Late referral for assessment of renal failure


Published in:
Journal of Epidemiology and Community Health

Document Version:
Publisher's PDF, also known as Version of record

Queen's University Belfast - Research Portal:
Link to publication record in Queen's University Belfast Research Portal

General rights
Copyright for the publications made accessible via the Queen's University Belfast Research Portal is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy
The Research Portal is Queen's institutional repository that provides access to Queen's research output. Every effort has been made to ensure that content in the Research Portal does not infringe any person's rights, or applicable UK laws. If you discover content in the Research Portal that you believe breaches copyright or violates any law, please contact openaccess@qub.ac.uk.
Late referral for assessment of renal failure
Frank Kee, Elizabeth A Reaney, A Peter Maxwell, Damian G Fogarty, Gerard Savage, C Christopher Patterson and on behalf of the Northern Ireland TSN Renal Group

*J. Epidemiol. Community Health* 2005;59;386-388
doi:10.1136/jech.2004.026658

Updated information and services can be found at:
http://jech.bmjournals.com/cgi/content/full/59/5/386

These include:

**References**
This article cites 8 articles, 2 of which can be accessed free at:
http://jech.bmjournals.com/cgi/content/full/59/5/386#BIBL

**Rapid responses**
You can respond to this article at:
http://jech.bmjournals.com/cgi/eletter-submit/59/5/386

**Email alerting service**
Receive free email alerts when new articles cite this article - sign up in the box at the top right corner of the article

**Topic collections**
Articles on similar topics can be found in the following collections

- Other Epidemiology (1636 articles)
- Pancreas and biliary tract (397 articles)

**Notes**

To order reprints of this article go to:
http://www.bmjournals.com/cgi/reprintform

To subscribe to *Journal of Epidemiology and Community Health* go to:
http://www.bmjournals.com/subscriptions/
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.1

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,2 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.3 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.

Figure 1 Distribution of creatinine results—maximum value for each subject tested in 2001.
Kaplan-Meier survival estimates (with 95% confidence limits) were obtained for the proportion referred by 12 months. Cox’s proportional hazards regression was used to test variation in the referred proportion according to age, sex, and whether diabetic or not.

The study was approved by the Queens University Medical Ethics Committee, 2002.

RESULTS
Twenty nine per cent of the resident population had at least one creatinine test in 2001 and 95% of all tests undertaken yielded a result below 150 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 illness population in Northern Ireland offers us advantages over other regions served by more fragmented or dispersed health services, serving more mobile populations.

Twenty nine per cent of the resident population had at least one creatinine test in 2001 and 95% of all tests undertaken yielded a result below 150 mol/l (Fig 1).

Table 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).

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 out-patients with chronic kidney disease (Korner Statistics, 2000). 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.

Late referral for assessment of renal failure 387

Table 1 Cumulative risk of referral to a nephrologist within 12 months of initial abnormal creatinine result

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number</th>
<th>Cumulative proportion referred (%)</th>
<th>95% Confidence limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-diabetic patients</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20–39</td>
<td>307</td>
<td>16.6</td>
<td>12.2 to 21.0</td>
</tr>
<tr>
<td>40–49</td>
<td>327</td>
<td>16.2</td>
<td>11.7 to 20.6</td>
</tr>
<tr>
<td>50–59</td>
<td>806</td>
<td>14.0</td>
<td>11.3 to 16.6</td>
</tr>
<tr>
<td>60–69</td>
<td>1746</td>
<td>9.6</td>
<td>8.1 to 11.1</td>
</tr>
<tr>
<td>70–79</td>
<td>4974</td>
<td>6.6</td>
<td>5.7 to 7.4</td>
</tr>
<tr>
<td>80+</td>
<td>5689</td>
<td>3.0</td>
<td>2.5 to 3.5</td>
</tr>
<tr>
<td>Total</td>
<td>12969</td>
<td>6.5</td>
<td>6.0 to 7.0</td>
</tr>
<tr>
<td>Diabetic patients</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20–39</td>
<td>74</td>
<td>41.7</td>
<td>31.5 to 51.8</td>
</tr>
<tr>
<td>40–49</td>
<td>95</td>
<td>24.9</td>
<td>19.7 to 30.2</td>
</tr>
<tr>
<td>50–59</td>
<td>279</td>
<td>26.1</td>
<td>20.8 to 31.5</td>
</tr>
<tr>
<td>60–69</td>
<td>801</td>
<td>25.8</td>
<td>22.7 to 29.0</td>
</tr>
<tr>
<td>70–79</td>
<td>1392</td>
<td>18.4</td>
<td>16.3 to 20.5</td>
</tr>
<tr>
<td>80+</td>
<td>1075</td>
<td>9.0</td>
<td>7.1 to 10.9</td>
</tr>
<tr>
<td>Total</td>
<td>3716</td>
<td>19.2</td>
<td>17.9 to 20.6</td>
</tr>
</tbody>
</table>

