Akaike Information Criterion (stepAIC) method (M2), and the Least Absolute Shrinkage and Selection Operator (LASSO) method (M3). We also performed sensitivity analysis on all patients with manual backward method (M4) after multiple imputation of missing data. Machine learning modelling: using the "SuperLearner" package on R, we modelled radiographic progression with stepAIC, LASSO, random forest, Discrete Bayesian Additive Regression Trees Samplers (DBARTS), Generalized Additive Models (GAM), multivariate adaptive polynomial spline regression (polymars), Recursive Partitioning And Regression Trees (RPART) and Super Learner. Finally, the accuracy of traditional and ML models was compared based on their 10-foldcross-validated AUC (cv-AUC).

Results: 10-fold cv-AUC for traditional models were 0.79 and 0.78 for M2 and M3, respectively. The 3 best models in the ML algorithm were the GAM, the DBARTS and the Super Learner models, with 10-fold cv-AUC of: 0.77, 0.76 and 0.74, respectively (Table 1).

Table 1. Comparison of 10-fold cross-validated AUC between best traditional and machine learning models.

Best models	Cross-validated AUC
Traditional models	
M2 (step AIC method)	0.79
M3 (LASSO method)	0.78
Machine learning approach	
SL Discrete Bayesian Additive Regression Trees Samplers (DBARTS)	0.76
SL Generalized Additive Models (GAM)	0.77
Super Learner	0.74

AUC: Area Under the Curve; AIC: Akaike Information Criterion; LASSO: Least Absolute Shrinkage and Selection Operator; SL: SuperLearner. N = 295.

Conclusion: Traditional models predicted better radiographic progression than ML models in this early axSpA population. Further ML algorithms image-based or with other artificial intelligence methods (e.g. deep learning) might perform better than traditional models in this setting.

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SAT0588

PREVALENCE, INCIDENCE, AND THE CARDIOVASCULAR AND CEREBROVASCULAR RISKS OF NONTRAUMATIC AVASCULAR NECROSIS IN SOUTH KOREA

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Background: Due to the shared mechanism of nontraumatic avascular necrosis (AVN) and endothelial dysfunction, the associations of AVN with increased cardiovascular and cerebrovascular events have been suggested in the several population-based studies.

Objectives: This study aimed to estimate the prevalence and incidence of non-traumatic AVN in South Korea from the Korean National Health Insurance Service Sample Cohort Database 2.0 (2006-2015) and to evaluate the risk of major cardiovascular and cerebrovascular events among patients with nontraumatic AVN.

Methods: We defined an incident case as a newly diagnosed and registered patient in the registry in that year, with a 2-year washout period. Prevalent cases were defined as all patients with nontraumatic AVN in the corresponding year. To evaluate the cardiovascular and cerebrovascular risks in patients with AVN, we set AVN group composed of patients with an initial diagnosis of non-traumatic AVN between 2008 and 2010 (n=1,150). The comparison group was composed of randomly selected subject (5 per patient with AVN; n = 5,750) who were matched to the AVN group according to age, sex, resident area, and year of AVN diagnosis. The development of major cardiovascular and cerebrovascular events was tracked in each sampled patient until 2015. Cox proportional hazard regressions were used to calculate the overall risks for the development of major cardiovascular and cerebrovascular events.

Results: From 2008 to 2015, the prevalence of nontraumatic AVN increased gradually, but its incidence did not change, with an annual average incidence of 413 per 1 million population and the male-to-female ratio of 1.2:1. The peak incidence occurred in the 50-59 year age group. The incident AVN was more prevalent in male than in female under 70, but there was female predominance after the age of 70 (Figure 1). The patients with AVN had a higher cumulative incidence of major adverse cardiovascular and cerebrovascular events than controls (19.5% versus 14.9%; p = 0.017). Upon univariate Kaplan-Meier method with the log-rank test, there was a significant difference in major cardiovascular and cerebrovascular events-free survival rates between AVN group and control group (p <0.001). However, after adjusting for potential confounders including hypertension, diabetes, dyslipidemia, and use of steroid or statin, the association between AVN group and major adverse cardiovascular and cerebrovascular events was insignificant (adjusted HR 1.114, 95% CI 0.959-1.295, p=0.158).

