Management of Patients with Renal Failure

By

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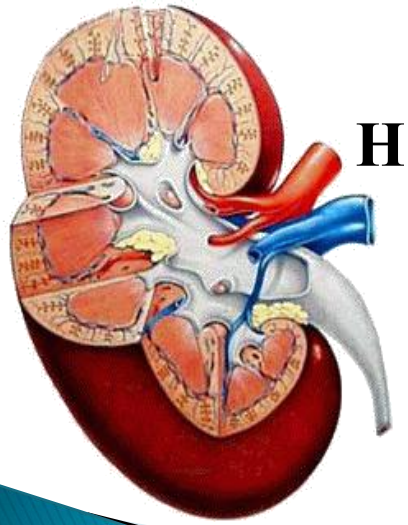

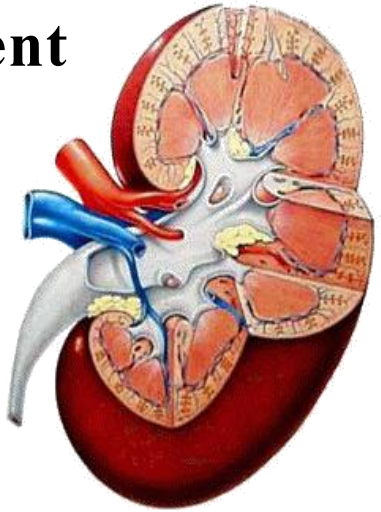

Out Lines

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- Functions of the kidney

Acute renal failure

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Chronic renal failure

- Definition
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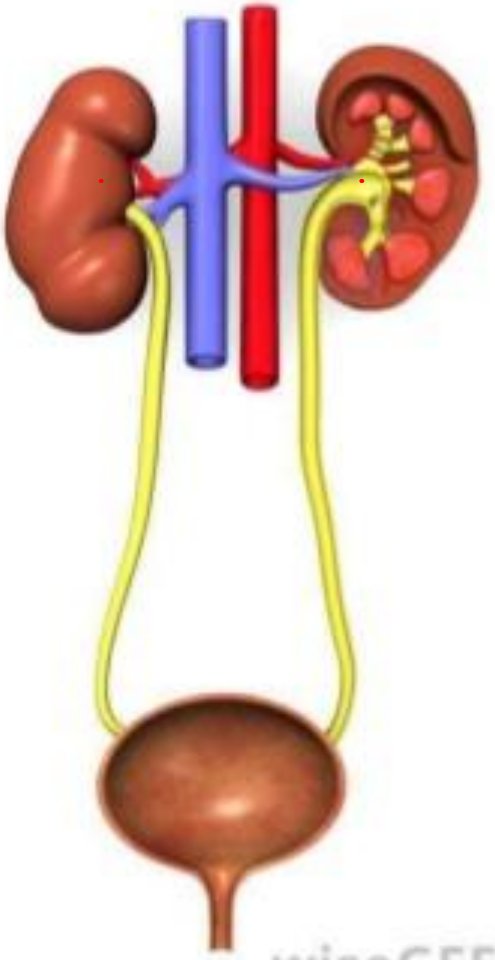
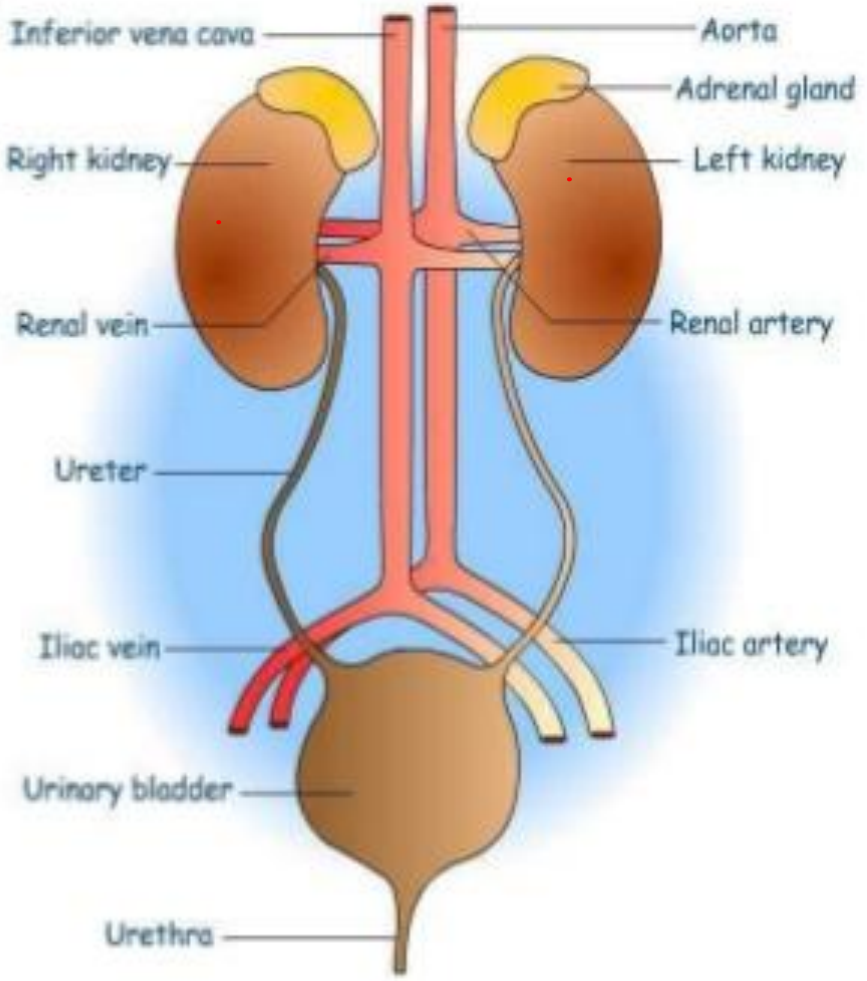
- Surgical Management
- Nursing care