*Patients previously known to the nephrology service have been excluded from the denominator.
expensive renal replacement therapy will continue to consequence, late referral of more advanced disease requiring opportunities for prevention of progressive renal failure. As a prevalence of chronic kidney disease will result in missed to meet the challenge posed by the higher than appreciated the efforts of primary and secondary care services to improve diagnostic, and treatment strategies are required to integrate cope with the number of patients with chronic kidney disease identified in this population based study. New screening, diagnostic, and treatment strategies are required to integrate the efforts of primary and secondary care services to improve the outcomes for people with chronic kidney disease. Failure to meet the challenge posed by the higher than appreciated prevalence of chronic kidney disease will result in missed opportunities for prevention of progressive renal failure. As a consequence, late referral of more advanced disease requiring expensive renal replacement therapy will continue to disadvantage non-diabetic and older patients.

ACKNOWLEDGEMENTS

We are very grateful for help of Ms Maire Brolly from the Central data. (A P Maxwell, advisor to Regional Review of Renal Services; personal communication). Although dealing with many fewer ethnic minority patients (less than 1.0% resident population), it is otherwise typical (in capacity terms) of many other UK regions. While there is emerging clinical and economic evidence for the potential benefits of early referral to a nephrologist, existing renal services in the UK could not cope with the number of patients with chronic kidney disease identified in this population based study. New screening, diagnostic, and treatment strategies are required to integrate the efforts of primary and secondary care services to improve the outcomes for people with chronic kidney disease. Failure to meet the challenge posed by the higher than appreciated prevalence of chronic kidney disease will result in missed opportunities for prevention of progressive renal failure. As a consequence, late referral of more advanced disease requiring expensive renal replacement therapy will continue to disadvantage non-diabetic and older patients.

ACKNOWLEDGEMENTS

We are very grateful for help of Ms Maire Brolly from the Central Services Agency and for that of Mr Colin Fox (Northern Ireland Cancer Registry) for assistance with record linkage, and to the staff of the Clinical Biochemistry laboratories for help in obtaining the source data.

Authors’ affiliations

F Kee, E A Reaney, C C Patterson, G Savage, Department of Epidemiology and Public Health, The Queens University of Belfast, UK. A P Maxwell, D G Fogarty, Department of Renal Medicine, The Queens University of Belfast

Funding: The study was supported by a TSN Commissioned Research Award from the DHSSPSNI Research and Development Office.

What this paper adds

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.

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.

Competing interests: APM served on the DHSSPSNI team that led the Northern Ireland Regional Review of Renal Services, 2002. The membership of the Targeting Social Need Renal Group also includes: Dr Claire Willis (Department of Health and Social Services and Public Safety). Mr Sean McCann (Information and Analysis Branch, Northern Ireland Statistics and Research Agency). Professor Philip Keilly, Department of General Practice, the Queens University of Belfast. Ms Hazel Granddier, Department of General Practice, the Queen's University of Belfast. Mr Colin Fox, Northern Ireland Cancer Registry. The views expressed in the paper are those of the authors and not of their employers.

Correspondence to: Professor F Kee, Department of Epidemiology and Public Health, The Queens University of Belfast, Mulhouse Building, Grosvenor Road, Belfast BT12 6BJ, UK; f.kee@qub.ac.uk

Accepted for publication 2 December 2004

REFERENCES

4 Reference withdrawn.
8 Reference withdrawn.