

DISORDERS OF GENITO URINARY SYSTEM

M.S.N.-1

UNIT - 6

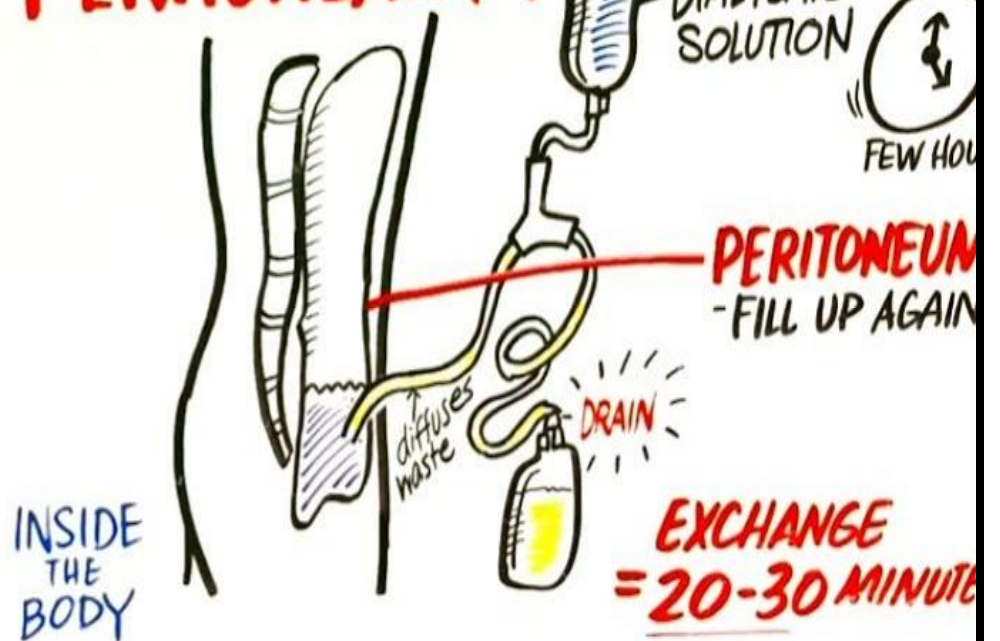
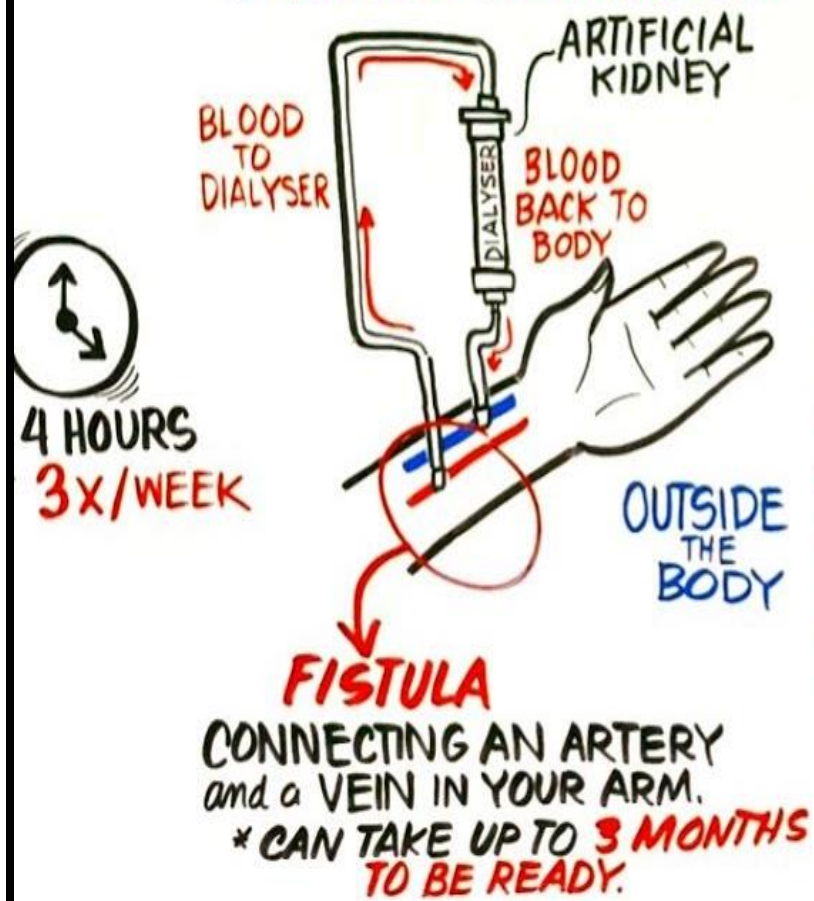


