

SPECIAL ARTICLE

Where do we go from here — the future of nephrology in South Africa

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The management of patients with end-stage renal failure (ESRF) poses worldwide technical, moral, financial and social dilemmas.

In order to move into the future in an unencumbered way, many concepts of the past will need to be discarded or radically modified. In South Africa we have a unique but short-lived opportunity to do just that before our current practice again becomes accepted dogma.

Our current approach, with few exceptions, has led us to assume that pursuit of 'the ideal' automatically results in an optimal outcome. Due regard for the overall price we pay and the likelihood of attaining these 'ideals' have received less emphasis.

Compromises may not seem ideal; calculated compromise, however, may surprisingly bring us closer to the attainable best. Issues to be considered include the following.

Availability of dialysis

Extremely expensive dialysis is available to a few, fortunate enough to have been selected for the dialysis and transplant programme.

In South Africa the extremely high cost of dialysis of a single patient (approximately R60 000 per year), coupled with limited resources, has been largely responsible for the extremely low overall acceptance rates for treatment of patients with end-stage renal failure (approximately 17 patients per million population per year (PPM/yr) (1994)). The ethnic breakdown is: whites 41, blacks 8.4, coloureds 32 and Asians 97 PPM/yr.¹

In South Africa, the number of patients needing treatment is likely to be at least 100 PPM/yr, but realistically probably in the vicinity of 150 - 200 PPM/yr. Most will die as it is unrealistic to think of providing treatment for all. Similarly, to achieve racial 'equity' will clearly require a strategy other than the mere offering of more dialysis to black patients or hoping to save money by taking from other population groups.

Because of the cost involved, compromise is required. Despite the fact that chronic dialysis is an accepted and highly effective mode of keeping patients alive, it cannot be justified solely for the sustaining of a few 'fortunate' patients.

Justification for the future role of dialysis depends on the following: (i) maintenance of a sufficiently big 'pool' of

dialysis patients so that the potentially very cheap and equitable transplant programme can function optimally. This is the only way of providing increased and effective treatment options, especially for black patients; (ii) provision of dialysis facilities sufficient to sustain all patients with failing transplants (one of the determinants of the size of the 'pool'); (iii) maximising the benefit and minimising the cost of dialysis (discussed later in this paper); and (iv) equitable and appropriate selection criteria of patients for the dialysis and transplant programme.

The myth that renal transplantation is very expensive

Unfortunately the legacy and image of great expense associated with transplantation has resulted in some bad publicity. Some renal transplant programmes are very expensive, especially during the first few years following the transplant. However, this need not necessarily be the case. Pre-operative preparation of cadaver donor recipients is minimal; surgery lasting about 1½ hours is relatively uncomplicated with an extraperitoneal approach and some vascular surgery. Postoperative management may be done in a general surgery ward with minimal monitoring and discharge a week or two later. Special investigations may include little more than a daily haemoglobin evaluation, white cell count, potassium and creatinine measurements and occasional isotope renograms. Why then the expense?

1. Past experience and expectations created the image of highly immunosuppressed and unstable individuals requiring intensive postoperative care in specially designed units with protocols to combat infection. These patients could hardly be regarded as 'heavily' immunosuppressed during the first 2 weeks after starting on as little as 30 mg prednisone, 200 - 400 mg cyclosporin and 50 - 100 mg azathioprine daily.

2. Immunosuppressive regimens are expensive. Virtually all transplant units use the highly effective but very expensive drug, cyclosporin, as their central immunosuppressive agent on an indefinite basis. This results in an ever-increasing pool of transplant recipients on this agent.

At Groote Schuur Hospital (GSH), cyclosporin is stopped in patients with stable function at approximately 12 months after transplantation, leaving the patients on prednisone (at an average hospital tender cost of R2.20/month) and azathioprine (cost R40/month). The total monthly cost of maintaining approximately 300 GSH long-term follow-up patients on this regimen is R12 660. This contrasts sharply with the R540 000 monthly which would have been required had all these patients remained on cyclosporin at an average monthly cost of R1 800 per patient.

