

## **The Development of Renal Dialysis and Transplantation in Kingston: 1961 – 1995**

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I came to Kingston in 1961 after spending the preceding three years in a Nephrology unit in St. Louis, Missouri. At that time Nephrology did not exist as a specialty and dialysis was almost an experimental therapy. Because of my background, I was frequently asked to see patients with renal failure and I treated them with acute peritoneal dialysis when indicated. Haemodialysis was a very different proposition. Initially, I refused to have anything to do with it, on the grounds that it should be performed in a properly equipped centre by an experienced team which knew what it was doing, and advised that haemodialysis candidates should be transferred to Toronto.

However, I was unable to postpone doing haemodialysis for very long. Dr. Bingham, the professor of surgery, asked me to see a patient with multiple trauma who was in renal failure. Peritoneal dialysis was not possible because of extensive abdominal surgery and the patient was too sick to move. There was a Kolff Twin Coil kidney in the basement of the Hotel Dieu Hospital that had been bought by the Women's Aid two years earlier. Of course, no one had asked if there was anyone capable of operating it, and it had therefore lain in the basement gathering dust. Because of the patient's critical condition we had little time to waste. The chief resident in general surgery was assigned to assist me. He was a bright young man called Tony Daicar (subsequently a Professor of Obstetrics at Queens). We borrowed the KGH van and drove over to the Hotel Dieu where we found the kidney, covered with dust, and brought it back to KGH. I plugged it in, switched it on and it seemed to be in working order. The OR (*operating room*) staff cleaned it and we set it up in one of the operating rooms. I worked with the Pharmacy to get the chemicals for the dialysis bath weighed out in little paper bags so that, when properly mixed with warm tap water, they would approximate the composition of normal

## A Scrapbook of Memories – 1954 to 2004

blood. Next, I had to insert the access lines. Subsequently this became a surgical procedure but in the early days I used to do them myself. After about 8 hours of intensive preparation, we hooked the patient up to the machine but by this time he was moribund. His blood pressure fell rapidly and we had to stop the procedure. He died shortly thereafter. This event galvanised the hospital to establish a haemodialysis team and we drew up the necessary protocols and nursing procedures and about a month later we had our second case.

*The next case* was a young man of 21, who had rolled his car into a ditch, where he had lain for six hours. He was in severe shock by the time of admission to hospital and had sustained multiple orthopaedic and abdominal injuries. Not surprisingly, he developed acute renal failure. Because of the abdominal trauma, peritoneal dialysis was not an option, and we therefore instituted haemodialysis in a room of the old ICU. In those days we wore scrubs suits and white rubber boots. The latter were essential because the dialysis bath seemed to always overflow. Dr. Bruce, the Head of Urology, and I stayed with the patient throughout the full 6 hours of treatment, and subsequent to this Dr. Bruce decided that dialysis was obviously a medical, and not a urological procedure! After several more dialyses the patient recovered. From then on we did acute haemodialysis as needed but, as far as possible, we tried to use peritoneal dialysis which was a much simpler procedure. Because haemodialysis was done infrequently, it was difficult to develop a trained team, and it was not until we started a chronic programme, 4 years later, that acute dialysis ran smoothly.

### **THE BEGINNING OF CHRONIC DIALYSIS**

In 1961, Scribner showed that it was possible to keep patients with chronic renal failure alive by repeated haemodialysis and by the mid sixties the demand for chronic dialysis was mounting but the resources were not readily available. We started our program by default when Dr. Andrew Bruce removed the remaining kidney from a 45 year old man who had undergone a nephrectomy for cancer some years earlier. Dr. Bruce attempted a partial nephrectomy, but this was not feasible, and he persuaded me to call Dr. John Dosseter in Montreal, who was pioneering renal transplantation in Canada at that time, and ask him if he would consider the patient for renal transplantation. John

## A Scrapbook of Memories – 1954 to 2004

said that if we would maintain the patient on dialysis for 2 years, and there was no recurrence of the cancer, that he would accept him for transplantation. Ironically, just before the 2 years were completed, the cancer recurred and he died 6 months later. Very reluctantly, I agreed with Dr. Dosseter's proposal because we had no process or funding in place for chronic haemodialysis and my own career in Kingston was predicated on my role as a full-time MRC, Research Associate and not as a practising nephrologist.

We soon acquired more patients and needed another kidney machine. At this time we had a very bright and aggressive urology resident called Doug Ackman, with an engineering background, who was interested in dialysis. He designed a T-piece so that we could dialyse 2 patients on one machine at the same time, but that was still not enough. Then we heard that Belleville General Hospital had a machine in their basement that had been acquired in similar circumstances to the one from the Hotel Dieu and never used. They agreed to lend it to us on an indefinite loan and Doug Ackman, Paddy Waddell, our Dialysis Nurse, and I drove down to Belleville in Doug's van and picked up the Kidney, and thus we became a 2-station unit. Next, Doug and two other engineers, Fred Siemenson and Chris English and I decided to redesign the Kolff kidney

The prototype was produced for only \$500.00 and used a milk pail as the dialysis bath. This machine, which was called the Kingmed kidney, was produced and marketed by a small, local, engineering firm owned by Fred Siemenson. It was an excellent kidney for its time and was used in the Royal Victoria Hospital in Montreal, and an American hospital in Pennsylvania as well as in Kingston, but it was unable to compete with the large American manufacturers particularly, Baxter Travenol, who produced a comparable but inferior product.

