Is Renal Replacement Therapy for All Possible in Developing Countries?

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Chronic kidney disease is a worldwide public health problem. More than one million individuals in the world are on maintenance dialysis, a number that is estimated to double in the next decade. Access to dialysis is significantly different between developed and developing nations. Close to 80% of the world dialysis population is treated in Europe, North America, and Japan, representing 12% of the world's population. The remaining dialysis patients are treated in the developing world. This disparity is likely due to the high cost and complexity of renal replacement therapy (RRT). Dialysis is so costly that is out of reach for low-income countries, which are struggling to provide preventive and therapeutic measures for communicable diseases and other basic needs.

Providing renal care to all developing nations, although a difficult task, is not impossible. A number of strategies are proposed. These include the prevention of kidney disease, as well as dialysis and transplantation. Dialysis programs should be decentralized, and kidney transplantation should be promoted as the treatment of choice. The use of generic immunosuppressive drugs can make this therapy more affordable. Peritoneal dialysis seems a good, affordable, therapy for patients living in areas where hemodialysis is not available. Governments should provide funds not only for RRT but also for the prevention of kidney failure. The provision of tax incentives and reaching a critical number of patients on RRT could be incentives for industry to lower the cost of dialysis.

The challenges are enormous, but renal care for all could be achieved through a concerted effort between nephrologists, governments, patients, charitable organizations, and industry. (*Ethn Dis*. 2006;16[suppl 2]:S2-70–S2-72)

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Chronic kidney disease is a worldwide public health problem. Incidence and prevalence of patients with kidney failure requiring renal replacement therapy are increasing. Today, more than one million individuals in the world are on maintenance dialysis, a number that is estimated to double in the next decade. Access to dialysis is significantly different between developed and developing nations. Close to 80% of the world dialysis population is treated in Europe, North America, and Japan, which represent only 12% of the world's population. On the other hand, 20% are treated in 100 developing countries that make up 50% of the world's population.[1]

These disparities are arguably due to the high cost and complexity of renal replacement therapy (RRT). Dialysis is so costly that is out of reach for low-income countries, which are struggling to provide preventive and therapeutic measures for communicable diseases and other basic needs. Therefore, less-privileged countries simply cannot afford RRT for all patients with kidney failure.[1]

At the June 30–July 2, 2005, meeting titled "Renal Disease in Minority Populations and Developing Nations," a satellite meeting of the International Society of Nephrology's World Congress of Nephrology (Singapore), Correa-Rotter,[2] Morad,[3] and Ahmed[4] discussed the challenges to bringing RRT to the developing world. First, the dialysis population has grown at an alarming rate, and this growth is expected to continue over the next decade, mostly among developing nations. As they indicate, the Mexican dialysis population has more than doubled over the last decade, and in Malaysia is now 10 times more prevalent than in 1990. Similar results have been reported in other developing nations.[5]

Second are competing priorities on scarce financial resources. Many developing nations continue to struggle with providing basic sanitation and nutrition to their populations; controlling infectious diseases like malaria, tuberculosis, water-borne infections, and emerging communicable diseases such as HIV/AIDS and SARS; and treating noncommunicable diseases such as diabetes mellitus and chronic kidney disease.[6–8]

Third, RRT tends to cost more in countries that can least afford it. The lack of a "critical mass" of patients in developing nations, does not encourage many suppliers to market or to manufacture their products in those countries. Peritoneal dialysis (PD) is less expensive and requires less technology than other RRT and therefore seems more appropriate for developing nations.[9] However, in those countries where PD fluids need to be imported, the cost of PD makes it prohibitively expensive.[10] Other factors that have limited the use of PD in less-privileged countries are poor sanitation, cost of connecting devices, lack of expertise, and lack of financial incentives to prescribe PD.[9,10] In addition, RRT programs in most developing nations are typically located in urban areas, while a significant number of patients live in rural areas, limiting even further the access to dialysis to a large percentage of the population.[8,11,12]

Ahmed discussed the factors that limit the use of kidney transplantation in the developing world.[4] The initial costs of operation and hospital stay, maintenance immunosuppression, am-

bulatory care, and treatment of intercurrent illness and re-hospitalization are barriers that make renal transplantation difficult to implement in developing countries. Also, the lack of organ donors has limited the number of transplants in these countries.[13]

Finally, skilled manpower is in short supply in developing nations.[12] The number of nephrologists is insufficient to meet the growing demand. Skilled nurses and dietitians are also equally lacking, as well as trained technicians to maintain dialysis equipment.

