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DEPARTMENT: MEDICINE AND SURGERY

COLLEGE: MEDICINE AND HEALTH SCIENCES

Level: 300level

Course: RENAL PHISIOLOGY

Course Code: PHS 303

ASSIGNMENT

1. WITH THE AID OF SUITABLE DIAGRAM, DISCUSS THE TYPE OF DIALYSIS YOU KNOW.
2. 1 DISCUSS THE PATHOPHISIOLOGIC PROCESS INVOLVED IN RENAL FAILURE

1) The term **dialysis** refers to diffusion of solutes from an area of higher concentration to the area of lower concentration, through a semipermeable membrane. Dialysis is the procedure to remove waste materialsand toxic substances and to restore normal volume andcomposition of body fluid in severe renal failure. It isalso called **hemodialysis.**

Types of Dialysis

There are two types of dialysis we may use: peritoneal and hemodialysis.

Peritoneal Dialysis

To perform peritoneal dialysis, we will:

1. Surgically place a soft, hollow tube into the lower abdomen near the navel.
2. Instill a special solution called dialysate into the peritoneal cavity. The peritoneal cavity is the space in the abdomen that houses the organs and is lined by two special membrane layers called the peritoneum.
3. Leave the dialysate in the abdomen for a certain period of time, which we will determine on an individual basis. The dialysate fluid absorbs the waste products and toxins through the peritoneum.
4. Drain the fluid from the abdomen, measure it and then discard it.

Types of Peritoneal Dialysis

There are three different types of peritoneal dialysis:

* Continuous ambulatory peritoneal dialysis (CAPD): Does not require a machine. Exchanges, often referred to as "passes," can be done three to five times a day, during waking hours.
* Continuous cyclic peritoneal dialysis (CCPD): Requires the use of a special dialysis machine that can be used in the home. This type of dialysis is done automatically, even while you are asleep.
* Intermittent peritoneal dialysis (IPD): Uses the same type of machine as CCPD, but treatments take longer. IPD can be done at home, but it is usually in the hospital.

Peritoneal Dialysis: Possible Complications

Possible complications of peritoneal dialysis include an infection of the peritoneum, or peritonitis, where the catheter enters the body. Peritonitis causes fever and stomach pain. A dietitian will help plan your diet during peritoneal dialysis, so we can ensure you are choosing appropriate meals. During dialysis:

* You may have different protein, salt and fluid needs.
* You may have different potassium restrictions.
* You may need to reduce your calorie intake, since the sugar in the dialysate may cause weight gain.

Hemodialysis

Hemodialysis is can be performed at home or in a dialysis center or hospital by trained healthcare professionals. During the procedure, we will:

1. Surgically place a special type of access, called an arteriovenous (AV) fistula, usually in your arm. We will need to join an artery and a vein together. (We may also insert an external, central intravenous (IV) catheter, but is less common for long-term dialysis.)
2. Connect you to a large hemodialysis machine.
3. The machine drains the blood, bathes it in a special dialysate solution to remove waste substances and fluid and then returns it to your bloodstream.

Tips for Undergoing Hemodialysis

* Hemodialysis is usually performed several times a week and lasts for four to five hours. Because of the length of time hemodialysis takes, it may be helpful to bring reading material, in order to pass the time during this procedure.
* During treatment you can read, write, sleep, talk or watch TV.
* At home, hemodialysis is done with the help of a partner, often a family member or friend. If you choose to do home hemodialysis, you and your partner will receive special training.

Hemodialysis: Dialysis Access Management

Interventional radiologists work closely with you, your nephrologist and your vascular surgeon to help maintain functional hemodialysis access.

* Treating stenoses and clots: If you have arteriovenous fistulas or grafts, hemodialysis may fail if narrowings, called stenoses, develop in your blood vessels. Those narrowing cause poor flow, which affects the ability to efficiently dialyze the blood. The narrowings may cause additional symptoms, such as swelling of the head and arms. Without treatment, poor flow can result in clot formation, which prevents the ability to dialyze. It can even lead to permanent fistula or graft failure.

Interventional radiologists are skilled at treating clots with special devices and by administering clot-dissolving drugs directly into the clot. They are also skilled at treating sites of narrowing with angioplasty and, if appropriate, stent placement.

* Tunneled hemodialysis catheters: Interventional radiologists can also place tunneled hemodialysis catheters. Patients with long-standing use of tunneled hemodialysis catheters may develop blockages in the commonly used veins of the neck and chest. Those blockages may make it challenging to place a new catheter.

Interventional radiologists can often open a channel through the blockage to allow placement of a new catheter. If that is not possible, we can use alternative sites (through the veins draining the legs, through the liver, or through the back) for placing the catheter.

Hemodialysis: Possible Complications

Possible complications of hemodialysis include muscle cramps and hypotension (sudden drop in blood pressure). Hypotension may cause you to feel dizzy, weak or sick to your stomach. You can usually avoid side effects by following the proper diet and taking your medications.

A dietitian will work with you to plan your meals according to your physician's orders. Generally:

* You may eat foods high in protein such as meat and chicken (animal proteins).
* You may have different potassium restrictions.
* You may need to limit the amount you drink.
* You may need to avoid salt.
* You may need to limit foods containing mineral phosphorus (such as milk, cheese, nuts, dried beans, and soft drinks).

2) **ACUTE RENAL FAILURE**

1. **Oliguria** (decreased urinary output)

2. **Anuria** (cessation of urine formation) in severe cases

3. **Proteinuria** (appearance of proteins in urine) including albuminuria (excretion of albumin in urine)

4. **Hematuria** (presence of blood in urine) 5. **Edema** due to increased volume of extracellular fluid (ECF) caused by retention of sodium and water

6. **Hypertension** within few days because of increased ECF volume

7. **Acidosis** due to the retention of metabolic end products

8. **Coma** due to severe acidosis (if the patient is not treated in time) resulting in death within 10 to 14 days

 **CHRONIC RENAL FAILURE**

**1. *Uremia***

Uremia is the condition characterized by excess

accumulation of end products of protein metabolism

such as urea, nitrogen and creatinine in blood. There is

also accumulation of some toxic substances like organic

acids and phenols. Uremia occurs because of the failuretoxic substances.

*Common features of uremia*

i. Anorexia (loss of appetite)

ii. Lethargy

iii. Drowsiness

iv. Nausea and vomiting

v. Pigmentation of skin

vi. Muscular twitching, tetany and convulsion

vii. Confusion and mental deterioration

viii. Coma.

**2. *Acidosis***

Uremia results in acidosis, which leads to coma and

death.

**3. *Edema***

Failure of kidney to excrete sodium and electrolytes

causes increase in extracellular fluid volume resulting in

development of edema.

**4. *Blood Loss***

**Gastrointestinal bleeding** accompanied by platelet

dysfunction leads to heavy loss of blood.

**5. *Anemia***

Since, erythropoietin is not secreted in the kidney during

renal failure, the production of RBC decreases resulting

in normocytic normochromic anemia.

**6. *Hyperparathyroidism***

Secondary hyperparathyroidism is developed due to the

deficiency of calcitriol (1,25dihydroxycholecalciferol).

It

increases the removal of calcium from bones resulting

in **osteomalacia.**

5. **Edema** due to increased volume of extracellular fluid

(ECF) caused by retention of sodium and water

6. **Hypertension** within few days because of increased

ECF volume

7. **Acidosis** due to the retention of metabolic end

products

8. **Coma** due to severe acidosis (if the patient is not

treated in time) resulting in death within 10 to 14

days.