated among patients who had available information.

Conclusion: This large real-world RA population provides insight into the burden of ILD in RA pts. Pts with ILD had a higher proportion of comorbidities and RA-related conditions and higher RA activity. Further analysis is warranted to assess the risk factors of ILD and its prognosis.
Disclosure of Interests: Joe Zhuo Shareholder of: Bristol-Myers Squibb, Employee of: Bristol-Myers Squibb, Qisu Zhang Consultant of: I am a paid employee of STATinMED Research which is a paid consultant to Bristol-Myers Squibb Company., Keith Knapp Consultant of: In the last year, I was a paid consultant to Bristol Myers-Squibb Company.,

Employee of: I am a paid employee of Discus Analytics., Yuexi Wang Consultant of: I am a paid employee of STATinMED Research which is a paid consultant to Bristol-Myers Squibb Company., Cynthia Gutierrez Consultant of: I am a paid employee of STATinMED Research which is a paid consultant to Bristol-Myers Squibb Company., Ding He Consultant of: I am a paid employee of STATinMED Research which is a paid consultant to Bristol-Myers Squibb Company., Lin Xie Consultant of: I am a paid employee of STATinMED Research which is a paid consultant to Bristol-Myers Squibb Company., Sonie Lama Shareholder of: I own shares of Bristol-Myers Squibb Company., Employee of: I am a paid employee of Bristol-Myers Squibb Company., Gary Craig Consultant of: I have served as a consultant to Bristol-Myers Squibb Company., Employee of: I am a paid employee of Arthritis Northwest and VP of Discus Analytics., Speakers bureau: I am a member of the speakers bureau for Bristol-Myers Squibb Company.

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OP0036 METHOTREXATE AND RHEUMATOID ARTHRITIS ASSOCIATED INTERSTITIAL LUNG DISEASE

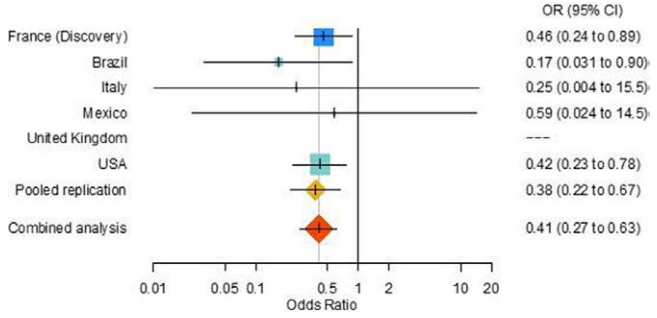
P. A. Juge[1], J. S. Lee[2], J. Lau[3], L. Kawano[4], J. Rojas-Serrano[5], M. Sebastiani[6], G. Koduri[7], E. Matteson[3], K. Bonfiglioli[4], M. Sawamura[4], R. Kairalla[4], L. Cavagna[8], E. Bozzalla Cassione[8], A. Manfredi[6], M. Mejia[9], P. Rodríguez Henríquez[9], M. I. Gonzalez-Perez[5], R. Falfan-Valencia[5], I. Buendia-Roldan[5], G. Perez-Rubio[5], E. Ebstein[1], S. Gazal[10], R. Borie[1], S. Ottaviani[1], C. Kannengiesser[1], B. Wallaert[11], Y. Uzunhan[12], H. Nunes[12], D. Valeyre[12], N. Saidenberg Kermanac'h[12], M. C. Boissier[12], L. Wemeau Stervinou[11], R. M. Flipo[13], S. Marchand-Adam[14], P. Richette[15], Y. Allanore[16], C. Dromer[17], M. E. Truchetet[17], C. Richez[17], T. Schaeverbeke[17], H. Lioté[18], G. Thabut[1], K. Deane[2], J. Solomon[19], T. Doyle[20], J. H. Ryu[3], I. O. Rosas[20], V. M. Holers[2], C. Boileau[1], M. P. Debray[1], R. Porcher[21], D. A. Schwartz[2], R. Vassallo[3], B. Crestani[1], P. Dieudé[1]. *[1]Bichat-Claude Bernard Hospital, Paris, France; [2]University of Colorado School of Medicine, Aurora, United States of America; [3]Mayo Clinic, Rochester, United States of America; [4]Medical School of the University of São Paulo, São Paulo, Brazil; [5]Instituto Nacional de Enfermedades Respiratorias, Ciudad de México, Mexico; [6]University of Modena and Reggio Emilia, Rheumatology, Modena, Italy; [7]Southend University Hospital NHS Foundation Trust, Southend-on-Sea, United Kingdom; [8]University and IRCCS Policlinico S. Matteo Foundation of Pavia, Pavia, Italy; [9]Hospital General "Dr. Manuel Gea González", Ciudad de México, Mexico; [10]Harvard T.H. Chan School of Public Health, Boston, United States of America; [11]CHRU de Lille, Service de Pneumologie et Immuno-Allergologie, Lille, France; [12]Avicenne Hospital (AP-HP), Bobigny, France; [13]CHRU de Lille, Rhumatologie, Lille, France; [14]CHRU de Tours, Pulmonology, Tours, France; [15]Hopital Iariboisiere, Paris, France; [16]Hospital Cochin, Paris, France; [17]Chu Bordeaux Pellegrin, Bordeaux, France; [18]Hospital Tenon Ap-Hp, Paris, France; [19]National Jewish Health, Denver, United States of America; [20]Brigham and Women's Hospital, Boston, United States of America; [21]Hôpital Hôtel-Dieu AP-HP, Paris, France*

