Prevention of end stage renal failure: an achievable goal?

MUCH of the past 30 years of nephrology has been successfully dedicated to improving the survival and quality of life of patients with end stage renal failure. As a result, more than 20 000 people in the United Kingdom (more than 400 000 worldwide) are currently receiving renal replacement therapy and it is estimated that this number will increase by 75% within the next decade.[1,2]

The treatment of end stage renal failure, however, remains palliative, not curative, and detrimentally affects most aspects of a patient's life. Haemodialysis and peritoneal dialysis are time consuming and, despite major refinements in technique, are associated with poor health, low rates of employment and a high mortality;[1,3] in Europe annual mortality on dialysis is approximately 9%[1] whereas in the United States of America it is greater than 20%.[4] Renal transplant, which is the treatment of choice for the majority of patients with end stage renal failure, has a 30–40% failure rate within five years[1] and graft failure is associated with a significantly increased mortality and morbidity.[5] In any case, there are not enough kidneys to satisfy demand; every year approximately twice as many new patients are accepted for renal replacement therapy in the UK as receive transplants.[1]

Renal replacement therapy is expensive and, unlike those of many other illnesses, the costs recur until the patient dies. In the UK, haemodialysis and peritoneal dialysis cost between £10 000 and £18 000 a year and renal transplant approximately £10 000 in the first year and £3000 a year thereafter.[6] In other words, the cost of treating end stage renal failure is similar to performing coronary artery bypass surgery twice a year for the rest of the patient's life (Finance Department, University College London Hospitals, personal communication).

Although much is made of the undoubted need to increase and improve facilities for renal replacement therapy, scant attention has been paid to the large scale prevention of end stage renal failure. In our experience and that of other units,[7,8] between 30% and 50% of patients with end stage renal failure present to the nephrologist with advanced renal impairment despite cogent evidence that several therapeutic measures can delay or even prevent many cases of the condition.

There are numerous causes of end stage renal failure: chronic glomerulonephritis, particularly immunoglobulin A nephropathy, accounts for approximately 20% of cases; diabetic nephropathy between 15% and 25%; and hypertension about 20%; with atherosclerotic renal artery stenosis, urological disease and congenital diseases such as autosomal dominant polycystic kidney disease making up the bulk of the rest.[9] Most causes of chronic renal failure have common factors which may be determinants of disease progression and which are amenable to therapy. Research has concentrated on hypertension, proteinuria and hyperlipidaemia. Although proteinuria and hyperlipidaemia may induce continuing renal injury, it remains uncertain whether treatment of either of these factors delays progression of renal impairment in man. In contrast, several well controlled studies indicate that good blood pressure control (maximum blood pressure of 135/85 mmHg) may halve the rate of progression to end stage renal failure in a variety of types of chronic renal failure.[10-12] These studies highlight both the importance of careful monitoring of blood pressure and the need for rigorous efforts to achieve good control.

The underlying disease process may be amenable to therapy in a few renal diseases. Improved glycaemic control delays the development of renal disease in diabetes[13] and angiotensin converting enzyme inhibitors reduce proteinuria and retard progression of renal impairment in established diabetic nephropathy.[14] An aggressive approach to atherosclerotic renovascular disease with rigorous medical management combined with angioplasty or open surgery may preserve or improve renal function.[15] Chronic glomerulonephritis associated with systemic disease may respond to immunosuppression and, lastly, obstruction of bladder outflow is a completely preventable cause of end stage renal failure, but only if it is identified and treated early.[16]

If end stage renal failure can be prevented or at least delayed in many patients, why is the number of new patients not declining, particularly in those countries with relatively large numbers of renal specialists? Prevention depends on identifying patients at risk and many patients continue to present to nephrologists with advanced renal impairment. Some of these patients have never sought medical advice and therefore represent a failure of detection. Improvements in routine screening in primary health care for hypertension, diabetes, proteinuria and haematuria should increase the early identification of this group. Other patients, usually under hospital care, have their renal disease detected, but not recognized, and thus subsequently receive inadequate care. There is a widespread failure to recognize the severity of renal disease; for example a plasma creatinine concentration of 200 $\mu mol\ l^{-1}$ is often misinterpreted as representing mild renal failure whereas, in fact, it indicates a loss of between 60% and 70% of renal function. This ignorance, combined with a failure to appreciate the benefits of appropriate treatment, leads to inadequate care and results in a potentially treatable cohort of patients progressing unnecessarily to end stage renal failure. Although most cases of impaired renal function may first be detected in a hospital setting, the general practitioner is in a prime position to identify the problem and to organize appropriate investigation and referral.

The development of clinically significant renal impairment is the start of a protracted nightmare for many patients and greater efforts need to be directed towards preventing this expensive disease. Large population-based studies will be able to determine whether, and by how much, screening and early referral reduce end stage renal failure rates. At present, we would recommend that the following groups of patients are referred for specialist investigation, treatment and follow up: those with impaired renal function, where possible when the plasma creatinine concentration is 150 $\mu mol\ l^{-1}$ or more but definitely when it is more than 200 $\mu mol\ l^{-1}$; those with documented proteinuria, more than 1+ on repeated urine dipstick testing or more than 0.5 g in 24 hours; and those already identified as having renal disease but who continue to be followed up in other hospital departments such as diabetic, hypertension and urology clinics. With such a strategy, more cases of end stage renal failure should be prevented or at least delayed.