Conclusion: In this population-based cohort study, we provided the updated epidemiologic data of Korean patients with nontraumatic AVN. The increased risk for major cardiovascular and cerebrovascular events among AVN patients was not observed in the representative Korean population.

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Figure 1. Age- and sex-distributed incidence of patients with nontraumatic avascular necrosis in Korea, 2008-2015

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SAT0589

RISK FOR PSYCHIATRIC HOSPITALIZATION FOLLOWING A RHEUMA-RELATED HOSPITALIZATION: RESULTS FROM A CZECH NATIONWIDE COHORT STUDY

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Background: Cohort studies using nationwide health registers have shown an increased risk for affective and anxiety disorders in people with ankylosing spondylitis (AS) and rheumatoid arthritis (RA) (1-3). Moreover, a nationwide cohort study demonstrated an increased risk for mental disorders in people with rheumatic diseases (4).

Objectives: We aimed to investigate the risk for psychiatric hospitalization following a hospitalization for rheumatic disease.

Methods: Using data from the Czech nationwide register of all-cause hospitalizations, we obtained 4 971 individuals hospitalized (index hospitalization) between 2004 and 2012 for rheumatic diseases - RA, spondyloarthritis (including AS, psoriatic arthritis and undifferentiated spondyloarthritis), systemic lupus erythematosus and systemic scleroderma, with no history of psychiatric and rheuma-related hospitalization in the previous 10 years from the index hospitalization. On these individuals, we randomly matched (on age, gender and year of index hospitalization) controls that were hospitalized in the same time period for a non-rheumatic disease and have no history of psychiatric and rheumatic hospitalization in the last 10 years from their index hospitalization, in the ratio of 1:5. We employed conditional logistic regression for assessing the risk for psychiatric hospitalization in the subsequent 3 years from the index hospitalization. To strengthen our results, we repeated the matching step 100 times and run the analysis on each resulting dataset

separately, and pooled the results. The findings are expressed as odds ratios (OR) with 95% confidence intervals (95% CI).

Results: We identified an elevated risk for psychiatric (OR = 1.34, 95% CI = 1; 1.78) and for affective disorders (OR = 2.19, 95% CI = 1.17; 4.1) in people hospitalized for rheumatic diseases. We did not find a statistically significant association with organic, psychotic and anxiety disorders.

Conclusion: There is an increased risk for experiencing a psychiatric disorder in the period of 3 years after a rheuma-related hospitalization.

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SAT0590

ORAL MICROBIOTA IDENTIFIES PATIENTS WITH EARLY RHEUMATOID ARTHRITIS

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Background: Several studies have suggested a link between the two chronic inflammatory diseases, rheumatoid arthritis (RA) and periodontitis (PD) [1]. The diseases share similar environmental and genetic risks factors, e.g., smoking [2] and the HLA-DRB1 alleles [3]. Several serum markers used in the diagnosis of RA have also been found to be elevated in PD, e.g., anti-citrullinated proteins antibodies (ACPA) and rheumatoid factor (RF) [4]. The connection between PD and RA has been suggested to be explained by several periodontal pathogens, e.g., *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis*, which have been suggested to induce the production of autoantibodies [5, 6].

Objectives: To investigate the composition of the concerted saliva microbiota and its role in the development of RA, with the aim of improving the diagnostic tools.

Methods: 16S ribosomal RNA gene sequencing of saliva bacterial DNA isolated from a total of 61 early RA (eRA) patients and 59 healthy controls was made. The eRA (symptoms ≤ 12 months) was diagnosed at an Early Arthritis Clinic (fulfilling the 1987 ARA criteria) and matched with the controls for sex and age, except for two of the elderly cases. None of the individuals included in the study had taken antibiotics during the preceding 3 months. No one of the cases were treated with anti-rheumatic drugs except for corticosteroids in 16 cases the latest month.

Results: All participants were classified into three hierarchical cluster groups based on their saliva microbiota and the distribution of eRA cases versus controls differed distinctly between the cluster groups. The microbiota from the eRA had higher species richness, differed in beta-diversity, and was enriched for species in the *Fusobacterium* and *Porphyromonas* genera, and for the *Alloprevotella tannerae*, *Campylobacter gracilis*, *Capnocytophaga leadbetteri*, *Filifactor alocis*, *Fusobacterium nucleatum* subsp. *polymorphum*, *Neisseria elongate*, *Porphyromonas endodontalis* and *Prevotella pleuritidis* species compared to controls. Combining two topped ranked species, *A. tannerae* and *Catonella morbi* significantly predicted eRA with an AUC score of 0.86 and a specificity and sensitivity of 0.80 and 0.85, respectively. The predicted functions of the microbiota in eRA patients were dominated by fatty acid metabolism, ornithine metabolism, glucosylceramidase, sphingolipids, beta-lactamase resistance, biphenyl degradation and 17-beta-estradiol 17-dehydrogenase metabolism.