Background: Methotrexate (MTX) is a key anchor drug for rheumatoid arthritis (RA) management. Its use has been associated with hypersensitivity pneumonitis and diffuse lung disease. Whether MTX exposure increases the risk of interstitial lung disease (ILD) in patients with RA is disputed.

Objectives: We aimed to evaluate the association of antecedent MTX use with development of RA-ILD.

Methods: Through a case-control study design with derivation and international validation samples, we examined the association of MTX exposure with ILD in 482 patients with RA-ILD and 741 patients with RA without ILD. Estimates were pooled over the different samples using meta-analysis techniques.

Results: Analysis of the derivation sample revealed an inverse relationship between MTX exposure and RA-ILD (adjusted odds ratio [OR], 0.48; 95% confidence interval [CI], 0.25 to 0.92; P=0.028), which was confirmed in the validation samples (pooled adjusted OR, 0.39; 95% CI, 0.23 to 0.68; P<0.001). The combined estimate using both the derivation and validation samples revealed an adjusted OR of 0.43 (95% CI, 0.28 to 0.65; P<0.0001). MTX ever users were less frequent among patients with RA-ILD compared to those without ILD, irrespective of chest high resolution computed tomography pattern. In patients with RA-ILD, ILD onset was significantly delayed in MTX ever users compared to never users (11.5 ± 10.6 years and 3.7 ± 7.1 years, respectively; P<0.001).



Conclusion: Our results suggest that MTX is not a risk factor for RA-ILD and support a possible disease modifying effect of MTX on development of RA-ILD.

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OP0037 NON–ANTI-TNF BIOLOGIC AGENTS ARE ASSOCIATED WITH LESS MARKED PROGRESSION OF INTERSTITIAL LUNG DISEASE SECONDARY TO RHEUMATOID ARTHRITIS

N. Mena-Vázquez[1], F. Godoy-Navarrete[1], I. Añón Oñate[2], C. M. Romero-Barco[3], L. Pérez Albaladejo[4], A. Fernandez-Nebro[1]. *[1]Instituto de Investigación Biomédica de Málaga – IBIMA, UGC de Reumatología, Hospital Regional Universitario de Málaga, Málaga, Spain; [2]Complejo Hospitalario de Jaén, Jaén, Spain; [3]Hospital Universitario Virgen de la Victoria de Málaga (HUVV), Málaga, Spain; [4]Hospital Virgen de las Nieves de Granada, Granada, Spain*

Background:

Objectives: To analyze the effect of disease-modifying antirheumatic drugs (DMARDs) on the outcome of interstitial lung disease secondary to rheumatoid arthritis (ILD-RA).

Methods: We performed a multicenter, prospective, observational study of patients with ILD-RA receiving DMARDs between 2015 and 2017. The patients were assessed using high-resolution computed tomography and lung function tests at baseline and at 24 months. The radiological assessment was centralized. The main outcome measure at 24 months was change in lung function (improvement, non-progression, progression, or death). We recorded the 28-joint Disease Activity Score 28 (DAS28) and adverse events. A logistic regression analysis was performed to identify factors associated with progression of ILD.

Results: We included 70 patients with ILD-RA treated with DMARDs. The main baseline characteristics are shown in Table 1. After 24 months, lung disease did not progress in 40 patients (57.1%), improved in 8 (11.4%), and progressed in 21 (30.0%). One patient (1.4%) died. The factors associated with progression of ILD in the multivariate analysis were treatment with abatacept, tocilizumab, or rituximab (OR, 0.102 [95%CI, 0.015-0.686]), DAS28 (OR, 1.969 [95%CI, 1.005-3.857]), and smoking (OR, 6.937 [95%CI, 1.378-4.900]). During follow-up, 30 patients (42.9%) experienced an adverse event, which was severe in 12 cases (17.1%).

Conclusion: Lung function is stable and inflammatory activity well controlled in most patients with ILD-RA receiving treatment with DMARDs. Non–anti-TNF DMARDs reduce the risk of progression of lung disease in 90% of patients, whereas the inflammatory activity of RA and smoking are associated with progression.