

01

THE HISTORY OF DIALYSIS

Module 1: Basic Concepts



LESSON OBJECTIVES

Flow of Discussion

- Discuss the origins of Medicare coverage for ESRD
- Review the progression of dialysis since its inception

1942

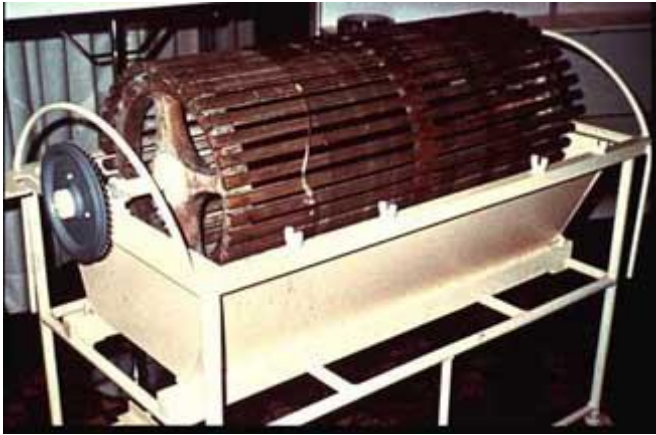
- Prior to 1942, individuals diagnosed with renal failure had no method of treatment.
- Dr. Willem Kolff invented the first working dialysis machine. The first dialysis machine had a rotating drum, with wooden slats. The wooden slats were covered by a semipermeable membrane and rotated down into the fluid-filled tank of dialysate.
- The patient's blood ran through the inside of the semipermeable membrane. However, to “prime” the membrane, an entire blood transfusion could be required prior to each treatment

1960's Dialyzer Advances

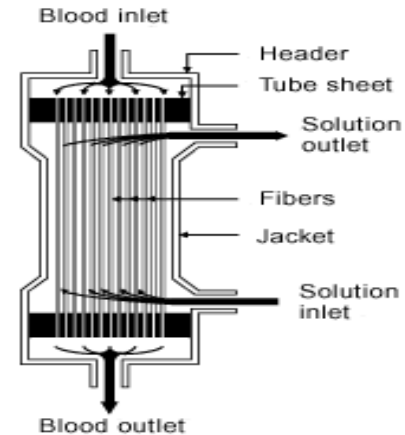
- **Kiil dialyzer** - The Kiil dialyzer was used in the early 1960's. It was a large flat plate dialyzer surrounded by cellophane. After each treatment, the dialyzer was taken apart, cleaned and the cellophane replaced. Treatments could take over 12 hrs to complete.
- **Coil dialyzer** - Was the first mass produced dialyzer. Coil dialyzers was sterile and disposable. A semipermeable membrane was wrapped around a core. It required a large amount of blood to prime
- **Flat plate dialyzers** - Consisted of multiple layers of membranes, blood flowed between the layers and dialysate flowed outside of the semipermeable membrane.
- **Hollow fiber dialyzers** - Hollow fiber dialyzers – These dialyzers consist of many small, hollow tubes which blood flows through. External to the small hollow-semi permeable membranes, dialysate flows on the outside, allowing for diffusion and osmosis

Changes in Dialyzers

Dr. Kolff's first dialysis "machine"



A Dialyzer Filter Today



1960: Access to the Bloodstream

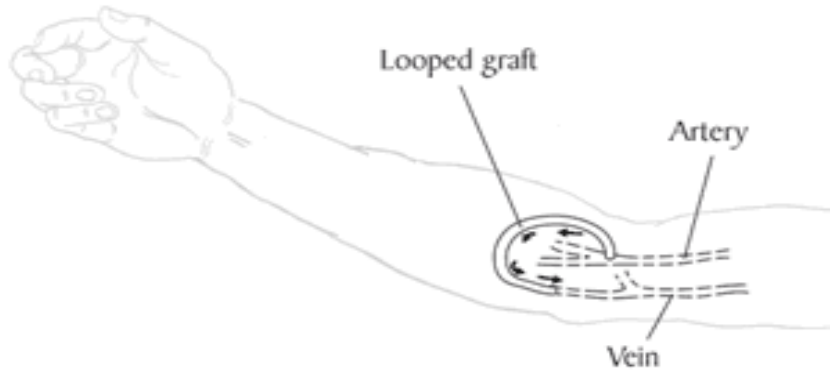
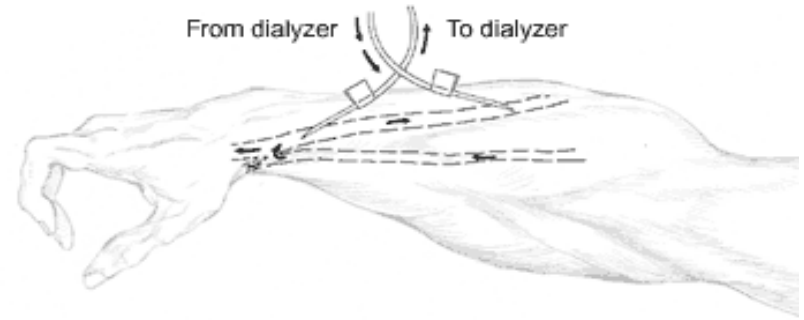
- As is still true today, access to the patient's bloodstream was required.
- A “shunt” was developed by Drs. Belding Scribner and Wayne Quinton in 1960.