In the face of this somber situation, what should be done? Morad pointed out the role governments can play.[3] They can fund RRT and provide incentives and tax breaks for foreign companies to facilitate licensing and registration for dialysis-related items. They also can foster market forces that could drive the cost of dialysis down. In coordination with suppliers, they can implement programs of cost containment. As an example, Morad reports that in Malaysia the government now finances, directly and indirectly, >60% of RRT in that country. Private, for-profit units are also major providers of hemodialysis (HD) treatment. Interestingly, since the early 1990s, nongovernmental charity organizations (NGOs) with no medical background have started providing HD services to the low-income patients who are not accepted by public HD units, and cannot afford private HD services. Since 1996, the government has been subsidizing the cost of HD treatment provided by these NGOs. This collaboration between the three major providers has enabled the country to increase the dialysis acceptance rate from 10 per million population (pmp) in 1990 to 100 pmp in 2003. Likewise, in a poor country like Pakistan, a community-government partnership has allowed 110 kidney transplants a year, with free follow-up care and immunosuppressive therapy.[13]

Mexico has already successfully solved some of the problems outlined before. More than half of the Mexican population lacks medical insurance, and their access to RRT is limited.[12] Many patients abandon their treatment because dialysis is unaffordable. In 1989, we started a unique RRT program at the Hospital Civil de Guadalajara, a tertiary-care facility located in the western state of Jalisco that offers dialysis to poor patients without medical insurance. In this program, the cost of treatment, including immunosuppressive therapy for kidney transplantation, is shared by industry, government, patients, and charitable organizations.

Because of these efforts, in the last 15 years, 702 patients have benefited from continuous ambulatory peritoneal dialysis (CAPD). Despite low socioeconomic status, illiteracy, and poor sanitation, which are common among our patients, our results are similar to those reported in developed nations.[14] Overall, 1-, 2-, and 5-year patient survival rates on CAPD are 79%, 55%, and 22%, respectively. Technique survival rates at 1, 2 and 5 years are 91%, 78%, and 60%. The rate of peritonitis went from 1 episode every 7 patient-months with the spike system to 1 episode every 25 patient-months with the use of double-bag ($P<0.001$). One hundred and thirty (18%) patients have received a kidney graft.[15]

In addition, to minimize the shortage of nephrologists and skilled nursing personnel, in 1990 we started a residency program in nephrology, followed by one in 1997 at the Mexican Institute for Social Security's Western Medical Center. As a result, the number of nephrologists in our state has increased from 20 in 1990 to 60 in 2005. Likewise, a postgraduate training program in nephrology nursing was initiated in 2001. Forty-four nephrology nurses have graduated over the last 4 years from this program. All programs are sponsored by the University of Guadalajara.

Transplantation should be pursued vigorously because it may be the most cost-effective means for managing end stage renal disease in the developing world.[13] Also, we should concentrate our efforts not only on providing access to dialysis and transplantation but also on preventing progression of kidney disease. The success achieved by prevention programs in India, Cuba, and Bolivia are encouraging.[16–18]

In conclusion, we believe that renal care can be provided to all developing nations. Renal care should include prevention programs as well as dialysis and transplantation. An effort should be made to decentralize the dialysis programs and to promote transplantation as the treatment of choice. The use of generic immunosuppressive drugs could help to make this therapy more affordable. Peritoneal dialysis (PD) is a good therapy for patients living in areas where HD is not available. Governments should provide funds not only for RRT but also for the prevention of kidney failure. The provision of tax incentives and reaching a critical number of patients on RRT are incentives for industry to lower the cost of dialysis.

The challenges are enormous, but renal care for all could be achieved through a concerted effort between nephrologists, governments, patients, charitable organizations, and industry.

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