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Peritoneal Dialysis in China: Meeting the Challenge of Chronic Kidney Failure

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Due to limited medical and economic resources, particularly in the countryside and remote areas, the proportion of individuals with end-stage kidney disease who are treated with dialysis in China is only about 20%. For the rest, renal replacement therapy currently is not available. Peritoneal dialysis (PD) has been developed and used for more than 30 years in China to treat patients with end-stage kidney disease. Several national PD centers of first-rate scale and quality have sprung up, but the development of PD varies widely among geographic regions across China. The Chinese government has dedicated itself to continually increasing the coverage and level of medical service for patients with end-stage kidney disease. Under the guidance of the government and because of promotion by kidney care professionals, presently there are more than 40,000 prevalent PD patients in China, representing approximately 20% of the total dialysis population. Recently, a National Dialysis Unit Training Program for countywide hospitals has been initiated. Through the efforts of programs like this, we believe that awareness of PD and advances in the underlying technology will benefit more patients with end-stage kidney disease in China.
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INDEX WORDS: End-stage kidney disease (ESKD); peritoneal dialysis (PD); renal replacement therapy (RRT); PD centers; clinical outcomes; renal failure; health care infrastructure; health care policy; China.

Xueqing Yu, MD, PhD, was an International Distinguished Medal recipient at the 2014 National Kidney Foundation Spring Clinical Meetings. The International Distinguished Medals are awarded to honor individuals who have made significant contributions to the field of kidney disease and furthered the goals of the National Kidney Foundation.

China is a developing country with the world's largest population (>1.3 billion). It has an increasing prevalence of end-stage kidney disease and relatively insufficient medical and economic resources, particularly in rural and remote areas. Providing dialysis treatment to patients with end-stage kidney disease is a public health challenge that puts a large economic burden on individuals and health care resources.

Peritoneal dialysis (PD) is a well-accepted dialysis modality that is less expensive than in-center hemodialysis (HD) and has been developed and used for more than 30 years in China. The rapid growth of the end-stage kidney disease population coupled with limited resources in China highlights the need for strategies to maximize the use of PD. This review discusses the prevalence and economic burden of end-stage kidney disease in China, the Chinese government policy regarding the treatment of end-stage kidney disease, and the current status and challenges for expanding the availability and improving clinical outcomes for PD patients in China.

CHRONIC KIDNEY DISEASE IN CHINA

Results of a multicenter cross-sectional study of chronic kidney disease (CKD) estimated the CKD prevalence at 10.8% in China. Based on these data, there are up to 119.5 million patients with CKD in the country.[1] However, prevalence varies significantly from region to region across China due to the variability in lifestyles and economic development. For example, the prevalence of adult CKD has been reported to be 13.0% in Beijing,[2] 11.8% in Shanghai,[3] and 19.1% in Tibet.[4] In a rural and urban epidemiology survey in Guangdong Province, we found that the prevalence of CKD is 10.1%

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in urban populations[5] and up to 13.6% in rural areas.[6] Chronic glomerulonephritis currently is the most common cause of CKD in China.[7,8] As the way of life changes and the population ages, prevalences of diabetes, hypertension, and obesity are increasing very quickly. It has been reported that the total prevalence of diabetes is 9.7% in China.[9] A shift in the epidemiology of kidney disease also has been reported: the leading causes of CKD among elderly Chinese patients now are diabetes mellitus and hypertension, rather than glomerular diseases.[10] These epidemiologic changes have been exacerbating the burden of CKD in China, a trend that will continue in the future.

Even with optimal treatment, a significant portion of patients with CKD progress to end-stage kidney disease, and the estimated prevalence of end-stage kidney disease in China is about 200 to 250 cases per million population.[11] The increasing incidence of end-stage kidney disease has a major impact on the need for dialysis, including maintenance HD and PD. In China, the cost of treatment for a patient with end-stage kidney disease is approximately CN ¥90,000 to ¥100,000 (equal to US $13,850-$15,380) a year,[12] which puts a large economic burden on individuals and health care resources. Due to the country's limited economic and medical resources coupled with restricted health insurance coverage, the prevalence of dialysis is very low in China relative to many developed countries.[7] A survey by the Chinese Society of Blood Purification showed that at the end of 2008, there were 102,863 patients with end-stage kidney disease treated by HD or PD, and the point prevalence was estimated to be 79.1 per million population in mainland China.[13] At the end of 2013, according to data from the Chinese Renal Data Registration System, the number of patients in mainland China receiving dialysis was 326,000 (280,000 HD patients and 46,000 PD patients), accounting for ~20% of the global end-stage kidney disease population.[14] Given the high prevalence and extensive treatment costs, end-stage kidney disease has become a major public health problem for the Chinese government.[7,15]

CHINESE GOVERNMENT POLICY REGARDING THE TREATMENT OF END-STAGE KIDNEY DISEASE

The Chinese government has paid increasing attention to the treatment available for patients with end-stage kidney disease in the past few years. Uremia is 1 of 8 major serious diseases covered by National Social Medical Insurance.[16] A joint document developed in 2012 by relevant government departments specified that coverage provided by the New Rural Cooperative Medical Care plan should reach 70% of the total medical costs of these major diseases.[17] Recently, with the advancement of health care system reform in China, basic medical insurance now covers >95% of urban and rural residents, and a high-reimbursement policy for catastrophic diseases including end-stage kidney disease has been established.[11] These improvements in health care policy have challenged the Chinese nephrology community to strengthen kidney disease care by finding ways to take advantage of limited resources so that more patients with end-stage kidney disease can obtain appropriate renal replacement therapy.

As a renal replacement therapy, PD has many advantages compared to in-center HD. It is home based, offering a more independent lifestyle and greater freedom of movement. The modality is characterized by comparatively slow decreases in residual kidney function, generally stable hemodynamics, and good clearance of middle molecules. In addition, PD patients are less likely to acquire hepatitis or experience delayed recovery of kidney function after kidney transplantation. The medical resources required, including labor, space, and equipment, are relatively minimal, and accordingly, the treatment cost is significantly lower than that of HD.[12,18,19]

A report assessing dialysis options and costs of end-stage kidney disease in China from the National Health Development Research Center showed that the annual cost of PD is about CN ¥93,520 (US $14,380), whereas the cost of in-center HD is CN ¥103,416 (US $15,910).[12] The report further discussed the particular benefits offered by PD for patients in China's vast rural areas, in that home-based treatment minimizes the impact on their lives by reducing the inconvenience and financial burdens of traveling to and from the hospital. By reducing patients' dependence on medical institutions, PD treatment also helps minimize the burden on China's developing health care system.[12] Because of these unique advantages, PD therapy is highly valued by the Chinese government. In order to pave the way to end-stage kidney disease care that takes account of the conditions in China, the past Minister of Health, Dr Chen Zhu, specifically advocated that China first vigorously promote PD and then construct a complementary system that combines PD with HD.[11,20] These policies are meant to promote PD treatment technology in order to maximize the number of patients with end-stage kidney disease receiving renal replacement therapy and benefit more patients.

DEVELOPMENT OF A PD PROGRAM IN GUANGZHOU

The Department of Nephrology of The First Affiliated Hospital of Sun Yat-sen University is one of the earliest free-standing