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17/MHS01/178

MEDICINE AND SURGERY

PHS 303 - RENAL PHYSIOLOGY, BODY FLUIDS AND TEMPERATURE REGULATION.

1.) Discuss the pathophysiological process involves in renal failure:

It is estimated that kidney disease affects 31 million people in the United States alone, and globally 1 in 10 people have some form of kidney disease. Also called renal disease, kidney disease is the general term for damage that reduces function of the kidney. Chronic kidney disease (CKD) occurs when kidneys are no longer able to clean toxins and waste product from the blood and perform their functions to full capacity. This can happen all of a sudden or over time.1 Chronic kidney disease (CKD) has five distinct stages.

Every day, our two kidneys filter about 120 to 150 quarts of blood to produce about 1 to 2 quarts of urine, composed of wastes and extra fluid.2 Healthy kidneys help regulate blood pressure, remove waste and water, signal your body to make red blood cells, and help regulate growth in children.

In addition to the different phases of chronic kidney disease, or CKD (listed below), there are different types of kidney disease, with different causes and requiring different treatments. NKI and this website provide detailed information about the diseases that cause.

Five Stages of Kidney

The (NKF) created a guideline to help doctors identify each level of kidney disease. The NKF divided kidney disease (CKD) into five stages. Identifying the stage of kidney disease a person is in helps health care practitioners provide the best care, since each stage requires different treatment.

To understand each stage, we must first understand how kidney function is measured. The universally accepted measure of kidney function is Glomerular Filtrate Regulation (GFR). Kidney function is measured by how effectively your kidneys clean your blood. The main way of estimating GFR is a blood test to determine the level of Creatinine in the blood, or serum creatinine. As kidney function declines, the levels of creatinine increase.

An equation is used to determine GFR. In addition to serum creatinine, factors such as age, race,

and gender are included in the equation. Additional factors that may be included are weight and blood urea, serum albumin.

5 Stages of Kidney Disease		
	Kidney Function/GFR	Description
Stage 1	> 90%	Normal or High Function
Stage 2	60-89%	Mildly Decreased Function
Stage 3	30-59%	Mild to Moderately Decreased Function
Stage 4	15-29%	Severely Decreased Function
Stage 5	< 15%	Kidney Failure

The five stages of kidney disease, or CKD, and the GFR for each stage, is shown below:

Stage 1 with normal or high GFR (GFR > 90 mL/min)

Stage 2 Mild CKD (GFR = 60-89 mL/min)

Stage 3A Moderate CKD (GFR = 45-59 mL/min)

Stage 3B Moderate CKD (GFR = 30-44 mL/min

Stage 4 Severe CKD (GFR = 15-29 mL/min)

Stage 5 End Stage CKD (GFR <15 mL/min)

2.) With the aid of suitable diagrams discuss the types of dialysis you know

What is dialysis?

The kidneys filter your blood by removing waste and excess fluid from your body. This waste is

sent to the bladder to be eliminated when you urinate.

Dialysis performs the function of the kidneys if theyve failed. According to the National Kidney Foundation, end-stage kidney failure occurs when the kidneys are performing at only 10 to 15 percent of their normal function.

Dialysis is a treatment that filters and purifies the blood using a machine. This helps keep your fluids and electrolytes in balance when the kidneys cant do their job.

Dialysis has been used since the 1940s to treat people with kidney problems.

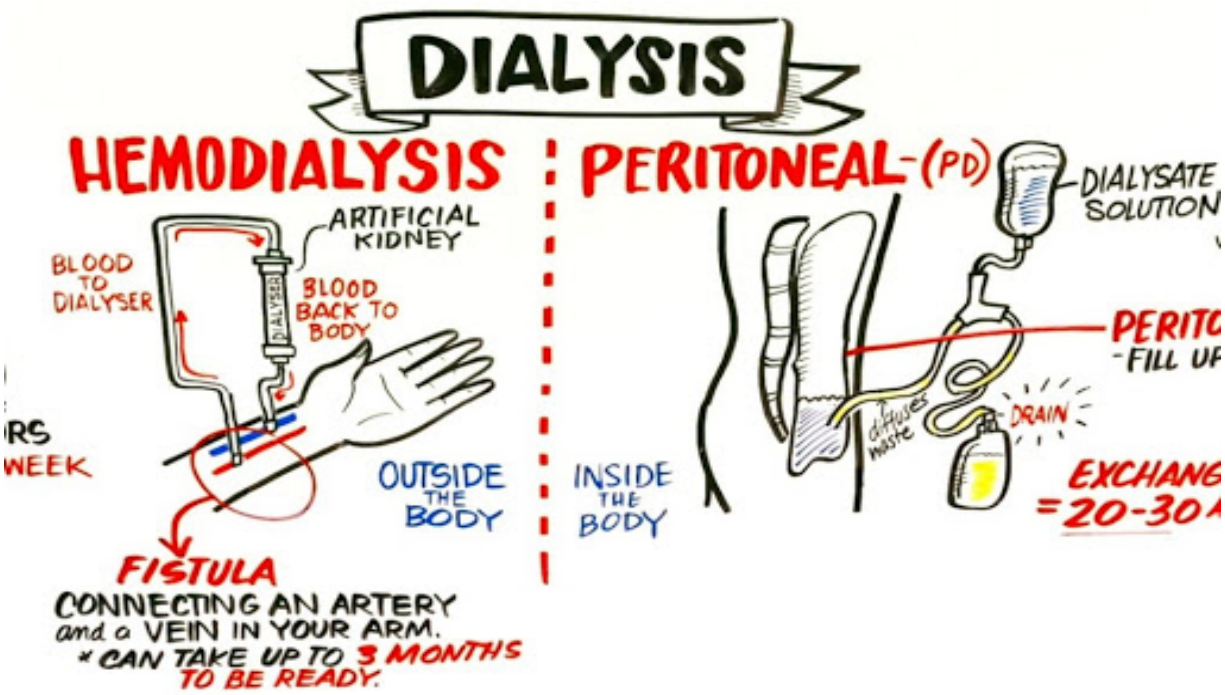
Why is dialysis used?

