Figure 1. Box plots of change from baseline to week 24 in biomarkers of bone metabolism observed values

ALP, alkaline phosphatase; CTX-1, C-terminal telopeptide of type 1 collagen; MMP-3, matrix metalloproteinase 3; P1NP, N-terminal propeptide of type 1 collagen
* $p < 0.001$ for tapered prednisone vs continued prednisone based on Wilcoxon signed rank test

Conclusion: The findings of this biochemical marker analysis suggest that withdrawal from GC after achievement of LDA or remission with TCZ results in increased bone remodeling, with a trend toward an anabolic window and reduced cartilage degradation. Given that it could take a year to recover from increased fracture risk after cessation of GC therapy,⁵ our results offer further insight on the reversible risk of systemic harm to noninflamed bone versus benefits for inflamed joints in the context of LDA or remission.

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OP0087

TRENDS IN HIP FRACTURE INCIDENCE IN WOMEN AND MEN OVER 1980-2015 IN OLMSTED COUNTY, MINNESOTA, USA

Delamo Bekele, Ann Kearns, Elizabeth Atkinson, Shreyasee Amin. *Mayo Clinic, Rochester, United States of America*

Background: Hip fracture incidence, which has been generally declining in North America, may have recently plateaued in women (Lewiecki, et al 2018).

Objectives: We examined the trends in hip fracture incidence over 1980-2015, in both women and men, from Olmsted County, Minnesota, USA.

Methods: Using the Rochester Epidemiology Project, a unique medical records linkage system that allows access to all (inpatient and outpatient) community medical records for Olmsted County residents, we identified all incident hip fractures among residents age ≥ 18 years between 1980-2015. Available medical records were reviewed by trained nurse abstractors to validate hip fractures identified and to determine their antecedent cause (pathological process [e.g., malignancy], severe trauma [e.g., motor vehicle accidents] and those due to no more than moderate trauma [by convention, equivalent to a fall from standing height or less]). Overall incidence rates were summarized separately for women and men, as well as by 5 year strata for different age groups (ages 18-39, 40-59, 60-79 and ≥ 80 yrs). Rates for women and men were each directly age-adjusted to the population distribution of US whites in 2010.

Results: Between 1980-2015, we identified 2488 hip fractures in women (73%, median age 84 yrs) and 918 hip fractures in men (27%, median age 80 yrs), 97.4% of which were in whites. The majority of hip fractures were due to no more than moderate trauma (88% in women; 81% in men). The overall age-adjusted annual incidence of first hip fracture over 1980-2015 was 154 per 100,000 person-

years (p-y) for women and 98 per 100,000 p-y for men. Hip fracture rates have decreased overall in women since 1980 (Table), however since 2005, there has been a trend for increasing hip fractures among women age 40-59 yrs and since 2010, a possible plateau vs. slight increase in hip fracture rate for women age ≥ 80 yrs. In men, there has been a general decrease in rates among those age 60-79 yrs and, at least since 2005, in men age ≥ 80 yrs, but there may be a trend for increasing hip fractures since 2010 in men age 40-59 (Table).

Years	Hip Fracture Incidence per 100,000 p-y by Age Group							
	18-39 yrs		40-59 yrs		60-79 yrs		≥ 80 yrs	
	Women	Men	Women	Men	Women	Men	Women	Men
1980-84	2	4	43	7	345	175	1954	1173
1985-89	4	4	32	11	329	163	1892	1188
1990-94	2	3	26	19	282	122	1914	771
1995-99	4	3	20	17	302	168	2117	1116
2000-04	2	6	10	9	199	132	1788	1300
2005-09	5	4	27	10	203	134	1320	1148
2010-15	4	4	27	29	162	125	1413	811

Conclusion: There appears to be different trends in hip fracture rates for women and men and by age groups. The factors contributing to the observed recent increases in hip fracture rates among women and men ages 40-59 yrs warrant further attention. As suggested by others, there may be a recent plateau vs. slight increase in hip fracture rates in older women, which we noted in women age ≥ 80 yrs since 2010. The decrease in hip fractures in older men, particularly in those age ≥ 80 yrs, may reflect improved awareness in recent years of osteoporosis in men with initiation of treatment or better mitigation of risk factors, but warrants further review.