Dr. Ackman also persuaded us that the patient should be separated from the noise, heat and smell of the dialysis machinery and we asked the hospital administration to drill a hole in the wall between two adjacent rooms to permit this. Even in those days such requests moved very slowly, so one night Dr. Ackman, with my unofficial approval, took a hammer and chisel and cut the hole in the wall himself. This became our first chronic dialysis unit.

## **THE SELECTION PROCESS**

In the early days of chronic dialysis, the criteria for acceptance on a programme were:

Age between 15 and 45.

No other disease.

Capability of being restored to "normal functioning".

Willingness and ability to comply with the restrictions of the program.

These criteria, which were generally employed at that time, raised many very difficult ethical decisions and to help deal with them I asked for a selection committee. This consisted of an internist Dr. Larry Wilson, a psychiatrist, Dr. Simon Ramesar, and a member of the Hospital Board, Mr. Justice Alan Campbell. Each patient who was considered for chronic dialysis had an intensive social service evaluation performed by Miss Betty Grey, head of the Social Service Department. A psychiatric evaluation was performed, initially by Dr. Paul Hoaken and later on by Dr. David Surridge, and a medical report was prepared by me. The committee reviewed the data and advised me on what it considered to be a reasonable and defensible course of action in each case. It continued operating until the mid seventies by which time the greater availability of dialysis and the evolution of more liberal selection criteria rendered it obsolete. Since those early days chronic haemodialysis has grown exponentially and has expanded into self-care and satellite units that have proved highly successful.

## **CHRONIC PERITONEAL DIALYSIS**

Peritoneal dialysis was performed initially with intermittent catheterization of the peritoneal cavity and then, in 1968, Tenckhoff introduced a permanent catheter which could be left in place almost indefinitely and permitted ongoing treatment. Continuous ambulatory peritoneal dialysis (CAPD) was developed in 1977, and we started our first patient on this modality in 1978.

In 1990 Dr. Ross Morton took over the Peritoneal Dialysis

## A Scrapbook of Memories – 1954 to 2004

Program and we obtained permission from the Government to develop a pilot project for assisted home treatment. Community nurses were trained to connect patients to a peritoneal dialysis machine at night and take them off in the morning. This enabled patients to stay in their own homes and avoid going to a nursing home. This programme was very successful and grew from 18 patients initially to 84 one year later. This was a pioneering program in Canada and we can be justly proud of it and the peritoneal nursing team that made it possible.

### **TRANSPLANTATION**

Since the first successful cadaveric transplant in 1959 it was widely recognised that a perfect renal transplant would be a much better way of dealing with renal failure than chronic dialysis. I had taken the position that a small centre like Kingston should not undertake transplantation until the procedure had moved from being experimental, to something that could be done in any hospital that had skilled urological and vascular surgeons and dialysis backup. This was the situation by 1968. I enrolled the support of Dr. Jim McCorrison, the Chief of Surgery, who headed up a large committee to plan the process and on November 28th we performed our first transplant. The kidney came from a motor vehicle accident victim, under the care of Dr. Robert Elgie who informed me that the patient was a potential donor.

The recipient was a young woman who had renal failure caused by membranous glomerulonephritis. The vascular anastomosis was performed by Dr. Ed Charette, and Dr. Bruce implanted the ureter into the bladder. I still remember the excitement when the vascular clamps were removed and the white kidney became blue, and then pink, and shortly thereafter, urine started dripping out the free end of the unattached ureter. Fortunately, the kidney functioned immediately and the patient was well enough to be discharged just before Christmas. Since then Kingston has had a small but successful transplant programme which achieves comparable results to much larger centres.

### **CONCLUSION**

Before concluding I must mention the wonderful people who were involved with these programmes over the years. Dr. Moussa

## A Scrapbook of Memories – 1954 to 2004

Cohanim joined me in 1968 and was a tower of strength. Dr. Michael Singer was recruited in 1971 after a brilliant academic career and subsequently Drs. Kiberd, Toffelmire, Morton and Holland became part of the team, each bringing special strengths to the group. Every one of these physicians made enormous contributions but we could not have developed a premier programme without the superb nursing and ancillary staff that we were fortunate to recruit. Helen Paprica, Paddy Waddell, Viginia Masterson, Shirley Boag, Jan Mann and Marg Polk were extraordinary head nurses and developed and maintained the most highly trained staff of dialysis nurses in the country. Karin Irvin Bird was our nurse clinician since 1976 and her contributions to the whole program were enormous. May Graham, Wendy Blaney and Sue Wood as head nurses on Connell 9 South played major roles in the early days of the peritoneal dialysis programme. Ian Kennedy, Ludwig Nowakowski, Pat Borden and Perry Bonin provided the technical support to keep the machinery running, and there were many others, too numerous to mention, to whom I will always be indebted.