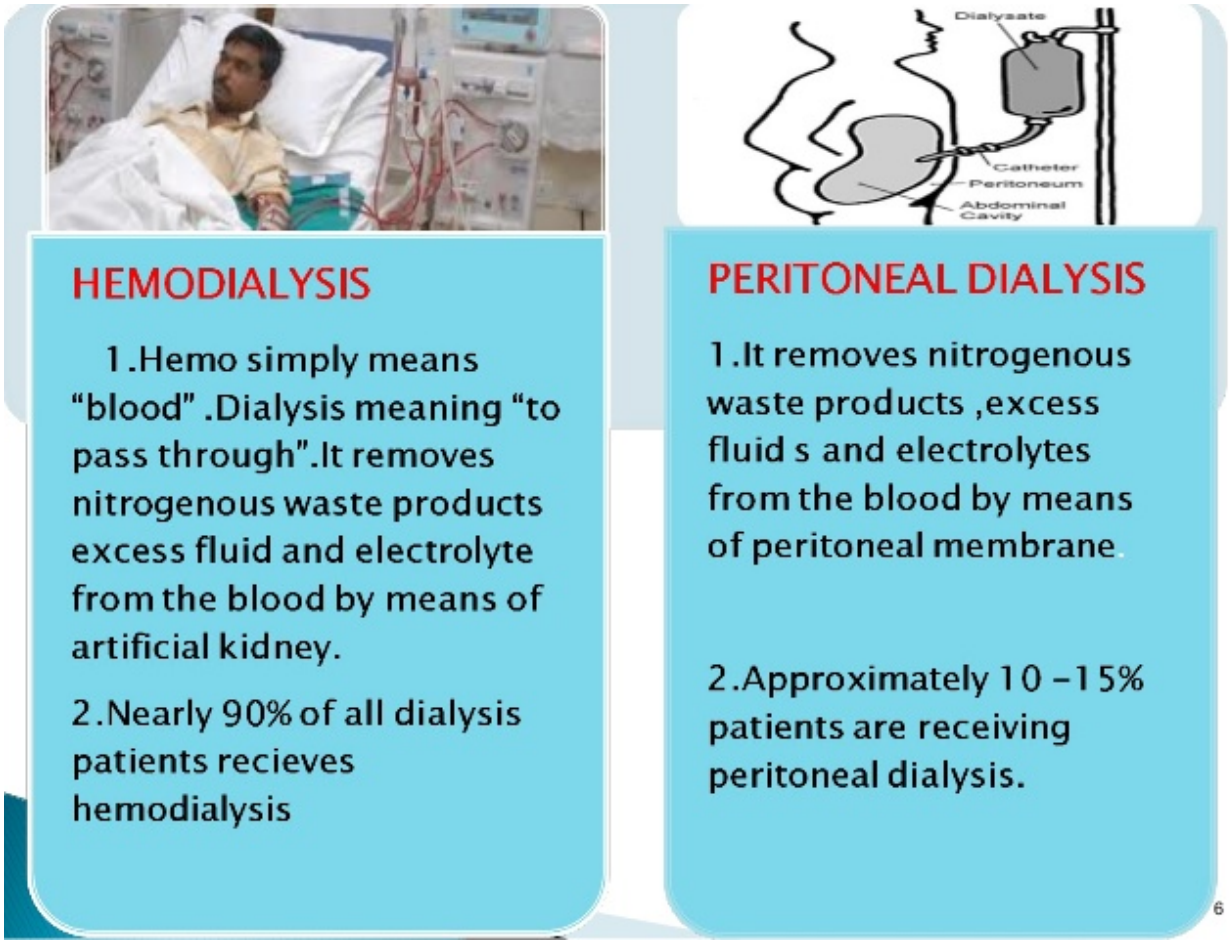
Properly functioning kidneys prevent extra water, waste, and other impurities from accumulating in your body. They also help control blood pressure and regulate the levels of chemical elements in the blood. These elements may include sodium and potassium. Your kidneys even activate a form of vitamin D that improves the absorption of calcium.