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When rheumatoid arthritis (RA) does not walk alone: new data on comorbidities in RA

OP0088

COMORBIDITIES AS RISK FACTORS FOR RHEUMATOID ARTHRITIS (RA) AND ACCRUAL AFTER RA DIAGNOSIS

Vanessa Kronzer¹, Cynthia S. Crowson¹, Jeffrey Sparks², Elena Myasoedova¹, John Davis¹. ¹Mayo Clinic, Rochester, United States of America; ²Brigham and Women's Hospital, Boston, United States of America

Background: Understanding the timeline of comorbidity development in patients with RA may inform disease pathogenesis and help identify targets for improving outcomes (1).

Objectives: We first aimed to compare the prevalence of a comprehensive list of comorbidities in RA cases versus controls. Second, we aimed to investigate the time association of comorbidity development relative to RA onset to identify which comorbidities might predispose to developing RA and comorbidities that might result from RA.

Methods: We performed a case-control study using a biobank at a single center, identifying 821 cases of RA (143 incident) using a rules-based algorithm combining two diagnosis codes with use of a DMARD (PPV = 95%). We matched each case to three controls based on age, sex, and location of residence at the time of the biobank survey. Participants self-reported the presence or absence and age of onset for 77 comorbidities on the survey.

Results: Among the 3,276 RA cases and controls, mean age was 62 years, and 73% were female. Cases with RA had the same number of comorbidities as controls before RA diagnosis (median 1.0 vs 1.0, $P = 0.49$) but had more comorbidities by the time of the survey (median 5.0 vs 4.0, $p < 0.001$). At the time of the survey, several comorbidities were more common in participants with RA than controls (Table1). Cancer was not more common in RA cases than controls (31% vs 32%, $p = 0.80$), even among all cancer subtypes. The only comorbidities that tended to develop in the time period before RA diagnosis more often than controls were inflammatory bowel disease (1.9% vs 0.5%, $p < 0.001$) and type 1 diabetes (1.3% vs 0.4%, $p = 0.01$). In contrast, in the time period after RA diagnosis, myocardial infarctions were more common in cases with RA (3.8% vs 1.2%, $p < 0.001$) and hyperlipidemia was less common (11.4% vs 16.4%, $p = 0.004$) compared to controls.

Table 1. Comorbidities that were more prevalent in RA cases than controls at the time of baseline survey*

Comorbidity	N (%)		p-value
	RA cases (N = 821)	Controls (N = 2455)	
Osteoarthritis	370 (50)	915 (38)	< 0.001
Fibromyalgia	114 (15)	144 (6)	< 0.001
Autoimmune disorder	123 (16)	95 (4)	< 0.001
Epilepsy	22 (3)	29 (1)	0.003
Cataracts	278 (35)	699 (29)	0.003
Myocardial infarction	63 (8)	88 (4)	< 0.001
COPD	47 (6)	88 (4)	< 0.001
Sleep apnea	164 (20)	352 (15)	< 0.001
Pulmonary fibrosis	16 (2)	10 (0.4)	< 0.001
Gastroesophageal reflux disease	304 (38)	675 (28)	< 0.001
Inflammatory bowel disease	37 (5)	40 (2)	< 0.001

*significance threshold was set at $p < 0.01$ given multiple comparisons

COPD = chronic obstructive pulmonary disease

Conclusion: Many comorbidities were associated with RA, including several potentially novel comorbidities such as COPD, epilepsy, and acid reflux. RA was not associated with an increased risk of cancer. The increased occurrence of inflammatory bowel disease and type 1 diabetes prior to RA suggests either a predisposition to RA development or a shared immunological defect, meriting further study.

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OP0089

METABOLIC SYNDROME IS COMMON AROUND THE TIME OF EARLY RHEUMATOID ARTHRITIS DIAGNOSIS AND ASSOCIATIONS VARY BY SEX AND MENOPAUSAL STATUS: RESULTS FROM THE CANADIAN EARLY ARTHRITIS COHORT

Bindee Kuriya¹, Orit Schieir¹, Marie-France Valois², Janet Pope³, Gilles Boire⁴, Louis Bessette⁵, Glen Hazlewood⁶, Carter Thorne⁷, Diane Tin⁷, Carol Hitchon⁸, Susan J. Bartlett^{2,9}, Edward Keystone¹, Vivian Bykerk^{10,11}, Lillian Barra⁹.