Parts of Renal/uirinary System

- Kidneys
- Ureter
- Bladder
- Urethra





Function of the kidney

Excretion

- Removal of the waste products of metabolism – urea and creatinine
- Removal of excess fluid
- Regulation of acid-base balance
- Regulation of electrolyte levels

Function of the kidney

Secretion

- Regulation of blood pressure – renin
- Regulation of red blood cell production – erythropoietin
- Regulation of calcium uptake – activated vitamin D.

Definition

- **Acute renal failure (ARF)** defined as an abrupt decline in renal function resulting in the inability to excrete metabolic wastes and maintain proper fluid and electrolyte balance.

- **Irreversible renal failure**: implies that kidney function will not return and uremia will progress, with the patient requiring lifetime dialysis treatment or a kidney transplant.
- **Reversible renal failure**: This implies that kidney damage is reversible and that renal function will return at some stage.

Causes

Prerenal

- Volume depletion resulting from hemorrhage, Gastrointestinal losses (vomiting, diarrhea, nasogastric suction)
- Impaired cardiac efficiency resulting from myocardial infarction , heart failure ,Dysrhythmias and Cardiogenic shock.

Intrarenal

- Nephrotoxic agents such as radiopaque contrast agents, heavy metals (lead, mercury), Non steroidal anti-inflammatory drugs (NSAIDs)
- Infections such as acute glomerulonephritis.
- Ischemia and blockages.

Post-renal

- Urinary tract obstruction, including calculi (stones) , tumors.
- Benign prostatic hyperplasia.
- **Blood clots.**

Risk factors

- Chronic kidney disease
- History of Diabetes, Heart failure, and Liver disease.
- Sepsis
- Hypervolemia
- Age 65 years or over.
- Use of drugs with nephrotoxic potential (NSAIDs)
- Use of iodinated contrast agents within past week.
- **Symptoms** or history of urological obstruction, Oliguria.

Phases (Stages) of acute renal failure

- **The initiation period** begins with the initial insult and ends when oliguria develops.
- **Oliguric phase**: defined as a urinary output of less than **400ml/day**. This phase may last one to two weeks, or may extend up to six weeks or longer. Anuria is a poor prognostic indicator and requires renal replacement therapy.

- **Diuretic phase:** occurs when the kidneys are beginning to recover. This phase marked by a gradual increase in urine output.
- **Recovery phase:** Tubular function is restored, diuresis subsides and the kidney begins to function normally again.

