
Laudatio:
Professor Carl Magnus F. T:son
Kjellstrand

Professor Carl Magnus F. T:son Kjellstrand was the recipient of this year's Special Award for Lifetime Achievements in Hemodialysis. It was presented during the General Session of the 20th Annual Conference on Dialysis in San Francisco, California, February 27, 2000. After presentation of the award, Professor Kjellstrand gave the keynote address (Fig. 1) of the Conference, "Unphysiology of Intermittent Dialysis: Hemodialysis and Peritoneal Dialysis."

Dr. Kjellstrand (Figs. 2 and 3) was born in Svenljunga, Sweden, in 1936. He studied at the University of Lund Medical School in Lund, Sweden, from 1954 to 1962, received a Bachelor of Science degree in 1956, and his MD degree in 1962. On the basis of the thesis, "Ethical Problems of High Technology Medicine," he received a PhD degree from the Karolinska Institute, Stockholm, Sweden, in 1988. He completed residency at the University of Lund, Sweden, in 1962, then moved to the Bethesda Lutheran Hospital, St. Paul, Minnesota, for one more year of training and accepted the

position of Director of the Artificial Kidney Unit from 1963 to 1964. He returned to Lund and became an attending physician in the Department of Nephrology at the University of Lund from 1965 to 1968. He moved to the University of Minnesota to serve as the Director of Dialysis from 1968 to 1981, and as the Chief, Division of Nephrology, from 1976 to 1980. In 1981 Dr. Kjellstrand moved to the Hennepin County Medical Center as a Senior Staff Physician, then again returned to Sweden, this time to the Karolinska Hospital in Stockholm to accept the position of Chief of the Division of Nephrology



FIGURE 1 Dr. Kjellstrand gives the keynote address, "Unphysiology of Intermittent Dialysis: Hemodialysis and Peritoneal Dialysis," at the 20th Annual Conference on Peritoneal Dialysis.



FIGURE 2 Carl as an angelic child.



FIGURE 3 Carl as a schoolboy.

in 1987. At the end of the 1980s he moved again to the Metropolitan Medical Center in Minneapolis and worked as a Senior Staff Physician from 1989 to 1990.

His Canadian connection started in 1990 at the University Hospital in Edmonton, Alberta, where he worked as a staff physician in the Departments of Nephrology and Bioethics. In 1997 he accepted the position of the Vice President for Medical Affairs, AKSYS, Ltd., Lincolnshire, Illinois, U.S.A.

Dr. Kjellstrand started his academic career very early. As a medical student, he worked in the capacity of Research Assistant in the Department of Histology, University of Lund, from 1955 to 1959, then as a Research Assistant, Department of Nephrology, from 1959. His first academic appointments after residency were at the University of Minnesota, starting with Research Fellow in 1963 and ending as Full Professor from 1974 to 1990. In 1988 he served as a Docent in Internal Medicine at the Karolinska Institute in Stockholm. From 1990 to 1997, he held several academic appointments in Medicine, Bioethics, and Epidemiology at the University of Alberta, Edmonton, Alberta, Canada; Wake Forrest University, Winston-Salem, North Carolina; and University of Washington, Seattle, Washington, U.S.A. Since 1997 he has held academic appointments in Medicine at the University of Alberta, the State University of New York, Brooklyn, New York, and Loyola University in Chicago, Illinois, U.S.A.

Dr. Kjellstrand has always been an excellent teacher. He has received numerous awards for teaching excellence starting with recognition of his Division as the best Division at the University of Minnesota in 1977 and 1978, and him personally as a best teacher in 1978. The American Society for Artificial Internal Organs honored him for his paper, "Zirconium Phosphate," in 1981. The Central Society for Clinical Research awarded him the E. Lilly Prize for a presentation in 1986. Also, the University of Alberta regarded him as the Superior Teacher in 1992, and the University of Lund as the First Opponent in 1987 and 1995.

The bibliography of Dr. Kjellstrand is impressive: as of the time of this writing he has published 478 articles, 218 in peer-reviewed journals. In addition to articles, he has submitted 325 abstracts, 220 of which have been selected for presentations. Carl is a member of 31 societies, has held 40 positions of office, including President of 3 societies. He has edited 16 symposia, has been a member of 30 editorial boards, a reviewer of 34 journals, and a member of 54 committees.

Why did Dr. Kjellstrand choose nephrology for his career? He could have excelled in any field of medicine. Everything started in his "Lucky Year 1957." Carl met To Kerstin E.M. Clifford, his wife-to-be (Fig. 4). Her parents were neighbors of Prof. Nils Alwall so Carl met him socially. Alwall had made significant improvements to Kolff's rotating drum dialyzer. The cellophane tubing was still wound around the mesh cylinder, but a second, outer cylinder was added, restricting expansion of the tubing when internal pressure increased; thus



FIGURE 4 Carl with his future wife, To Kerstin, in the "Lucky Year 1957."



