About Benefits and Costs

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Prevention of End-Stage Renal Disease

In clinical practice, the term end-stage renal disease (ESRD) is applied to patients with advanced renal failure which, if untreated, will lead to uremia and death. Treatment of ESRD imposes a serious economic hardship on affected individuals and on their families and society. During 1990, the cost of ESRD care in the United States was more than $7 billion. African-Americans, Hispanics, Native Americans, and individuals with lower socioeconomic status bear a disproportionate burden of illness due to ESRD.

Incidence and prevalence rates of ESRD treatment have increased relentlessly for as long as U.S. national statistics have been collected on this topic. During the period between 1985-87 and 1988-90, the age-, race-, and gender-adjusted incidence rate of ESRD treatment increased by 7.8% per year. By 1990 the number of patients treated for ESRD had risen to approximately 210,000 annually, and current projections suggest that the number may be close to 300,000 by the year 2000. The increase reflects improved access to care, but the rates have been increasing even for those who are least likely to have had problems with access to care.

Treatment of established end-stage renal disease by chronic dialysis and renal transplantation is an imperfect response associated with markedly increased premature mortality, social disruption, unemployment, an unsatisfactory quality of life, and a substantial economic burden for the individual and for society. Treatment of established disease must be complemented by equally vigorous attempts to treat and prevent risk factors.

Numerous studies in animal models and in humans have documented the central role of high blood pressure as a cause of ESRD. Every year, nearly 2 million Americans develop hypertension. About 1 in 10 go on to develop mild renal insufficiency due to high blood pressure, and approximately 1 in 40 of these, or about 1 in every 400 new hypertensives, go on to develop hypertension-related ESRD. The risk of progressing from hypertension to hypertension-related ESRD is about 10 times higher in African-Americans than in others and more than 12 times higher in those aged 60 to 69 years than in those aged 30 to 49 years. The risk is also greater for those with the highest levels of blood pressure. Because of its greater frequency, however, almost three quarters of all hypertension-related ESRD occurs in those with mild hypertension.

An increasing body of evidence from experimental studies documents the value of hypertension treatment in preventing the development of end-stage renal disease. Ongoing clinical trials are exploring the comparative value of different forms of antihypertensive drug therapy and optimal goals for reduction of blood pressure during antihypertensive treatment. In addition to treatment with medications, high blood pressure can be prevented by weight control, a reduced intake of salt, moderation in alcohol consumption, and increased physical activity.

Diabetes mellitus is also well established as an important risk factor for renal insufficiency and may account for up to one third of all cases of end-stage renal disease in the United States. The risk of ESRD is much greater for those with Type I or insulin-dependent diabetes than for those with Type II. Given the greater prevalence of Type II diabetes, however, it accounts for about two thirds of all cases of diabetic ESRD. Typically, diabetic renal failure is preceded by a long prodrome of proteinuria and a shorter period of progressive hypercreatinemia. As opposed to the mild proteinuria that often accompanies hypertensive renal disease, the proteinuria in diabetic renal disease is often quite heavy. Recent evidence from the NIDDK-supported Diabetes Control and Complications Trial suggests that strict control of blood sugar levels in Type I diabetes halves the subsequent incidence of renal insufficiency. NIDDK is currently supporting a larger multicenter treatment trial in Type II diabetes and a multicenter primary prevention of diabetes trial. The results of these studies should help to strengthen the basis for prevention of diabetic renal disease.

Although high blood pressure and diabetes mellitus are the major modifiable risk factors for ESRD, evidence supports the etiologic role of a variety of other factors. These include genetic markers, analgesic agents, prescription medications including antibiotics, heavy metals, street drugs, cigarettes, hyperlipidemia, and hantavirus infections. Some of these exposures may also play a role in explaining the excess of ESRD in underprivileged members of society and in explaining why some hypertensives progress to blood pressure-related ESRD while the majority do not. In combination with high blood pressure and diabetes, these factors may account for most of the ESRD in our society. Further efforts to clarify the causes of ESRD and to prevent its occurrence should be a high priority for the renal disease research community.

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