**BY- AHMED SODHA
M.Sc.(N)- M.S.N.**

DIALYSIS

HEMODIALYSIS

PERITONEAL-(PD)



q DEFINITION:- DIALYSIS IS USED TO REMOVE FLUID AND UREMIC WASTE PRODUCTS FROM THE BODY WHEN THE KIDNEYS CANNOT DO SO.

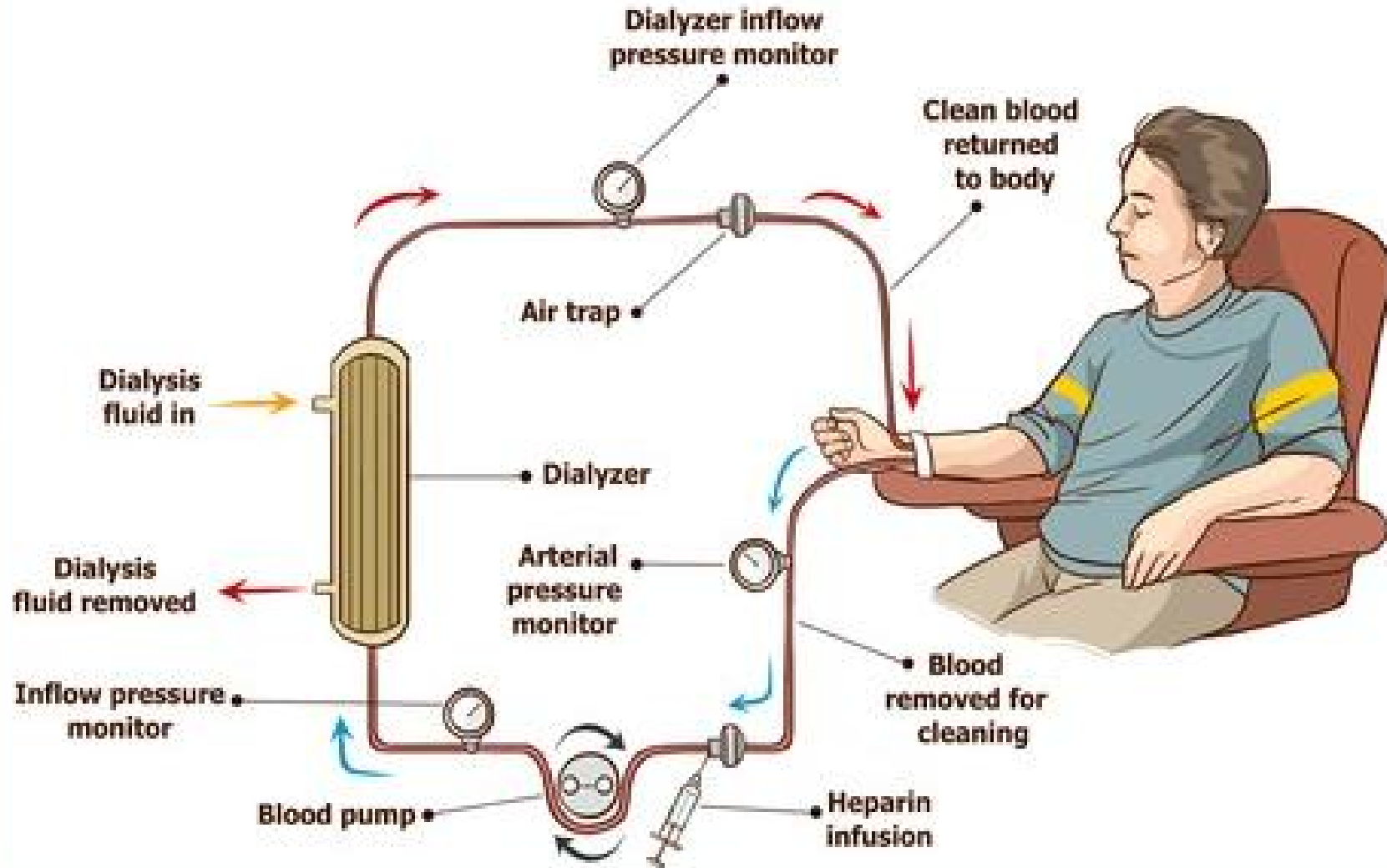
q INDICATIONS:-

- ESRD / CRF
- ARF
- HYPERKALEMIA, HYPERCALCEMIA
- HEPATIC COMA
- FLUID OVERLOAD
- EDEMA
- ACIDOSIS

q METHODS OF DIALYSIS:-

- 1) HEMODIALYSIS
- 2) PERITONEAL DIALYSIS

Hemodialysis



qHEMODIALYSIS

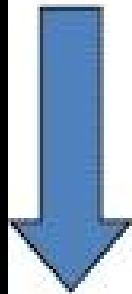
- HEMODIALYSIS IS THE MOST COMMONLY USED METHOD OF DIALYSIS.

q PRINCIPLES OF HEMODIALYSIS

- THE OBJECTIVES OF HEMODIALYSIS ARE TO EXTRACT TOXIC NITROGENOUS SUBSTANCES FROM THE BLOOD AND TO REMOVE EXCESS WATER.
- IN HEMODIALYSIS, THE BLOOD, LADEN WITH TOXINS AND NITROGENOUS WASTES, IS DIVERTED FROM THE PATIENT TO A MACHINE, A DIALYZER, IN WHICH THE BLOOD IS CLEANSED AND THEN RETURNED TO THE PATIENT.