At GSH we feel, as do some other units, that the enormous saving in cost justifies this policy, despite some problems with 'rejection episodes' and the occasional loss of a transplanted kidney.² Such patients, on returning to dialysis, need not incur much extra cost provided one operates on the understanding that the 'pool' of dialysis patients is limited and provided one does not embark on exceptionally expensive 'salvage' therapy.

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A further 'cost-saving' strategy used at GSH, both with the cardiac and the renal transplant programmes, is to reduce the breakdown of cyclosporin selectively with the concurrent use of ketoconazole (a P450 enzyme inhibitor). Results after 2 years of this regimen in renal transplantation have shown a reduction of cyclosporin use in these patients of about 80%, and a considerable reduction in overall costs with minimal compromise of patient care. Similar data have been published for cardiac transplant recipients.³

3. Regimens for managing patients with renal 'rejection episodes' are extremely expensive. Attempted salvage of kidneys in patients with severe 'rejection episodes' has limited success. A single course of therapy with a drug such as OKT3 costs in the vicinity of R15 000 and has a short-term success rate of less than 25%. The overall cost per salvaged kidney is therefore R65 000 without the guarantee of a good long-term outcome. Furthermore, aggressive immunosuppressive therapy for rejection is often associated with the most severe complications requiring extremely expensive supportive therapy.

4. Another issue is the management of patients with complications as a consequence of long-term immunosuppressive protocols. Many of these complications may be avoided by more conservative immunosuppressive protocols and less aggressive attempts to salvage failing kidneys.

Solving the 'problem' by harvesting more kidneys

The shortage of donors is a worldwide problem. Many strategies for increasing the number of donor organs have evolved and deserve unqualified support. In South Africa there is a multitude of problems that hamper effective retrieval and utilisation. Even if these were totally overcome, retrieval rates would not be likely to exceed 40 organs PPM/yr, which falls far short of the total needs of the country.

The need for living related donors therefore remains as great as ever. Not only are graft and patient survival rates much better, but every additional kidney used effectively saves the life of a patient who would otherwise have been denied treatment. Even living unrelated donors, e.g. husband and wife, should be seriously considered, as recent data have demonstrated graft and patient survival rates superior to those associated with cadaver transplants and approaching those of living related grafts.⁴ During 1993 12 such transplants were undertaken in South Africa, representing 4% of the total.¹

Selection of patients for dialysis/transplant programmes

In the past, elaborate systems of 'assessment' were employed by some units. The criteria used need revision to place more emphasis on the importance of 'suitability for transplantation' as the single most important criterion. This would also allow increasing acceptance of patients who, because of poor social, educational and employment

circumstances, are generally not accepted because they tend to do badly on conventional dialysis programmes. For them, however, a successful transplant offers a cure for a fatal disease. Transplantation of such individuals is likely to have some negative impact on graft survival statistics of the unit involved, but offers the only hope of a life of good quality for many of the less fortunate members of our society.

Reducing costs and improving quality of life on dialysis

Poor quality of life, high morbidity and mortality are common in dialysis patients. Yet maximising the well-being of dialysis patients need not be particularly expensive. The recommended approach has been clearly outlined in a recent 'consensus statement' following a meeting at the National Institutes of Health in the USA.⁵ It emphasises, among other issues, the need for close co-operation between primary and secondary health care providers during the early phases of CRF in order to optimise all aspects of the health of the patient by the time he/she requires dialysis or transplantation.