Signs and symptoms

- **Subjective symptoms**
  - Nausea
  - Loss of appetite
  - Headache
  - Lethargy
  - Tingling in extremities

Objective symptoms

Oliguric phase

- Vomiting
- edema
- ⇧ K+ , decrease Na
- ⇧ BUN and creatinine
- uremic breath
- CHF and pulmonary edema
- hypertension
- sudden drop in UOP
- Acidosis
- convulsions, disorientation, coma

Diuretic phase

- Increased UOP
- Hyponatremia
- Gradual decline in BUN and creatinine
- Tachycardia
- Hypokalemia
- Improved LOC

Assessment and Diagnostic Findings

1. Health History

2- Physical examination

3- Diagnostic Evaluation

- Blood: Complete blood count and coagulation studies. BUN, creatinine, sodium, potassium. PH, bicarb.
- Urinalysis and microscopy
- Renal ultrasound scanning.
- Chest X-ray.
- Renal biopsy.

Prevention of Acute Renal Failure

- Provide adequate hydration to patients who are at risk for dehydration including:

✓ Before, during, and after surgery

✓ Patients undergoing intensive diagnostic studies requiring fluid restriction and contrast agents (eg, barium enema, intravenous pyelograms).

- Treat hypotension promptly.
- Take precautions to ensure that the appropriate blood is administered to the correct patient in order to avoid severe transfusion reactions, which can precipitate renal failure.
- Prevent and treat infections promptly. Infections can produce progressive renal damage.

- Pay special attention to wounds, burns.
- Give meticulous care to patients with indwelling catheters to prevent infections from ascending in the urinary tract, remove catheters as soon as possible.
- Closely monitor dosage, duration of use, and blood levels of all medications metabolized or excreted by the kidneys to prevent toxic drug effects.

Nursing Management

- ***Monitoring Fluid and Electrolyte Balance*** during all phases of the disorder and accurate daily weights, as well as I & O records, are essential.
- ***Nutritional Therapy:*** Caloric requirements are met with high-carbohydrate meals, foods and fluids containing potassium or phosphorus (eg, bananas, citrus fruits and juices, coffee) are restricted.
- ***Reducing Metabolic Rate:*** by providing bed rest, and prevent or treat fever and infection promptly.

Nursing Management

- ***Promoting Pulmonary Function*** through assisting the patient to turn, cough, and take deep breaths frequently to prevent atelectasis and respiratory tract infection.
- ***Preventing Infection by using*** aseptic technique with invasive lines and catheters.
- ***Providing Skin Care***: Bathing the patient with cool water, frequent turning, and keeping the skin clean.

Definition of chronic renal failure, or ESRD

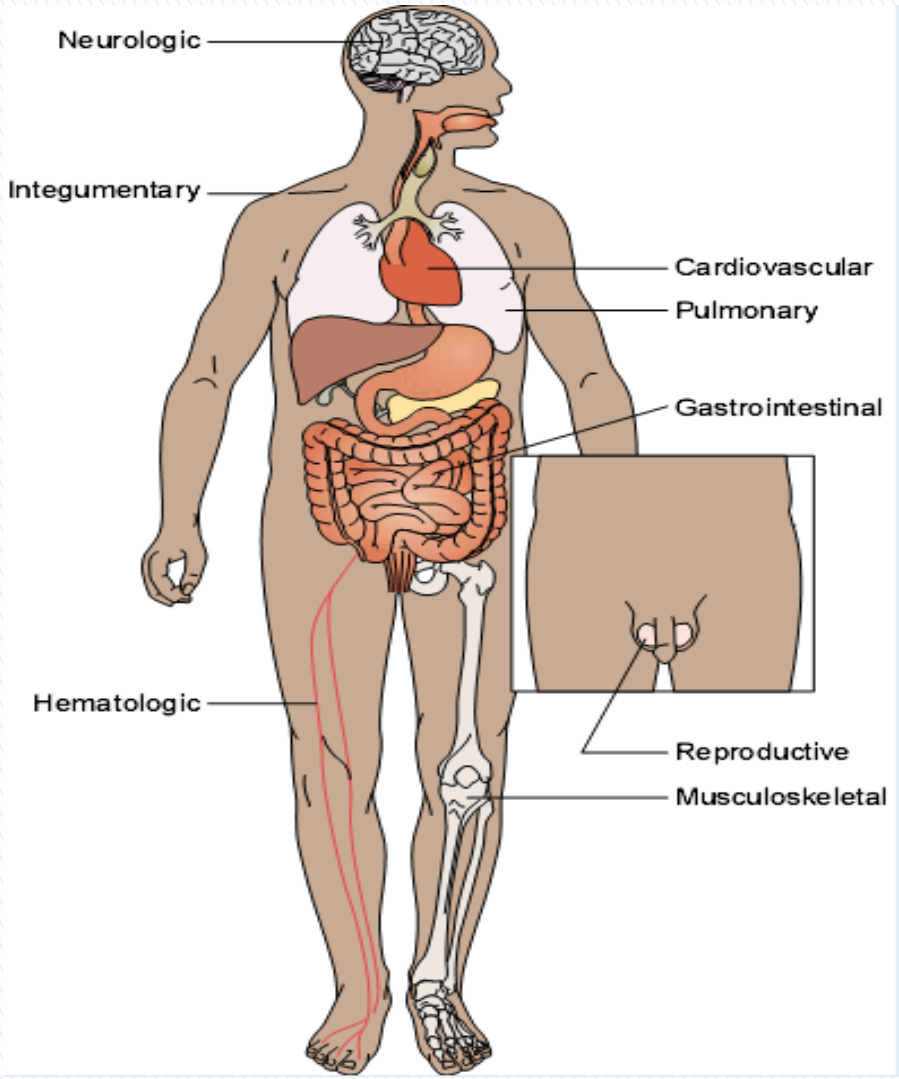
is a progressive, irreversible deterioration in renal function in which the body's ability to maintain metabolic and fluid and electrolyte balance fails, resulting in uremia or azotemia (retention of urea and other nitrogenous wastes in the blood).

