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EDITORIALS

Identifying people with diabetes at high risk of blindness and amputation

A new risk tool will help to personalise care and advice and to target resources at those in greatest need

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Blindness and lower limb amputations are among the most feared complications of diabetes. Despite the frequency of these complications and their effect on patients, methods of identifying those patients with diabetes who are at greatest risk of blindness and amputation have been lacking. This gap has now been filled in a study by Julia Hippisley-Cox and Carol Coupland (doi:10.1136/bmj.h5441), using data from QResearch, a large clinical database derived from the electronic patient records used by general practices in the United Kingdom.[1]

The study used data derived from electronic patient records of around 455 000 people with diabetes from 763 general practices in England. The same data source (QResearch) and statistical methods used in this study have also been used to produce other risk measurement tools—for example, QRISK, which has now been adopted by the NHS in England for measuring the risk of developing cardiovascular disease.[2] The data from primary care records were linked to other data sources such as NHS Hospital Episode Statistics. The authors then used Cox proportional hazards models to derive separate risk equations for the 10 year risk of blindness and amputation.

The equations were subsequently validated using data from two different sets of general practices (from QResearch and the Clinical Practice Research Datalink). In this validation, the two risk prediction models performed well, explaining around 41% and 32% of the variation in time to amputation and blindness, respectively, with good discrimination as measured by C statistic values. In the final phase of their work, the authors developed a web based calculator so that clinicians can enter their patients' data, and patients can enter their own data, to determine the 10 year risk of these complications.[3]

The authors are to be congratulated on the scale of their study and its potential impact on clinical practice and on self management. Previous risk prediction studies in diabetes have been on a substantially smaller scale. For example, the UK Prospective Diabetes Study (UKPDS) was based on a sample of around 5100 patients.[4] Very few patients in the UKPDS developed blindness (n=116) or amputation (n=45) during follow-up, making derivation of accurate methods of predicting these complications difficult. Data on ethnicity were also lacking. In contrast, in the QResearch study, 4822 people had lower limb amputations and 8063 cases of blindness occurred during the follow-up period, and data on ethnicity were available. The risk factors in the final models—such as age, ethnicity, blood pressure, deprivation, glycated haemoglobin, and smoking for the amputation risk model—are what we might expect on the basis of previous research on complications of diabetes, but it is very useful to have the effect of each of these risk factors quantified.

The scale of the morbidity from diabetes and its impact on patients, clinicians, health systems, and societies is considerable and growing because of the continuing increase in the global prevalence of diabetes. Diabetic eye disease is now the second most common cause of blindness in people of working age in the United Kingdom and one of the most common causes of blindness worldwide.[5 6] A previous study using NHS Hospital Episode Statistics showed increasing rates of diabetes related amputations in England, driven largely by the rising prevalence of type 2 diabetes.[7] More than 7000 diabetes related amputations take place annually in England, which illustrates the impact of this complication on both patients and health systems.[8]

The new risk prediction models can help to provide the basis of a more individualised and holistic method of tackling these complications in patients. People with diabetes can for the first time be given individualised risk scores based on their own characteristics. They can also be shown how changes in their lifestyle or management affect their risk—for example, stopping smoking or improving their diabetes control—thus promoting more patient centred care for people with diabetes.[9] For the NHS, the risk prediction models will permit risk stratification of people with diabetes, thus allowing resources to be targeted

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at those groups of people at the highest risk of complications. This targeted use of resources is critically important in a period when the NHS faces unprecedented financial pressures.[10]

Some caveats remain, however. Firstly, we need to test the models in actual practice to see if they can improve the management of people with diabetes and thereby lead to lower rates of blindness and amputation. Secondly, because of the global burden of diabetes, we also need to test the impact of the models outside the United Kingdom, particularly in those countries with the highest prevalence of diabetes.[11]

The risk prediction tools developed from QResearch are one example of the value of the data held by the NHS in its electronic medical records and administrative databases. These data have great potential to improve NHS clinical care as well as giving patients information to help them to make better decisions about their own health. We do, however, need to overcome the political, organisational, and technical barriers to making greater use of these data so that the NHS, clinicians, the public, and patients can all benefit fully from this potential.[12]

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