- *DIFFUSION*, *OSMOSIS*, AND *ULTRAFILTRATION* ARE THE PRINCIPLES ON WHICH HEMODIALYSIS IS BASED.

Blood

- Na = 140 mEq/L
- K = 4.5 mEq/L
- Cl = 100 mEq/L
- CO₂ = 24 mEq/L
- BUN = 30 mg/dL
- Cr = 5 mg/dL
- Glucose = 100 mg/dL
- Calcium = 1.2 mmole/L
- Phosphorus = 4 mg/dL
- Magnesium = 2 mg/dL
- Vit B12 = 500 pg/mL
- Albumin = 4 g/dL



Dialysate

- Na = 140 mEq/L
- K = 2 mEq/L
- Cl = 100 mEq/L
- HCO₃ = 35 mEq/L
- Urea = 0 mg/dL
- Cr = 0 mg/dL
- Dextrose = 200 mg/dL
- Calcium = 2.5 mEq/L
- Phosphorus = 0 mg/dL
- Magnesium = 1.2 mg/dL
- Vit B12 = 0
- Albumin = 0



DIALYSATE:- THE DIALYSATE IS A SOLUTION MADE UP OF ALL THE IMPORTANT ELECTROLYTES IN THEIR IDEAL EXTRACELLULAR CONCENTRATIONS.

q**DIFFUSION:-** TOXINS AND WASTES IN THE BLOOD ARE MOVE FROM AN AREA OF HIGHER CONCENTRATION IN THE BLOOD TO AN AREA OF LOWER CONCENTRATION IN THE DIALYSATE.