Causes of chronic renal failure

- Systemic diseases: Diabetes mellitus and Hypertension
- Chronic glomerulonephritis
- Obstruction of the urinary tract
- Infection
- Medications

Clinical Manifestations

- Neurologic
- Integumentary
- Cardiovascular
- Pulmonary
- Gastrointestinal
- Hematologic
- Musculoskeletal



Clinical Manifestations

- **Neurologic:** Weakness and fatigue; confusion; disorientation; tremors; seizures; burning of soles of feet.
- **Integumentary:** Gray-bronze skin color; pruritus; ecchymosis; thin & brittle nails.
- **Cardiovascular:** Hypertension; pitting edema, distended neck veins, pericardial effusion, hyperkalemia & hyperlipidemia
- **Pulmonary:** Crackles; depressed cough reflex, shortness of breath & tachypnea.

- **Gastrointestinal:** Ammonia odor to breath ("uremic fetor"); metallic taste; mouth ulcerations and bleeding; anorexia, nausea, and vomiting; constipation or diarrhea; bleeding from gastrointestinal tract.
- **Hematologic:** Anemia, bleeding tendency.
- **Musculoskeletal:** Muscle cramps, loss of muscle strength, bone pain, bone fractures and foot drop.

Assessment and Diagnostic Findings

- **Lab findings**

- **BUN** – indicator of glomerular filtration rate and is affected by the breakdown of protein. Normal is 10-20mg/dL. When reaches 70 = dialysis
- **Serum creatinine** –is a better indicator of kidney function. Normal is 0.5-1.5 mg/dL. When reaches 10 x normal, it is time for dialysis

- **Serum electrolytes** (Ca, K).
- **<u>Other abnormal findings</u>**

✓ Metabolic acidosis

✓ Fluid imbalance

✓ Insulin resistance

✓ Anemia

✓ Immunological problems

Complications

- **Hyperkalemia** due to decreased excretion, metabolic acidosis
- **Pericarditis,** pericardial effusion due to retention of uremic waste products and inadequate dialysis.
- **Hypertension** due to sodium and water retention and malfunction of renin–angiotensin–aldosterone system.

Complications

- **Anemia** due to decreased erythropoietin production decreased RBC life span and blood loss during hemodialysis.
- **Bone disease** due to retention of phosphorus, low serum calcium levels, abnormal vitamin D metabolism.