Conclusion: In this study a difference in oral microbiota diversity between eRA patients and healthy controls could be shown. Some of the eRA-associated oral bacteria have previously been suggested to play an aetiological role in the development of RA, but others have not been recognized earlier, such as *A. tannerae*, *F. alocis*, *F. nucleatum* subsp. *polymorphum*, and *P. endodontalis*, and may therefore be useful in RA risk assessment.

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SAT0591

REAL-WORLD PATTERNS OF PEGLOTICASE USE FOR TREATMENT OF GOUT IN THE U.S.

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Background: Pegloticase is used in severe refractory gout or in cases of intolerance to other urate lowering therapies but the real-world use of pegloticase since its U.S. Food and Drug Administration approval in 2010 is not known.

Objectives: We sought to evaluate the real-world patterns of pegloticase use in the U.S. and the incidence of safety outcomes with its use.

Methods: We conducted a retrospective descriptive study using data from two U.S. commercial insurance claims databases (MarketScan and Optum, 2010-2018). We identified new initiators of pegloticase with ≥1 gout diagnosis code in the 365-day baseline period prior to pegloticase initiation. We measured the number and duration of pegloticase therapy. We assessed the risk of anaphylaxis, cardiovascular events including myocardial infarction or stroke, hospitalization for heart failure (new onset or exacerbations) while receiving pegloticase therapy.

Results: Among 2.9 million patients with ≥1 diagnosis code for gout, we identified only 483 (179 in Optum and 304 in MarketScan) pegloticase initiators. The mean age and % female was 55.6 years, 10.9% for MarketScan and 60.6 years and 17.3% for Optum (Table). Cardiovascular comorbidities were prevalent in both cohorts. Hypertension was present in up to 85%, diabetes mellitus in 38%, chronic kidney disease in 46%, and heart failure in 21% of the patients. As expected, use of gout-related medications at baseline was common. The median duration of pegloticase therapy was 93 days (interquartile range [IQR] 56-186) in MarketScan and 105 (IQR 56-127) in Optum. The median number of pegloticase infusions was 4 (IQR 2-10) for MarketScan and 5 (IQR 2-12) in Optum. In MarketScan, 57 (18.8%) patients switched to allopurinol, 64 (21.1%) to febuxostat, and 2 (0.7%) to probenecid during the mean 0.5-year followup time. Similarly, during the mean 0.5-year followup time in Optum, 38 (21.2%) patients switched to allopurinol, 34 (19.0%) to febuxostat, and 2 (1.1%) to probenecid. During the mean 0.5-year follow-up time on pegloticase, there were 3 (0.6%) anaphylaxis, 7 (1.4%) composite cardiovascular, 31 (6.4%) heart failure hospitalizations, and 3 (0.6%) deaths in both datasets.

Conclusion: Pegloticase is rarely used in gout, and the median duration of pegloticase therapy was 3 months. There were few anaphylaxis events captured in this claims-based study, while heart failure hospitalizations were common.

Table. Select baseline characteristics of pegloticase initiators

	MarketScan	Optum
N	304	179
Mean age (SD), years	55.62 (12.83)	60.58 (12.85)
Female sex, %	10.9	17.3
Comorbidities		
Hypertension, %	73.0	84.9
Diabetes mellitus, %	34.9	38.0
Heart failure, %	12.5	20.7
Coronary artery disease, %	12.8	26.3
Chronic kidney disease, %	34.2	45.8
Malignancy, %	10.2	8.4
Medication use		
NSAID/COXIB use, %	51.3	40.0
Colchicine use, %	72.0	65.4
Allopurinol use, %	33.6	47.5
Febuxostat use, %	38.8	36.9
Probenecid use, %	8.2	4.5
Oral steroid use, %	67.1	72.1
Anakinra use, %	5.9	6.7

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