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References

1. Raine AEG, Margreiter R, Brunner FP, *et al.* Report on management of renal failure in Europe, XXII, 1991. *Nephrol Dial Transplant* 1992; **suppl 2:** 7-35.
2. Port FK. Worldwide demographics and future trends in end-stage renal disease. *Kidney Int* 1993; **43 (suppl 41):** S4-S7.
3. Gokal R. Quality of life in patients undergoing renal replacement therapy. *Kidney Int* 1993; **43 (suppl 40):** S23-S27.
4. Hull AR, Parker TF. III. Introduction and summary: proceedings from the morbidity, mortality and prescription of dialysis symposium. *Am J Kidney Dis* 1990; **15:** 375-383.
5. Cattran DC, Fenton SSA. Contemporary management of renal failure: outcome of the failed allograft recipient. *Kidney Int* 1993; **43** (suppl 41): S36-S39.
6. Beech R, Mandalia S, Melia J, *et al.* Purchasing services for end stage renal failure: the potential and limitations of existing information sources. *Health Trends* 1993; **25:** 60-64.
7. Innes A, Rowe PA, Burden RP, Morgan AG. Early deaths on renal replacement therapy: the need for early nephrological referral. *Nephrol Dial Transplant* 1992; **7:** 467-471.
8. Jungers P, Zingraff J, Albouze G, *et al.* Late referral to maintenance dialysis: detrimental consequences. *Nephrol Dial Transplant* 1993; **8:** 1089-1093.
9. Clark TJ, Richards NT, Adu D, Michael J. Increased prevelance of dialysis-dependent renal failure in ethnic minorities in the West Midlands. *Nephrol Dial Transplant* 1993; **8:** 146-148.
10. National high blood pressure education program. National high blood pressure education program working group report on hypertension and chronic renal failure. *Arch Intern Med* 1991; **151:** 1280-1287.
11. Gabow PA, Johnson AM, Kaehny WD, *et al.* Factors affecting the progression of renal disease in autosomal-dominant polycystic kidney disease. *Kidney Int* 1992; **41:** 1311-1319.
12. Zucchelli P, Zuccala A, Borghi M, *et al.* Long-term comparison between captopril and nifedipine in the progression of renal insufficiency. *Kidney Int* 1992; **42:** 452-458.
13. The diabetes control and complications trial research group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993; **329:** 977-986.
14. Kasiske BL, Kalil RSN, Ma JZ, *et al.* Effect of antihypertensive therapy on the kidney in patients with diabetes: a meta-regression analysis. *Ann Intern Med* 1993; **118:** 129-138.
15. Kremer-Hovinga TK, de Jong PE, van der Hem GK, de Zeeuw D. Relief on renal artery stenosis: a tool to improve or preserve renal function in renovascular disease. *Nephrol Dial Transplant* 1990; **5:** 481-488.
16. Sack SH, Aparicio SAJR, Bevan A, *et al.* Late renal failure due to prostatic outflow obstruction: a preventable disease. *BMJ* 1989; **298:** 156-159.

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Undergraduate and postgraduate medical education: bridging the divide

A SURVEY of university departments in the United Kingdom and Eire, published in this issue of the *Journal*,[1] reveals that general practice is increasingly involved in all stages of the undergraduate curriculum. In the quarter century since the Todd report on medical education,[2] elective attachments have given way to formal courses for both pre-clinical and clinical students. At a pre-clinical level these often involve behavioural science and family placements,[3] while at a clinical level practice attachments provide opportunities to learn about medicine in the community, the primary care team, and clinical skills with emphasis on communication.[4] Some of these courses anticipated the 1993 General Medical Council report[5] with experience-based, self-directed learning and continuous assessments, which in Sheffield are part of the final degree examination and include a medical audit project and recorded feedback of interview skills using audiotape recordings.[6] These developments reflect an earlier review of basic medical education which had concluded that 16 of the 20 educational objectives identified by the General Medical Council required a general practice contribution for their achievement at any reasonable level.[7]

Some medical schools are shifting the emphasis of teaching clinical skills from hospital to community,[8] and one pilot project at Cambridge has based much of the clinical course in general practice.[9] The impetus for change stems partly from reforms in National Health Service funding, partly from the reduction in hospital beds, and partly from a realization that about half of all doctors work in the community where the vast majority of patient contacts take place. However, the implications for university departments of general practice are considerable. These departments have emerged by a process of opportunistic local arrangements over the past 25 years. Some are based on a university practice but the majority are practice-linked, with academic staff working in different practices.[10]

University departments of general practice in the UK are anomalous as there is a split between undergraduate university departments and postgraduate training which does not happen elsewhere, or for other clinical disciplines. In North America the great majority of family medicine residences are run by university departments of general practice which are also responsible for undergraduate teaching. The reasons for this situation are both historical and political. When pressure was building up for vocational training in the 1950s and 1960s it was easier to achieve this on the education budget in North America and on the health service budget in the UK. This was partly because it was felt that fees attracted by family doctors in North America would help pay for university departments involved in postgraduate training. Whereas, in this country a separate postgraduate organization was established with health service funding and has led the way in educational innovation. When pressure mounted for undergraduate teaching of general practice following the Todd report in 1968[2] small university departments were established, depending upon local circumstances. There was no proper funding such as that available for other clinical disciplines from the service increment for teaching (SIFT) (or additional cost in teaching, ACT, in Scotland). At the same time, postgraduate advisers and course organizers were developing vocational training with little formal contact with undergraduate teaching or research. The result was small university departments with no critical mass, where one or two people struggled to maintain credible continuity of care for patients while organizing the growing demands of undergraduate teaching and research.

The new contract for general practitioners undermined these shaky foundations, which had to be shored up initially by specially allocated payments from the Department of Health and recently by more substantial 'tasking funds' from regional health authorities. This at least enabled many departments for the first time to achieve a critical mass of four or five full time academic staff. Also for the first time, general practitioners taking medical students on attachment were remunerated by the family health services authority. Long term negotiations continue to seek a