A CLINICAL TOOL FOR AUTOMATED PREDICTION OF HIP AND MAJOR OSTEOARTICULAR FRACTURES USING ELECTRONIC MEDICAL RECORDS DATA: THE EPIC STUDY

Cristian Tebé1, Natalia Pallarés1, Cristina Carbonell-Abella2, Carlen Reyes3, Xavier Nogués3, Adolfo Díez-Perezo, Daniel Martínez-Laguna2, Daniel Prieto-Alhambra3, GREMIPAL, IDIAP Jordi Gol, Hospital Universitari de Bellvitge, BARCELONA, Spain; 2Idiap Jordi Gol, Universitat Autònoma de Barcelona, BARCELONA, Spain; 3Musculoskeletal Research Unit, Parc de Salut Mar and IMIM, BARCELONA, Spain; “Centre for Statistics in Medicine, NDMORU, University of Oxford, OXFORD, United Kingdom

Background: With increasing availability of patient data in healthcare, there is an unprecedented opportunity for prediction tools that can be automatically implemented in electronic medical records system.

Objectives: We aimed to develop and validate a fracture prediction tool that leverages patient data as routinely available in primary care computerized records.

Methods: We conducted a population-based cohort study. Data was extracted from all patients registered in the SIDIAP database on 1/1/2012, with data for 1+ years, and aged 50 years or older on that date. SIDIAP contains primary care records linked to pharmacy dispensations for >6 million people, equivalent to ~80% of the population of Catalonia. Participants were followed up until the earliest of death, transfer out, migration, or end of 2017.

Two models were developed to predict hip fracture (main outcome) and major osteoporotic (hip, clinical vertebral, wrist/forearm, and proximal humerus) fracture rate over 5 years. Potential predictors were pre-specified based on previous literature and combined in Cox models to derive prediction tools. Internal validation was performed using c-statistic for discrimination, and observed vs predicted plots for calibration. Multiple imputation with chained equations was used to minimize the impact of missing data on body mass index, smoking, and alcohol drinking. Bootstrapping methods were used to select key predictors to be combined in the final resulting models.

Results: A total of 1.76 million people (9.76 million person-years) were included, 50.7% women, of average age 65.4 years old. A 10.1% and 7.4% were lost to follow-up over 5 years due to mortality and migration, respectively.

Fracture rates were 3.57/1,000 person-years [95%CI 3.53-3.60] for hip and 11.61 [11.54-11.68] for major fracture. Key predictors of increased fracture risk included age, female gender, history of falls or previous fractures, specific medication's use (insulin, GnRH inhibitors, anticonvulsants, sedatives, SSRI, antipsychotics), and a history of diabetes mellitus (type 1 or type 2), cerebrovascular disease, ischemic heart disease, COPD and anorexia nervosa. Variables associated with lower fracture risk included use of statins, thiazidic diuretics, and overweight/obesity.

Combined, these resulted in a c-statistic of 84.9% for hip and 72.9% for major fracture. Calibration was excellent for both outcomes.

Conclusion: We have developed and validated a clinical prediction tool for 5-year hip and major osteoporotic fracture risks. The algorithm has excellent performance and can be installed in electronic primary care records systems for automated risk calculations at the population level. More research is needed on the transportability and external validity of this prediction tool.

Acknowledgement: Research grant from the Carlos III Institute of Health, Ministry of Economy and Competitiveness (Spain), awarded on the 2017, with reference PI17/00471, co-funded with European Union ERDF funds (European Regional Development Fund)

Disclosure of Interests: Cristian Tebé: None declared, Natalia Pallarés: None declared, Cristina Carbonell-Abella: Speakers bureau: AMGEN, LILLY, Carlen Reyes: None declared, Xavier Nogués: Speakers bureau: Amgen and Eli Lilly, Adolfo Díez-Perez: Speakers bureau: Lilly, Amgen, GSK and UCB, Daniel Martínez-Laguna: Speakers bureau: Eli Lilly, Amgen, Ferrer, Rubió and Novartis, Daniel Prieto-Alhambra: Grant/research support from: Grants from Amgen, UCB Biopharma and Servier outside the submitted work, Consultant: for UCB Biopharma, Speakers bureau: Amgen


SAT0592 THE IMPACT OF ORAL GLUCOCORTICOIDS ON THE DEVELOPMENT OF CATARACTS AND GLAUCOMA IN INCIDENT RHEUMATOID ARTHRITIS PATIENTS