Correcting abnormalities, such as low haemoglobin values, by the use of highly effective erythropoietin (EPO) is met with long-term monthly costs of around R1 500 per patient. The percentage of dialysis patients in South Africa receiving EPO ranges from 0% to 50% depending on the centre and reflects not only different levels of funding but also perceptions of its value in improving patient welfare. In theory many beneficial effects should follow its use, such as reduced need for blood products, reduced pre-transplant sensitisation and return of patients to work through improving effort tolerance. In practice it more often than not does none of the above, and often distracts attention from easily correctable causes of anaemia such as poor dialysis, undiagnosed illness or iron deficiency. Inexpensive correction of these may be met with very impressive results.⁶ The role for EPO in South Africa has yet to be defined; consequently its unrestricted use cannot be justified.

Despite the well-publicised enormous cost savings associated with dialyser re-use, it has (with rare exceptions) been almost totally neglected in South Africa. The fact that all dialysers used in the country (about 9 000 per month at an estimated cost of R547 000) are imported, with consequent loss of foreign exchange, makes this situation all the more untenable. At a re-use rate of 10, the import cost of these dialysers can be reduced to R54 720. (To date the GSH overall re-use rate of over 2 000 dialysers has been 10.7.) The total cost of reprocessing is in the vicinity of R14 per unit, indicative of the enormous savings possible.

A further benefit of re-use is achieved when more 'biocompatible' and efficient dialysers are used, without incurring the prohibitive expense of using such 'high-quality' but very expensive dialysers on a single-use basis. The benefit of such dialysers has been shown in patients with chronic and those with acute renal failure.

The use of sodium bicarbonate as the principal buffer in dialysis fluid provides a multitude of health benefits but to date has been limited by increased complexity of delivery as well as the cost of the dialysis fluids. Its cost-effective use

depends on offering it only to those who will benefit most (possibly about half of the patients in the average South African dialysis unit). Costs may also be limited by producing the 'bicarbonate' mixture locally and avoiding the use of overly expensive imported formulations.

Pursuit of the latest in 'high-flux dialysis', 'high-efficiency dialysis', 'dialysis kinetics' and 'dialysis prescription', and the use of 'volumetric machines', undoubtedly benefit some patients, yet the majority may be managed perfectly well with proper attention to existing and much cheaper technology. The challenge is to choose correctly.

The total cost of outpatient haemodialysis, prescribed according to current 'best practice' principles (excluding the cost of the hospital space and infrastructure, drugs and special investigations) but including all medical nursing and technical support, all disposables and all direct and indirect costs of machines and re-use equipment should be less than R40 000 per annum per patient. Because of low turnover, dialysis of fewer than 20 patients in a single unit is likely to be considerably more expensive and consequently more difficult to justify.

Peritoneal dialysis has always been considered the cheaper option as no expensive dialysis machine is needed. Unfortunately its current cost now rivals that of haemodialysis. This is largely due to increasingly expensive dialysis fluids and administration sets. Peritonitis rates have undoubtedly been diminished by these new developments allowing for longer 'technique survival'. It has, however, unmasked the problem of inadequate dialysis as residual renal function of native kidneys is progressively lost with increasing time spent on peritoneal dialysis. For many patients, peritoneal dialysis in the absence of some residual function is inadequate.

The practice of reducing costs by underdialysing patients (such as twice weekly or less often) for those not accepted onto the major state-funded programmes and with inadequate resources, cannot be justified.

Primary and preventive health care issues

Prevention of renal failure is very difficult and, where possible, likely to be very expensive. One might think that the two most 'obvious' targets for the prevention of renal disease would be the treatment of hypertension and diabetes and that nephrologists would have a major role to play. These are largely issues of public health, better handled by good general practitioners, primary health care clinics and diabetic counsellors. Public education on the benefits of weight and dietary salt reduction (both of which are low-cost interventions!) could have major benefits as both have a direct bearing on the prevalence and severity of hypertension in susceptible members of the community.

While not wishing to diminish the importance of attention to diabetes and hypertension, attainment of a noticeable reduction in renal disease by the programmes that are likely to be feasible in South Africa is an untested proposition. I feel that these are unlikely to make very much difference to the prevalence of renal disease in the foreseeable future.

