The burden of diabetes mellitus in renal failure patients—a plea for MORE action NOW

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In year 2001, there are over 4900 patients on renal replacement therapy (RRT) according to data of the Hong Kong Renal Registry. About 1500 are on transplant and about 3400 are on dialysis.

In this issue, Choy et al (1) published a very important paper using Hong Kong Renal Registry data about patients on RRT who are diabetics.

A recent survey of 149 806 non-institutionalized adults aged 18 years or older in the United States (US) showed that the prevalence of diabetes mellitus (DM) rose from 4.9% in 1990 to 6.5% in 1998, with an increase of 33% (2). Increases were observed in both sexes, all ages, all ethnic groups, all education levels, and nearly all states in US. The prevalence of DM in Asian-Pacific region as well as Hong Kong is also in the increasing trend (3). The age-standardized prevalence of DM in Hong Kong was 7.7% in 1990 and 8.9% in 1995. The same rate in Taiwan was 11% in 1995 and 8.1% in Singapore in 1992 (3). It is these alarming figures making us worry about the future medical burden that the society will face with DM patients. In addition, the economic burden of DM in the society will increase. In 1997, the total medical expenditure in US incurred by diabetic patients was US$ 10 071 per capita, compared with US$ 2669 for the non-diabetic population (4).

Hong Kong Renal Registry data, as summed up by Choy et al (1), showed that the prevalence of RRT for DM patients was 151 per million populations. In year 2000, DM nephropathy accounted for 29% of all new patients on RRT in Hong Kong.

Patients with DM are having not only a higher chance of developing renal failure; once they are on RRT, they have more significant cardiovascular complications. In Hong Kong, DM patients have higher chance of experiencing hypertension (85%), ischemic heart disease (24%), cerebrovascular disease (9%), and peripheral vascular disease (3%). A prospective cohort of 270 continuous ambulatory peritoneal dialysis (CAPD) patients (25.9% of whom were DM patients) in Hong Kong found that the presence of DM would incur an increased relative mortality risk of 2.11 for prevalent CAPD cases (5). This is also represented in the Registry data by the annual crude mortality rate of DM patients on RRT at 16% compared with non-DM patients on RRT at 6% (1). Fried et al (6) found that hospitalization rates in PD patients were higher among DM (2.2 admissions per patient year) than non-DM (1.6 admissions per patient year) populations. Thus it is, once again, confirmed that both morbidity and mortality are higher among RRT patients with DM than those without.

As nephrologists and general physicians, we should aim at three strategies to tackle this major problem:

1. Primary and secondary prevention of diabetic complications by optimal glycemic control—a computer analysis of the Diabetes Control and Complications Trial (DCCT) found that improved glycemic control resulted in a mean 7.7 additional years of sight, 5.8 additional years free from end-stage renal disease, 5.6 additional years free from lower-extremity amputation, and 15.3 additional years free from onset of substantial microvascular or neurological complications (7,8). Similar outcomes among individuals with type 2 diabetes were demonstrated in the United Kingdom Prospective Diabetes Study (9).

2. Secondary prevention of diabetic nephropathies through other measures—strict blood pressure control (10), use of angiotensin-converting enzyme (ACE) inhibition in both incipient and overt diabetic nephropathies (11,12), normalization of hyperlipidemia (13), and the recent findings of angiotensin II receptor antagonists in renoprotective effects in type 2 diabetes (14-16) were all useful in reducing the progression to nephropathy or renal failure.

3. Prevention of cardiovascular complications in DM patients on RRT—Parfrey (17) showed that DM is an independent risk factor of symptomatic de novo ischemic heart disease in dialysis patients, with an adjusted relative risk of 3.97. Dialysis patients with DM have an increased cardiovascular mortality as well as overall mortality than those without. The excessive cardiac morbidity and mortality of diabetic patients on dialysis therapy seem to be mediated via ischemic disease, rather than progression of cardiomyopathy (18). There is a whole list of risk factors for cardiovascular disease in dialysis (17,18), which includes genetics-like presence of the ACE D allele (19), inflammation, and malnutrition (20). Several strategies in treating and preventing cardiovascular diseases in RRT patients with DM encompass blood pressure control, lipid control, judicious use of aspirin, cessation of smoking, moderate level of physical activity for 30 minutes per day in most days of the week, as well as management of left ventricular hypertrophy and hypoalbuminemia (17-20).

The usefulness of laboratory research in preventing progression to renal failure cannot be emphasized more. One aspect may be the use of 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase inhibitor, as shown in this issue's original article by He et al (21). They
showed the presence of the antiproliferative property of NK-104, a new synthetic HMG-CoA reductase inhibitor, on the mesangial cells (21). This suggests that some HMG-CoA reductase inhibitor can suppress mesangial cell proliferation and prevent subsequent development of matrix expansion in progressive glomerular diseases in vivo. It is through these research findings that we have more data on the beneficial effects of drugs on preventing progression of nephropathies, some of which maybe applicable to diabetic patients.

Of course, primary prevention in the society is equally important in reducing the incidence of DM. These include weight reduction and exercise, which require more on health education and the change of lifestyles. In many cases, diet and exercise have controlled blood glucose levels to the normal range, reversed the course of the disease, and reduced the risk for accelerated vascular disease (22).

Prevention is always more important than treatment, and we, as nephrologists, should advocate with action the significance of early detection and treatment of complications of DM, making use of the evidence and strategies stated above. As yet, there are trends that diabetes-related complications are on the rise, with US being an example, despite the fact that doctors are aware of the potential of prevention. It is either the physicians or nephrologists not following strategies strictly, or the patients not doing what they are advised or treated. Thus, all the more important is the stress of compliance in patients in ensuring our targets being reached—the targets of glycemic control, blood pressure control, lipid control, diet control, and lifestyle changes. All these time and efforts that we spend will pay out when there will be less DM patients in the society, and less DM patients suffering from the complications either before or even after they have renal failure. Still a long way to go if we do not put effort into more action now! (Hong Kong J Nephrol 2001;3(2):48-50)