Scottish Government Health Directorates Chief Scientist Office

CHIEF SCIENTIST OFFICE

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CLINICAL DECISION MAKING IN CHRONIC KIDNEY DISEASE: A RECORD LINKAGE COHORT STUDY TO DEVELOP TOOLS TO SUPPORT PATIENTS, CLINICAL STAFF AND SERVICE

Researchers
Dr A Marks, Dr N Fluck, Prof WCS Smith, Dr G Prescott, Prof A MacLeod, Dr WG Simpson, Dr C Black

Aims

- To develop clinically relevant tools to predict outcome in those with chronic kidney disease (CKD).
- To develop clinically relevant tools to predict those with CKD who will not progress.
- To investigate the number of health events due to CKD, so renal services can be planned appropriately.

Project Outline/Methodology

30,000 people in Grampian with impaired kidney function and 40,000 also from Grampian but without CKD were identified in 2003 and followed up until mid 2009. Death, myocardial infarction (heart attack), starting renal replacement therapy (RRT: including dialysis and kidney transplantation), admissions to hospital and worsening kidney function over that time were investigated. Characteristics of those who did and did not suffer these outcomes were identified. This information was used to develop prediction tools to inform decision-making in clinical practice and health service planning.

Key Results

CKD is common, particularly in the elderly (approximately 50% of those over 85 years old). In those with CKD, comorbidity (other illnesses) is more common.

After adjusting for other factors including age and sex, people with CKD had a risk of starting RRT over 400 times that of people with normal kidney function. The risk of dying with CKD was 1.22 times that of normal kidney function. The risk of having a heart attack was 1.95 times that of people with normal kidney function. Being male, having worse kidney function and having large amounts of protein in the urine were associated with a higher risk of all these happening. Younger people who had CKD were more likely to have worsening kidney function and need dialysis or a transplant than older people.

One in three people with CKD had at least one admission to hospital every year.

Analysis of the patterns of who required dialysis or transplantation allowed a forecasting or prediction model to be developed that could be used to estimate need for dialysis in the future for individuals with CKD. These predictions correctly classified 97.6% of those who did and did not start dialysis or received a transplant. Knowledge of the number of people in the population that had CKD and then died or started dialysis/had a transplant will allow us to calculate the number of people who would have these outcomes in other populations.

Conclusions

We have shown that being male, having worse kidney function and high levels of protein in urine, increases the risk of starting RRT, dying and suffering a myocardial infarction. More severe CKD is associated with more hospital admissions.

What does this study add to the field?

We have used this knowledge to develop tools that can help predict the likely need for dialysis or a transplant in the future for an individual. These tools perform satisfactorily.

Implications for Practice or Policy

The use of these tools and knowledge of these risk factors for both poor and good outcomes will help provide the best care for an individual and allow the most appropriate place of delivery of that care. The tools will also help plan future health services.

Where to next?

The refinement of the prediction model will allow improved performance in people with less severe CKD. The model also needs testing in a second, external cohort of people to ensure it works for different people. The validation of these tools in direct clinical care rather than in research is necessary, to find out if they can be used easily and effectively with patients.

Further details from:

Dr Angharad Marks
Division of Applied Health Sciences
University of Aberdeen
Polwarth Building, Foresterhill, Aberdeen. AB25 2ZD