The previously common diagnosis of analgesic nephropathy as a cause of ESRF, is currently hardly ever

made in South Africa. There is also complacency about the 'safety' of paracetamol and other analgesic preparations. Yet increasing evidence points to the hazards of taking this drug on a regular basis.⁷ For patients with existing renal disease, who often complain of headaches, the threat to health may be even greater.

Treatment of acute renal diseases that lead to renal failure is a far more critical issue. These include accelerated hypertension (especially prevalent among black patients), aggressive forms of glomerulonephritis, including those initiated by infections such as streptococci, and renal disease associated with vasculitis, drug-induced renal disease and some types of urinary tract infections. Optimal investigation and management of HIV-associated renal disease in South Africa has yet to be defined.

Management of patients approaching ESRF requires special care that includes attention to their employment and family relationships, good nutrition and avoidance of inappropriate drugs. It is abundantly clear that optimal management of chronic renal failure prior to the patient's reaching end stage has a very pronounced effect on the likelihood of a successful outcome once dialysis and transplantation are started.⁵

Improvements in primary health care, education and screening for disease, are likely to result in a marked increase in the numbers of patients diagnosed with chronic ESRF. Appropriate selection of the few candidates for whom treatment will be available will require the utmost expertise and wisdom. For those for whom treatment will not be available great skill, compassion and co-ordination will be required to optimise their conservative management by all tiers of health care providers.

Excessive qualifications and training of many professionals involved with haemodialysis

Almost half the cost of a single haemodialysis treatment consists of payment of dialysis and medical staff. For patients dialysed in small units, the proportion may be even higher.

Haemodialysis must be managed by dedicated experts in order to maximise the benefit of the extremely expensive procedure. Yet the technique of chronic haemodialysis is a relatively simple procedure and does not require the routine attention of a nephrologist for more than a once-monthly consultation. Similarly it does not require the exclusive services of highly trained nursing staff, as much could be managed by adequately supervised dialysis assistants.

In the USA, dialysis technologists are fully functional after training periods as short as 3 - 6 months. By contrast, in South Africa, 4 years of training are required to qualify as a clinical technologist, including 1 full year spent at a technicon.

Co-operation between private and public health sectors

For the reasons outlined above it is likely that treatment for ESRF for the majority of the population will never be

possible. Selection of patients for treatment is therefore inevitable, especially for those without resources for 'private' dialysis.

By contrast it is not unreasonable that individuals with adequate financial resources but who do not qualify for a dialysis programme, should be able to purchase life-sustaining therapy. These patients could also have access to dialysis in state facilities as they will be more than capable of paying their way at current private dialysis fees and could even create profit to the benefit of those less able to support themselves.

Contracting out state-funded dialysis to private companies may result in considerable escalation in costs and will also be at variance with the principle that dialysis is not an end in itself. A haemodialysis unit should be an integral component of an academic renal unit where practices and policies are evaluated and patients are prepared and held in readiness for transplantation.

The issues relating to transplantation are somewhat different. Cadaver kidneys should be considered a national resource, equally available to all patients with ESRF, arguably even more so to those patients who do not have dialysis (medical aid) to fall back on once ESRF is reached. Private hospitals clearly need to be encouraged to obtain all possible kidneys for their institutions (and rewarded for doing so) and these should be available to all patients, 'private' or state, provided that they have been accepted for dialysis programmes according to generally accepted criteria.

Renal research and the future

Justification for the many 'compromised' treatment regimens outlined under the headings above clearly depends on careful analysis of all the highly complex issues involved. As a country used to spending as lavishly as the most wealthy in the world (if selectively), we now have a unique opportunity to determine how we can maximally and most appropriately utilise the resources available to us. It could become a model for the equitable and careful distribution of scarce resources in a land and on a continent where there *will not be enough for all*.

Our problem is not that nephrology in the new South Africa might not survive; we are in fact likely to do very well. The real tragedy would be not to have known that we could have done better.

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