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

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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 subjects 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.

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.

Fractions rates were 3.5/1,000 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, antidepressants), and a history of diabetes mellitus (type 1 or 2), cerebrovascular disease, ischemic heart disease, COPD and anorexia nervosa. Variables associated with lower fracture risk included use of statins, thiazide 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.

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