Rachell Black1,2,3,4, Susan Leste1,2,3,1, Catherine Hill,4 Will Dixon,1 Royal Adelaide Hospital, Rheumatology Unit, Adelaide, Australia; 2The University of Adelaide, Adelaide, Australia; 3University of Manchester, Arthritis Research UK Centre for Epidemiology, Manchester, United Kingdom; 4University of Manchester, Health eResearch Centre, Farr Institute for Health Informatics Research, Manchester, United Kingdom

Background: Cataracts and glaucoma are recognised glucocorticoid (GC) adverse effects. However, the impact of GC use, dose and timing on the development of cataracts and glaucoma has not been well quantified.

Objectives: 1. To determine the association between GC use and dose and the development of cataract and glaucoma in patients with incident RA. 2. To determine the lag effect of GC dose.

Methods: Data were used from the Clinical Practice Research Datalink (CPRD), a large UK primary care database derived from an electronic medical record (Jan 1992 – Dec 2017). RA patients were identified using a validated algorithm and only incident patients were included. Parametric log-logistic survival models were used to assess the impact of GC use, dose (prednisolone daily dose equivalent) and lagged dose (at 1, 3, 6 months, 1 & 2 years). A square root transformation of dose was used for the cataract models. Smoking, gender and uveitis were included as covariates in the model and age was used as the timescale. Comorbidities on the causal pathway, such as diabetes and hypertension, were not included. Results were reported as odds ratios (OR) for the cumulative incidence.

Results: There were 22607 patients with incident RA (median age 66, IQR 37-84, 68% female), of which 241 had cataracts and 164 had glaucoma on or before baseline. Median duration of follow up was 8.7 years (IQR 1.8-19.8) and 39% were ever GC users during follow up. The incidence rate, per 1000 patient-years was 12.3 (95% CI 11.8, 12.9) for cataracts and 3.1 (95% CI 2.8, 3.4) for glaucoma, and increased with age. Uveitis was an important predictor for both cataracts and glaucoma, and cataracts were more frequent in females. GC use and GC dose were associated with both cataracts and glaucoma (Table 1). In the multi-variable lagged dose analysis, GC dose at 1-year prior had the greatest effect size for cataracts (OR 1.26, 95% CI 1.12, 1.42), whereas GC dose at 3-months prior had the greatest effect size for glaucoma (OR 1.06, 95% 1.01, 1.11).

Table 1

<table>
<thead>
<tr>
<th>Cataracts</th>
<th>Glaucoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>GC use</td>
<td>Adjusted OR (95% CI)</td>
</tr>
<tr>
<td>CG dose</td>
<td>2.28 (1.90, 2.73)</td>
</tr>
<tr>
<td>GC dose</td>
<td>1.42 (1.31, 1.53)</td>
</tr>
</tbody>
</table>

Conclusion: The quantification of the risk associated with GCs and the development of cataract and glaucoma is of clinical utility in daily practice. EULAR guidelines recommend patients are informed of the risks and benefits of GC treatment prior to commencement, however the risk of these potential adverse effects had not previously been quantified. This information will allow patients to make better-informed treatment choices in conjunction with their treating doctor.

Disclosure of Interests: None declared


SAT0593 INCIDENCE OF RHEUMATOID ARTHRITIS, PSORIATIC ARTHRITIS AND SPONDYLOARTHRITIS AND THEIR ASSOCIATED COMORBIDITIES IN A BELGIAN GP REGISTRY

Sofia Pazmino1, Veerle Stouten1, Patrick Vescchueren1,2, Pavlos Mamouris3, Rene Westhovens1,2, Kurt de Vlam1,2, Delphine Bertrand1, Kristien Van der Elst2, Bert Vaes3, Rene Westhovens1,2, Kurt de Vlam1,2, Delphine Bertrand1, Kristien Van der Elst2, Bert Vaes3, Rene Westhovens1,2, Kurt de Vlam1,2, Delphine Bertrand1, Kristien Van der Elst2, Bert Vaes3, Rene Westhovens1,2, Kurt de Vlam1,2, Delphine Bertrand1, Kristien Van der Elst2, Bert Vaes3

Background: Rheumatoid arthritis (RA), psoriatic arthritis (PSA) and spondyloarthritis (SPA) are the most common inflammatory rheumatic diseases