One piece of the plastic tubing would be connected internally within an artery, and the other end connected internally within a vein. For easy access to the bloodstream, an external “loop” held an area that could be disconnected for easy access for dialysis. Disconnections could occur, and were an important safety concern with this type of access.

1960: Access to the Bloodstream

- By the late 1960's, Drs. Cimino and Brescia had created the first arterio-venous (AV) fistulas.
- This requires a surgical procedure to connect a artery and a vein together.
- These are created surgically under the skin, and accessed by a needle for dialysis treatments. There was a decreased rate of infection noted and also less issues with clotting.
- Even today, the AV fistula is the preferred vascular access for hemodialysis procedures. An AV fistula requires time to develop and strengthen the walls of the vein for cannulation.

Graft and Fistula Today



1960: The Beginning

- In Seattle, Washington, the first treatment for chronic renal failure began.
- At this time, treatment was expensive. Only patients that could afford it or whose private insurance would cover it, could receive dialysis services.
- There were minimal amounts of equipment and more patients requiring the procedure.

Determining Who Receives Treatment

- Committees were selected to “choose” who would receive dialysis and who would not...
- Shadowed members of the “life or death” panel
- Patient performs dialysis In front of congress



1972: A Banner Year

- Congress passed the law that provided ESRD patients with Medicare benefits.
- Medicare End-Stage Renal Disease (ESRD) Program in 1972.
- Estimates of the costs for the program, and the number of individuals that would require the benefit varied to a wide extent.
- Still the only chronic disease program funded

Renal Networks

- In 1978, Renal Networks were developed to oversee the quality of dialysis services provided in each region covered by Medicare services.
- There are 18 Renal Networks in the United States.
- Once the diagnosis of “ESRD” is established, a submission to the local network, establishes the patient for dialysis “coverage.”

Medicare

- Medicare pays 80% of the cost of dialysis services. With private insurance, Medicaid or other state programs providing the other 20%.
- If the patient has commercial insurance coverage, it provides coverage for dialysis through the first 30 months.
- Dialysis services are covered after the first 90 days of treatment for all individuals reported as having ESRD.

Medicare

- Forms are completed and sent to the Renal Network that covers that region.
- These are known as “2728” forms.
- The Networks also collect quality improvement data and report data and other required elements to CMS.

Progression of Nursing

- While initially, the physician performed much of the work of dialysis:
 - ❑ Setting up the coil
 - ❑ Performing the “cut down” to gain vascular access
 - ❑ Weighing the chemicals for the dialysate
 - ❑ Changing the dialysate every two hours...
- It became clear that the nursing role in nephrology would expand when the number of patients grew.

Progression of Nursing

- Physicians relinquished their direct provider role
 - Nurses went from assisting the physician to being the provider
- Patients then began performing their dialysis at home
 - Nurses became educators and supporters
- The role of the technician evolves to provide further direct care to the patient

Technician Role

- Training for the role of technician often depended upon the facility where the individual was hired.
- To provide support for the role, CMS in 2008 began requiring that all technicians become certified.
- Re-certification requires continuing education in the field of dialysis for the technician.

Technician Role

- The new ESRD Conditions for Coverage require that dialysis patient care technicians (PCTs) who have been employed since October 14, 2008, must be certified by either a State or a National PCT certification program by April 15, 2010.
- PCTs hired after October 14, 2008 must be certified within 18 months of their date of hire.

Technology

- Improvements to Care Continue
 - Hemodialysis
 - Access –Fistula First
 - Dialysis machines –Touch screen
 - Dialyzer filters –Increased biocompatibility
 - Peritoneal dialysis
 - New techniques – Decrease peritonitis rates
 - Transplant –Donor groups
 - Medications