Medical Management
A- Pharmacologic therapy

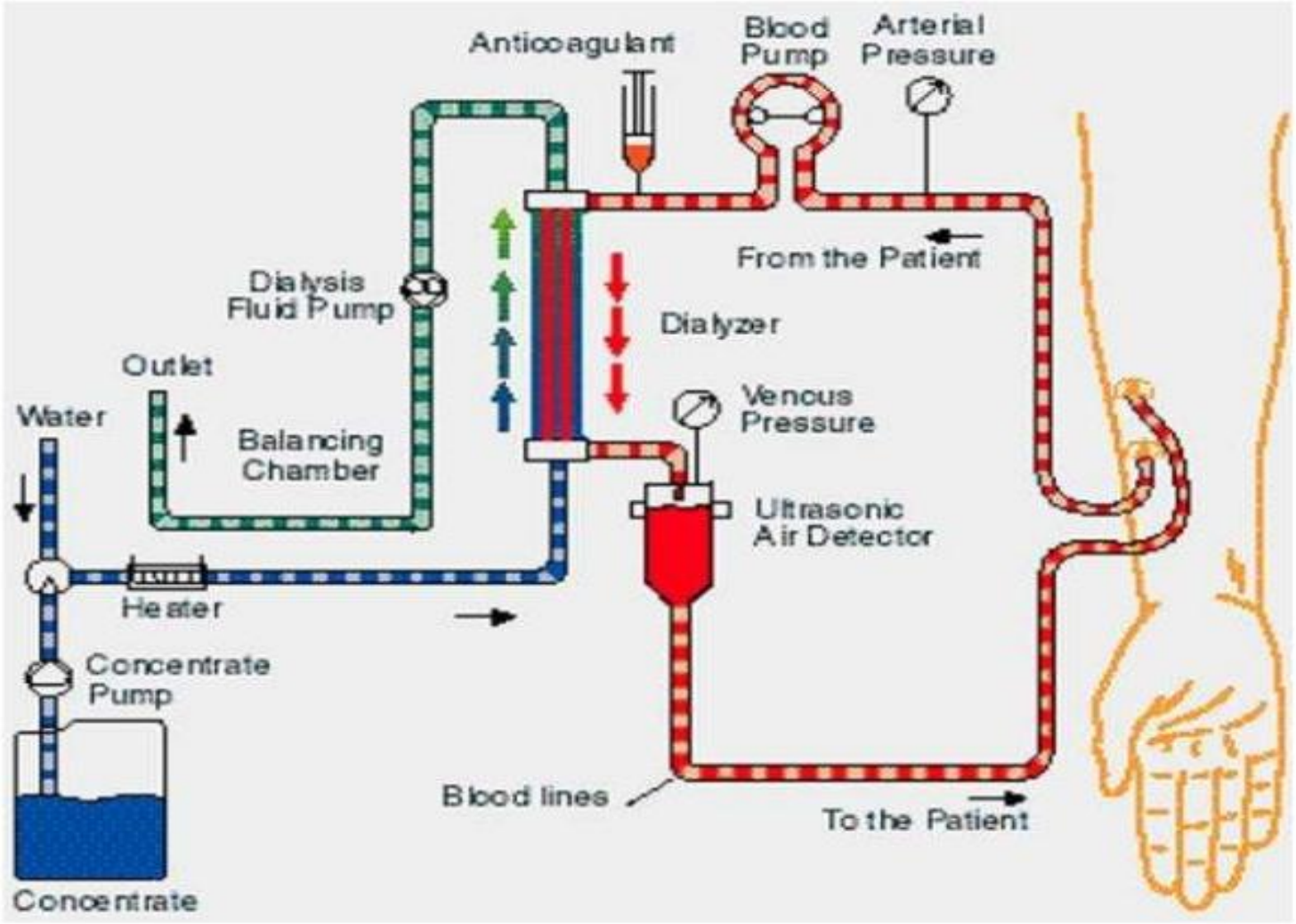
- Administering prescribed antihypertensive, erythropoietin, and iron supplements.
- Both calcium carbonate and phosphorus binding antacids must be administered with food to be effective.
- Magnesium-based antacids must be avoided to prevent magnesium toxicity.

