Late referral for assessment of renal failure

Frank Kee, Elizabeth A Reaney, A Peter Maxwell, Damian G Fogarty, Gerard Savage, C Christopher Patterson, on behalf of the Northern Ireland TSN Renal Group

It has been recommended that adult patients with a serum creatinine above 150 µmol/l should be referred to a nephrologist for specialist assessment. This study ascertained all patients in Northern Ireland with creatinine above this concentration in 2001 (n = 19,286) to see if this triggered referral within the subsequent year. After exclusion of those who were already known to a nephrologist and those who had acute renal failure, it was found that younger patients and diabetic patients were more likely to be referred. There was no difference in referral rates between male and female patients. However, only 6.5% of all non-diabetic subjects and 19% of diabetic patients were referred within 12 months after a first increased serum creatinine test.

In the past 20 years, the number of patients receiving treatment for end stage renal disease (ESRD) has risen substantially in most developed countries. This trend is driven by the aging of the population, better recognition of the outcomes and value of renal replacement therapy, and increased resources for haemodialysis. Yet data from renal units point to a pronounced variation in referral of patients with ESRD.

The third edition of the Renal Association guidance suggests that patients should be referred to a specialist, early in the course of their disease when serum creatinine is between 150 and 200 µmol/l, while the NICE guidance on the management of type II diabetes recommends referral when the creatinine reaches 150 µmol/l. The impact of using such thresholds on existing services or on patient outcomes is unknown. To start such a study and determine the potential numbers of patients meeting these criteria, we have capitalised on the comprehensive coverage of the clinical biochemistry laboratories serving one region’s entire 1.7 million population (Northern Ireland).

METHODS

Our full methods (including details of record linkage protocols) and the prevalence of chronic kidney disease have been described elsewhere. Briefly, we retrieved data on all serum creatinine, albumin and urea tests, urinary protein excretion tests, and HbA1c tests performed in Northern Ireland laboratories between 1 January 2001 and 31 December 2002. We reduced the test level database to a relational person level database of patients who had had any of these tests performed during 2001 and 2002. This analysis focuses on subjects whose first raised serum creatinine (above 150 µmol/l) was in 2001.

We were able to define the source and specialty of the doctor requesting the test and thus could exclude (from the analysis of subsequent referral rates) those whose first abnormal test had been ordered by a nephrologist. We defined a referred case as someone who had had any subsequent serum creatinine test ordered by a nephrologist within 12 months of the first abnormal result in 2001. We excluded those with acute renal failure from the analysis. We ascertained all deaths through the Office of the Registrar General and censored subjects on their date of death. Subjects with acute renal failure were defined as those who had a creatinine >300 µmol/l in 2001 that returned to <120 µmol/l within six months of the first raised test.

We defined as diabetic those subjects who had had any HbA1c test undertaken during the two year period. Results are presented by age and sex for patients 20 years and over.
Kidney disease prevalence data are reported elsewhere, 4 services, serving more mobile populations. While our chronic other regions served by more fragmented or dispersed health population in Northern Ireland offers us advantages over random population based surveys,6 whereas we have ana-

study methodology used. Some earlier studies have been previous estimates from the literature vary according to the between 1.56% and 3.25%), it should be borne in mind that (based on serum creatinine measurement estimated to be previously been highlighted5 but our comparatively static The feasibility and need for a study such as ours has yielded a result below 150 \( \mu \text{mol/l} \) (fig 1).

Tables 1 and 2 show that across both sexes and among diabetic and non-diabetic subjects the proportion “referred” is significantly higher at younger ages.

For example, compared with the oldest age category, 20–39 year olds had a more than fivefold chance of being referred to a nephrologist (table 2). Overall, less than 20% of diabetic patients and less than 7% of non-diabetic subjects had a subsequent investigation undertaken by a nephrologist within 12 months. Nevertheless the average number of renal/HbA1c tests performed on each “non-referred” cases during that period was 20 for diabetic patients and 14 for non-diabetic subjects (including tests ordered in both primary and secondary care settings).

**DISCUSSION**

The feasibility and need for a study such as ours has previously been highlighted but our comparatively static population in Northern Ireland offers us advantages over other regions served by more fragmented or dispersed health services, serving more mobile populations. While our chronic kidney disease prevalence data are reported elsewhere, (based on serum creatinine measurement estimated to be between 1.56% and 3.25%), it should be borne in mind that previous estimates from the literature vary according to the study methodology used. Some earlier studies have been random population based surveys, whereas we have analysed the data on all subjects who had their creatinine measured in a particular period. Although we will have “missed” some chronic kidney disease subjects (who did not have a creatinine test in 2001), you would expect the tested cohort to be “enriched” with subjects with some sort of illness (compared with the general population), and thus more likely to represent those in need of referral. We excluded 749 cases of presumed acute renal failure. While these subjects had to survive long enough to have at least a second creatinine test, whether this misclassifies a comparatively small number of acute renal failure and chronic kidney disease cases is a moot point, for as most of these acute renal failure cases merit specialist investigation, we do not feel it bears significantly upon our overall conclusion that existing renal services in secondary care would have difficulty in meeting the Renal Association and NICE guidelines.

Previous studies of late referral defined referral delay according to the interval (greater or less than three months) between initial referral and the time to dialysis start. Such a late or “downstream” approach would not truly reflect the number of people in the general population for whom interventions may retard progression of kidney disease. Although not all patients with chronic kidney disease will progress to ESRD, their increased cardiovascular risk still offers opportunities for health gain. Undoubtedly, some patients will die with rather than from their chronic kidney disease.

Although we have limited data on how our non-referred subjects were being managed in primary care (phase II of our study), we know that fewer than 8% had had additional tests of renal dysfunction performed (for example an estimate of the urinary albumin-creatinine ratio or 24 hour urinary protein excretion). The most effective service model for early intervention is open to question. While some modelling studies show that early referral to a specialist might be cost effective, there is no reason why most of the necessary intervention could not be delivered by the primary care team.

In Northern Ireland in 2001 there were about 1100 ESRD patients receiving renal replacement therapy and 9.5 whole time equivalent nephrologists saw about 1200 new outpatients with chronic kidney disease (Korner Statistics,
Many previous studies have assessed "late referral" as judged by the ("downstream") interval between referral and the start of dialysis, for patients with chronic kidney disease. Given the existing Renal Association guidance (that all patient with creatinine >150 μmol/l should be referred to a specialist), the novelty of this study is that it has ascertained the population prevalence of chronic kidney disease and calculated how many such patients have been referred to a specialist within 12 months. As early intervention may slow a decline in renal function, chronic kidney disease abatement and prevention strategies need to be better informed by this "upstream" approach.

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Policy implications

The existing Renal Association guidelines will fail patients, unless significantly more renal specialists and clinics are available. Alternatively, improved primary care management of chronic kidney disease or shared care should be promoted.

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