When your kidneys cant perform these functions due to disease or injury, dialysis can help keep the body running as normally as possible. Without dialysis, salts and other waste products will accumulate in the blood, poison the body, and damage other organs.

However, dialysis isnt a cure for kidney disease or other problems affecting the kidneys. Different treatments may be needed to address those concerns.

What are the different types of dialysis?





There are three different types of dialysis.

Hemodialysis

Hemodialysis is the most common type of dialysis. This process uses an artificial kidney (hemodialyzer) to remove waste and extra fluid from the blood. The blood is removed from the body and filtered through the artificial kidney. The filtered blood is then returned to the body with the help of a dialysis machine.

To get the blood to flow to the artificial kidney, your doctor will perform surgery to create an entrance point (vascular access) into your blood vessels. The three types of entrance points are:

Arteriovenous (AV) fistula. This type connects an artery and a vein. Its the preferred option.

AV graft. This type is a looped tube.

Vascular access catheter. This may be inserted into the large vein in your area of the neck.

Both the AV fistula and AV graft are designed for long-term dialysis treatments. People who receive AV fistulas are healed and ready to begin hemodialysis two to three months after their

surgery. People who receive AV grafts are ready in two to three weeks. Catheters are designed for short-term or temporary use.

Hemodialysis treatments usually last three to five hours and are performed three times per week. However, hemodialysis treatment can also be completed in shorter, more frequent sessions.

Most hemodialysis treatments are performed at a hospital, doctors office, or dialysis center. The length of treatment depends on your body size, the amount of waste in your body, and the current state of your health.

After youve been on hemodialysis for an extended period of time, your doctor may feel that youre ready to give yourself dialysis treatments at home. This option is more common for people who need long-term treatment. Hemodialysis risks include:

- low blood pressure
- anemia, or not having enough red blood cells
- muscle cramping
- difficulty sleeping
- itching
- high blood potassium levels
- pericarditis, an inflammation of the membrane around the heart
- sepsis
- bacteremia, or a bloodstream infection
- irregular heartbeat
- sudden cardiac death, the leading cause of death in people undergoing dialysis

Peritoneal dialysis

Peritoneal dialysis involves surgery to implant a peritoneal dialysis (PD) catheter into your abdomen. The catheter helps filter your blood through the peritoneum, a membrane in your abdomen. During treatment, a special fluid called dialysate flows into the peritoneum. The dialysate absorbs waste. Once the dialysate draws waste out of the bloodstream, its drained from your abdomen.

This process takes a few hours and needs to be repeated four to six times per day. However, the exchange of fluids can be performed while youre sleeping or awake.

There are numerous different types of peritoneal dialysis. The main ones are:

Continuous ambulatory peritoneal dialysis (CAPD). In CAPD, your abdomen is filled and drained multiple times each day. This method doesnt require a machine and must be performed while awake.

Continuous cycling peritoneal dialysis (CCPD). CCPD uses a machine to cycle the fluid in and out of your abdomen. Its usually done at night while you sleep.

Intermittent peritoneal dialysis (IPD). This treatment is usually performed in the hospital, though it may be performed at home. It uses the same machine as CCPD, but the process takes longer.

Continuous renal replacement therapy (CRRT)

This therapy is used primarily in the intensive care unit for people with acute kidney failure. Its also known as hemofiltration. A machine passes the blood through tubing. A filter then removes waste products and water. The blood is returned to the body, along with replacement fluid. This procedure is performed 12 to 24 hours a day, generally every day.

Are there any alternatives to dialysis?

Dialysis is time-consuming and expensive. Not everyone chooses it, particularly if theyre experiencing severe, acute kidney failure.

If you decide not to pursue dialysis, there are other treatment options that may help manage your symptoms. One of these options is anemia management. When the kidneys are working properly, the hormone erythropoietin (EPO) is produced naturally in the body. To help with an under-functioning kidney, you can get an injection of EPO every week.

Maintaining good blood pressure can help slow the deterioration of your kidney. Drink fluids to avoid dehydration. Talk to your doctor before taking any anti-inflammatory drugs, including ibuprofen (Advil) and diclofenac (Solaraze, Voltaren).

A kidney transplant is another option for some people. Its also a long-term commitment. Talk to your doctor to see if a transplant is right for you. You might not be a good candidate for a kidney transplant if you:

smoke, heavily use alcohol, are obese or have an untreated mental health condition.