¹University of Toronto, Toronto, Canada; ²McGill University, Montréal, Canada;

³Western University, London, Canada; ⁴University of Sherbrooke, Sherbrooke, Canada;

⁵Laval University, Québec, Canada; ⁶University of Calgary, Calgary, Canada;

⁷Southlake Regional Health Centre, Newmarket, Canada; ⁸University of Manitoba, Winnipeg, Canada;

⁹Johns Hopkins University, Baltimore, United States of America; ¹⁰Hospital for Special Surgery, New York, United States of America;

¹¹Weill Cornell Medical College, New York, United States of America

Background: Prevalence studies of metabolic syndrome (MetS) in early rheumatoid arthritis (ERA) are sparse and estimates are variable. Differences by sex and menopausal status have not been formally assessed.

Objectives: We estimated prevalence and factors associated with MetS in ERA patients treated in routine practice settings. Variations by sex, and by menopausal status were also examined.

Methods: Cross-sectional data were analyzed from patients meeting 1987 or 2010 ACR/EULAR RA criteria enrolled in the Canadian Early Arthritis Cohort (CATCH) from January 2007-March 2017. CATCH is a prospective multicenter observational study of patients diagnosed and treated for early inflammatory arthritis (symptoms < 1 year) by a rheumatologist. Participants completed standardized clinical assessments and patient-reported outcome measures. Laboratory testing of metabolic parameters was encouraged, but left to the discretion of the rheumatologist. MetS was defined according to modified WHO criteria¹ as ≥ 2 of the following: body mass index (BMI) ≥ 30 , hypertension, low high-density lipoprotein (HDL) cholesterol, dyslipidemia, or impaired glucose intolerance (IGT)¹. Univariate and multivariable logistic regression was used to estimate crude and adjusted associations between baseline demographic, clinical and lifestyle variables with prevalent MetS in men and in women, respectively.

Results: The sample included 1543 participants; 71% were female and mean (SD) age was 54 (15) years. 476 (31%) of the total sample met criteria for MetS. Participants with MetS were older, more frequently past smokers and reported more comorbid conditions, including cardiovascular disease (CVD) ($p < 0.0001$).

MetS prevalence was higher in men (42%) than women (26%, $p < 0.0001$) and higher in post-menopausal (33%) vs. pre-menopausal women (15%, $p < 0.0001$). Post-menopausal women had a higher frequency of hypertension (65%), IGT (32%) and dyslipidemia (21%) compared to pre-menopausal women ($p < 0.001$). In multivariable logistic regression MetS was negatively associated with seropositivity and pulmonary disease in men; with corticosteroid use in menopausal women; and with psychiatric comorbidity in pre-menopausal women.

Conclusion: Approximately 1 in 3 ERA patients met criteria for MetS. Though men had a higher prevalence of MetS and individual MetS components, post-menopausal women had a similar MetS profile as men, and should equally be considered high risk for CVD development. Characteristics and associations with MetS differed in men and women suggesting sex-specific variations are important considerations for comorbidity screening and surveillance of CVD outcomes in ERA.

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OP0090

THE OCCURRENCE OF SUBCLINICAL AND CLINICAL ATHEROSCLEROSIS IN RHEUMATOID ARTHRITIS, RESULTS FROM THE 3-YEAR, MULTICENTER, PROSPECTIVE, OBSERVATIONAL, GIRRCS STUDY

Piero Ruscitti¹, Paola Cipriani¹, Vasiliki Liakouli¹, Daniela Iacono², Ilenia Pantano², Giulia Maria Destro Castaniti³, Nicola Maruotti⁴, Domenico Paolo Emanuele Margiotta⁵, Licia Picciariello⁶, Francesco Caso⁷, Rosa Daniela Grebbiale⁸, Fabiola Atzeni⁹, Raffaele Scarpa⁹, Federico Perosa⁹, Antonella Afeltra⁵, Francesco Paolo Cantatore⁴, Giuliana Guggino³, Francesco Ciccio², Roberto Giacomelli¹, GIRRCS (GRUPPO ITALIANO DI RICERCA IN REUMATOLOGIA CLINICA E SPERIMENTALE). ¹University of L'Aquila, L'Aquila, Italy; ²University of Campania "Luigi Vanvitelli", Naples, Italy; ³University of Palermo, Palermo, Italy; ⁴University of Foggia, Foggia, Italy; ⁵Campus Bio-Medico University of Rome, Rome, Italy; ⁶University of Bari Medical School, Bari, Italy; ⁷University Federico II Naples, Naples, Italy; ⁸University "Magna Graecia" of Catanzaro, Catanzaro, Italy; ⁹Messina and Milan Univ, Milan, Messina, Italy

Background: The systemic inflammatory process and the "traditional" cardiovascular (CV) risk factors could synergize the enhancement of CV burden in rheumatoid arthritis (RA) [1].