

Better kidney health for Europe

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The epidemic of chronic kidney disease (CKD) with ultimate terminal kidney disease requiring renal replacement therapy is spreading at an alarming pace all over the world. Thus, up to 12% of the general population in Europe and in the US show signs of decreasing kidney function. At the same time the number of diabetes of the adult onset type is increasing alarmingly. Not surprisingly there is a direct link between these two diseases: up to 20-40% of all diabetics will eventually develop CKD which can be at least partially prevented by decreasing the known risk factors including hypertension, high cholesterol values, smoking and little physical activity. Already with the current number of diabetics, healthcare systems are dedicating 10-15% of all resources to diabetes and its complications, the costliest of which is CKD. Moreover, while CKD due to other causes tends to be a disease of the later years of life, the diabetes problem will increasingly bring the mean age of CKD down to active working years.

Recent multinational studies have emphasized an additional dimension of kidney health: the vastly increased mortality by cardiovascular events with even moderately decreased kidney function as measured by proteinuria and increasing serum creatinine levels. Out of these patients almost two thirds will die from cardiovascular complications before they are qualified for renal replacement therapy (hemodialysis, peritoneal dialysis, and transplantation). The link between diabetes, early kidney dysfunction and highly increased risk of cardiovascular complications has been exhaustively shown.

Proteinuria is the first sign of kidney dysfunction and, when persisting, will lead to further decrease. Large multicenter studies have convincingly shown that in diabetics as well as other patient groups, microalbuminuria is the best predictor of the increased cardiovascular risk. While existing and emerging therapies can be used to protect the kidney in diabetes, there is still incomplete understanding of disease mechanisms which lead to perturbation of the glomerular filtration barrier, and of the physiological properties of

glomerular cells themselves. Furthermore, we still do not fully understand the effects of excess protein presentation on tubular processing and the avalanche of worsening CKD.

Interestingly, the urine usually provides a rich, non-invasive window not only to diagnose the already existing and progressing kidney damage, but in future should also provide a window for predictive diagnostics and, particularly, the only easy access to monitor endothelial dysfunction and cardiovascular risk. At present, possibilities for early detection of kidney damage are not being used; wider mass screenings should lead to earlier detection and treatments thus greatly decreasing the total disease management costs. It is to be expected that new diagnostics will also identify those patients who will best benefit from the existing treatment options.

Presently there are an estimated 2 million people living on renal replacement therapies (RRT). However, this number is merely the tip of the iceberg, as an estimated more than 90% of the world population in need of RRT will never be able to achieve it. Together with the 8% annual rise in the number of diabetics and as a consequence millions of premature deaths, it is clear that the dimensions of the CKD problem will vastly exceed all treatment options all over the world. To heighten the awareness of the CKD epidemic, March 9 was nominated World Kidney Day, an important occasion to focus worldwide attention on kidney diseases and what they mean at the community level.

Clearly, the research communities extending from basic research in nephrology to vascular biology and diabetology should make a common effort to better understand the basic mechanisms involved in kidney failure and its connections to diabetes and increased cardiovascular risks. Only a better understanding of these mechanisms will allow rational approaches for translational and clinical medicine. However, the research community cannot work on this vast task alone but needs to alert the wider public and specific stakeholders including key European and international organi-

zations, industry and patient organizations to get the widest support possible. This has been initiated and is coordinated at the level of the European Renal Association-European Dialysis Transplant Association (ERA-EDTA), the International Society of Nephrology (ISN), and the European research community (details of the European Kidney Alliance activities can be found at www.technomedicum.fi; EKA).

In 2010, the US National Health Service is projected to spend more than 35 billion dollars for people on dialysis and the numbers are proportional in Europe and elsewhere in the world. To fight for this scenario we still have to learn more about the etiology and pathogenetic mechanisms involved, starting from the maintenance of the patency of the glomerular filtration barrier and the consequent sequence of events leading to worsening damage and CKD. Thus, strategies in basic research binding together advances e.g. in molecular, genetic, immunologic and proteomic analyses will be needed to achieve better predictive diagnostics and targeted therapies for the future.

These efforts call for expanding collaboration and joining forces with neighbouring disciplines including vascular biology and diabetes research and their existing methods, databases, resources. At the same time new programs for large scale screening and prevention should be launched in the general population and actuating plans to slow down progression of already diagnosed kidney disease.

It is time to join forces and act.

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