FIGURE 5 An Alwall dialyzer/ultrafilter. Cellophane tubing was wound around the mesh cylinder and a second, outer cylinder was added, restricting expansion of the tubing when internal pressure increased. Hydrostatic ultrafiltration became possible with restriction of tubing expansion. After both cylinders were assembled, they were inserted into the tank.

hydrostatic ultrafiltration became possible (Fig. 5). Dr. Kjellstrand was attracted to the treatment of renal failure with a dialyzer/ultrafilter. Professor Alwall created and became the head of the Department of Nephrology, which was Carl's first clinical rotation. The first, very ill, septic patient with acute renal failure whom Carl followed, recovered after 2 weeks of hemodialysis. Carl was so impressed that he wrote an obligatory medical case report on this patient and accepted a research assistant position. Shortly thereafter, Carl observed the use of hemodialysis in chronic renal failure. A

young man (an old high school friend of Carl's) with uremia from rapidly progressive glomerulonephritis was admitted for dialysis in Lund. He was kept alive on an artificial kidney for 180 days, the longest case ever at that time. Three years later, Carl was in Seattle training in clinical dialysis and met Robin Eady, a young physician from London with the same disease. Robin is alive today after some 25 years of dialysis and 10 of transplantation. The results with chronic dialysis were so spectacular that Carl was completely sold on dialysis nephrology. In 1963, in a book edited by Nils Alwall, Dr. Kjellstrand wrote nine chapters, with Dr. Alwall as a coauthor, reviewing the results of treatment of acute and chronic renal failure with an artificial kidney over the period from 1946 – 1961.

In a short *Laudatio* it is impossible to present all the scientific achievements of Dr. Kjellstrand. Here are a selected few: Dr. Kjellstrand was one of the first to use streptokinase to open clotted Quinton–Scribner arteriovenous shunts [1]. With Drs. T.J. Buselmeier, R.L. Simmons, J.S. Najarian, and others, he worked on arteriovenous shunts for hemodialysis in adults and children [2–4]. With Dr. K. Crossley, he was one of the first to use intraperitoneal insulin in peritoneal dialysis patients [5]. In the late 1960s and early 1970s, Dr. Kjellstrand was involved in kidney and pancreatic transplantation. Working with Drs. Simmons and Najarian, he coauthored over a dozen papers related to various aspects of transplantation. In one of the publications, a similarity of allograft rejection to renal artery stenosis was emphasized [6].

In the early 1970s in most dialysis centers, including that at the University of Minnesota, dialysis frequency was established at two or three per week. At that time, when high performance dialyzers were developed, it became fashionable to shorten dialysis duration and increase efficiency. Dr. Kjellstrand was one of the first to notice side effects of short efficient dialysis. Several papers published in the mid-1970s addressed this problem and introduced the concept of dialysis “unphysiology” [7–10].

The trend of short efficient dialysis continued, particularly in the United States, into the 1980s. At the same time, it was noted that mortality and morbidity were high in U.S. patients. After a thorough review of dialysis practices over the world, Dr. Kjellstrand concluded that one reason for high morbidity and mortality was short dialysis duration [11].

In the late 1980s, Dr. Kjellstrand moved to Stockholm, Sweden, to take the position of Chief of the Division of Nephrology at the Karolinska Hospital. At the same time, his interest widened to include ethical problems of dialysis programs. It was at that time that he wrote the thesis, “Ethical Problems of High Technology Medicine,” and received a PhD degree from the Karolinska Institute. Bio-ethical problems continued to be his main interest from 1990 to 1997, when he served as a staff physician in the Division of Nephrology and Bioethics in the Department of Medicine at the University Hospital in Edmonton, Alberta, Canada.

Quality of treatment was always Dr. Kjellstrand's highest priority. In 1990 he published a paper on various factors responsible for mortality on dialysis; late start was one of them [12]. Considering that “unphysiology of dialysis” is the major cause of poor results of hemodialysis, he accepted a position of Vice President of Medical Affairs, AKSYS, Ltd, Lincolnshire, Illinois, in 1997. This company is involved in the construction of a machine for daily (frequent) hemodialysis (Figs. 6 and 7). Dr. Kjellstrand is currently directing a study testing the machine on more than 20 patients.

Considering his vast expertise and teaching ability, it is not surprising that he is one of the most sought after speakers, with over 160 invited speaking engagements and over 90 lectures as Visiting Professor. Multiple honors granted to Dr. Kjellstrand illustrate the esteem he enjoys in the nephrology community throughout the world. To mention only a few, he is an honorary member of the Peruvian Society of



FIGURE 6 Carl in his office at AKSYS, Ltd. Also seen is the personal hemodialysis system (PHD™) for daily (frequent) hemodialysis, with the shell partly removed.



FIGURE 7 Carl with a goat to be dialyzed on the PHD™.

Pediatrics; the Peruvian Society of Nephrology; the Venezuelan Society of Nephrology; an International Scholar in the International Information Institute, Tokyo, Japan; Silver Medallist of the Bologna University 900-Year Jubilee for Scientific Achievements; and Research Professor to Egypt, selected by the International Society of Nephrology at the University of Lund.

In addition to his extremely busy professional life, Carl is also a family man. Figure 8 shows him with his wife of 42 years, his daughter, son, daughter-in-law, and 2 grandchildren.

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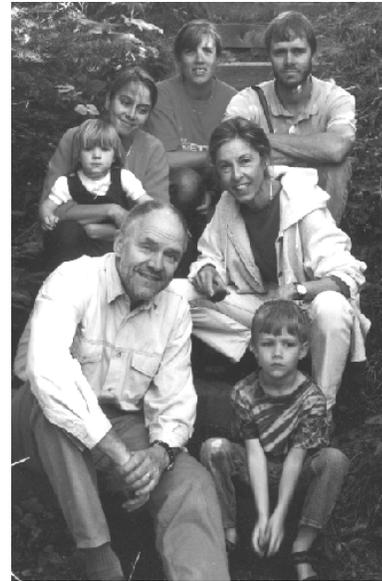


FIGURE 8 Carl with his wife of 42 years, his daughter, son, daughter-in-law, and 2 grandchildren.

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