B- Nutritional therapy

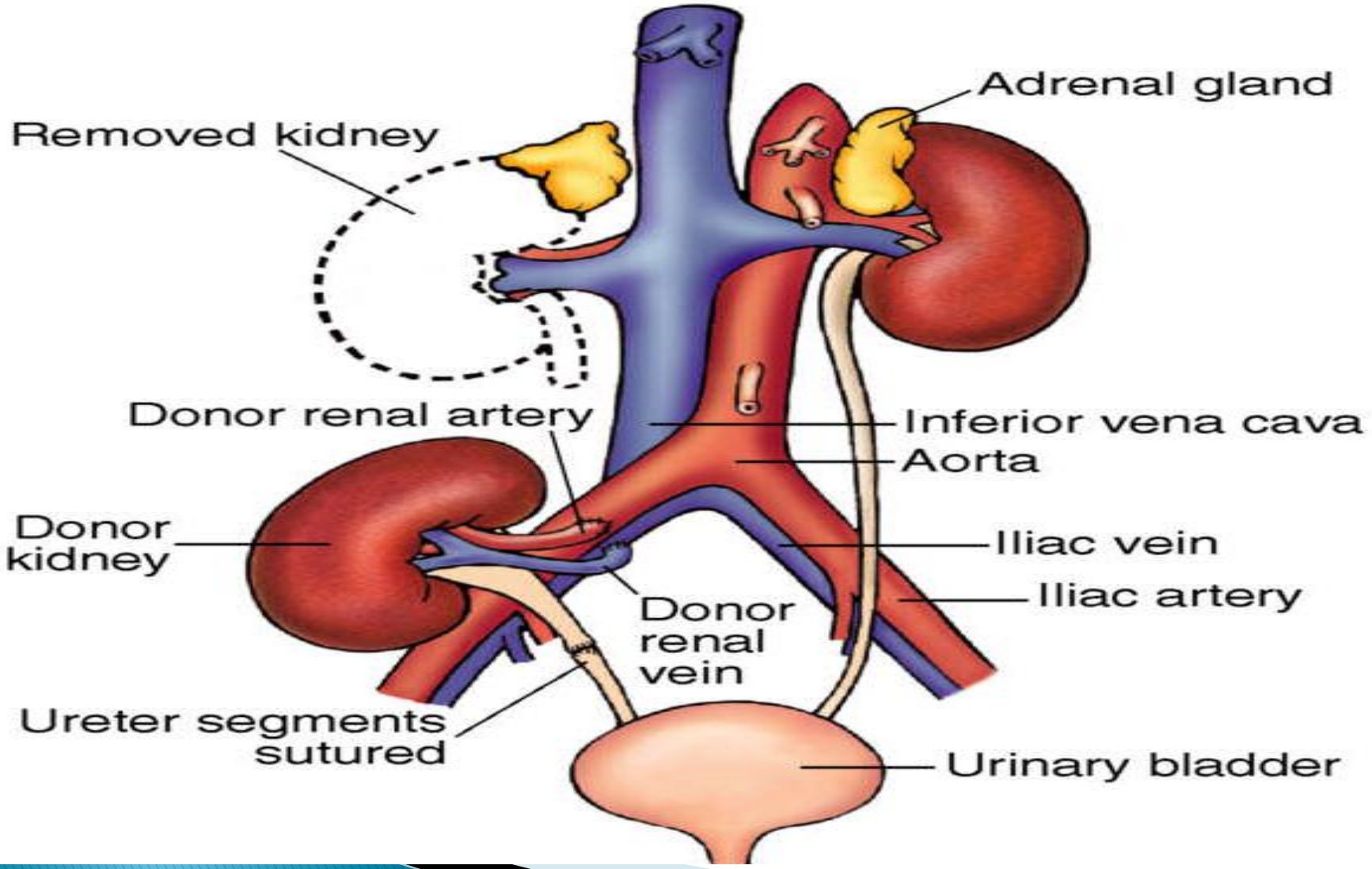
- Regulation of fluid and sodium intake to balance fluid and sodium losses.
- The fluid allowance is 500 to 600 mL more than the previous day's 24-hour urine output.
- Some restriction of potassium.
- Vitamin supplementation

- Protein is restricted because urea, uric acid, and organic acids—the breakdown products of dietary and tissue proteins—accumulate rapidly in the blood when there is impaired renal clearance.
- ***High-biologic-value proteins*** are those that are complete proteins and supply the essential amino acids necessary for growth and cell repair.

Dialysis


Anticoagulant
Blood Pump
Arterial Pressure
From the Patient
Dialysis Fluid Pump
Dialyzer
Outlet
Water
Balancing Chamber
Venous Pressure
Ultrasonic Air Detector
Heater
Concentrate Pump
Blood lines
To the Patient
Concentrate

Surgical management
Transplantation



Nursing care

Frequent monitoring for:

- Hydration and output
- Cardiovascular function
- Respiratory status
- Electrolytes
- Nutrition

- Mental status and Emotional well-being
- Ensure proper medication regimen
- Provide Skin care
- Assess for bleeding problems
- Provide care of the shunt
- Education to client and family


Thank You!