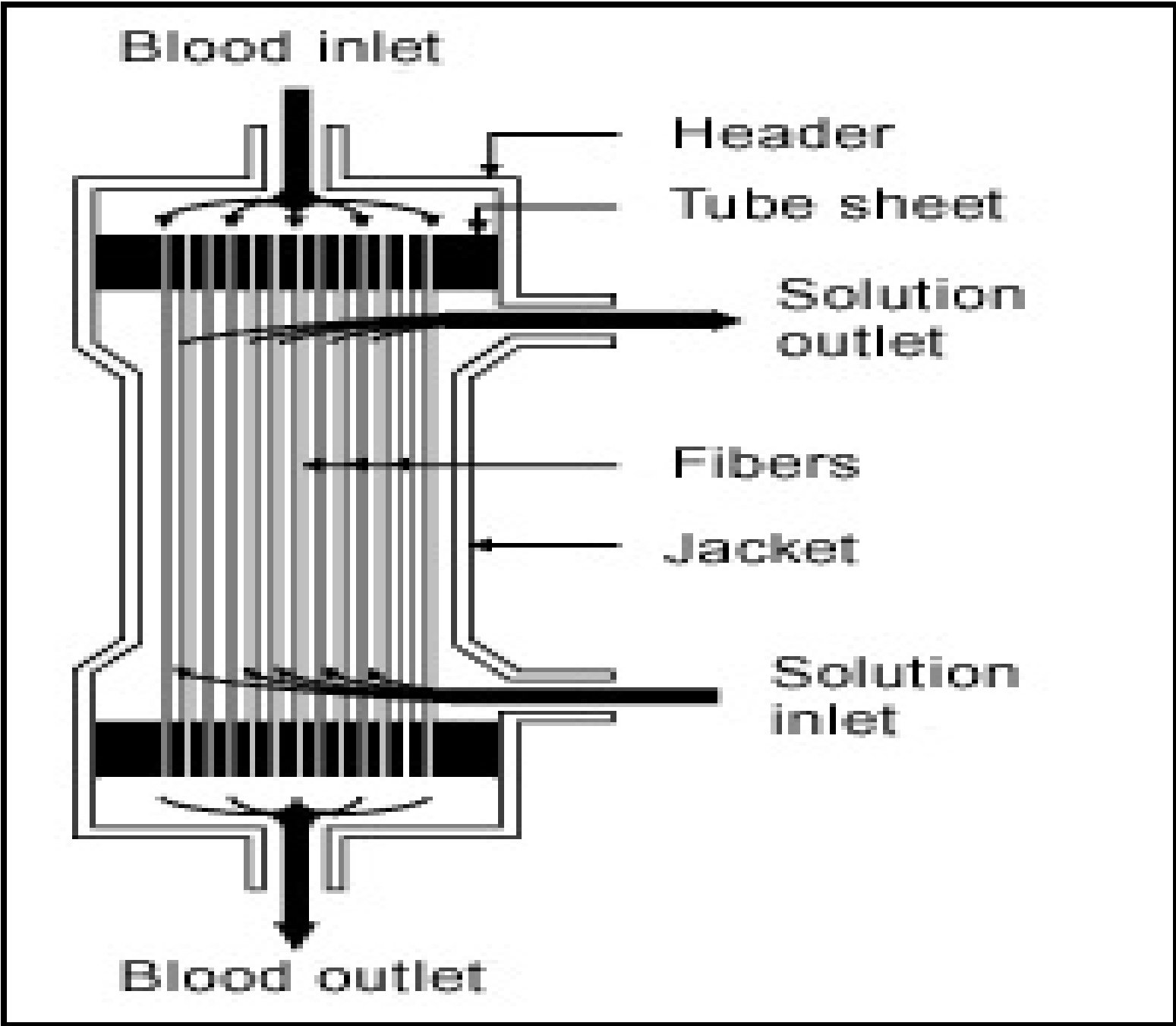
q**OSMOSIS:-** EXCESS WATER IS REMOVED FROM THE BLOOD BY OSMOSIS, IN WHICH;

- WATER MOVES FROM AN AREA OF HIGHER SOLUTE CONCENTRATION (THE BLOOD) TO AN AREA OF LOWER SOLUTE CONCENTRATION (THE DIALYSATE).

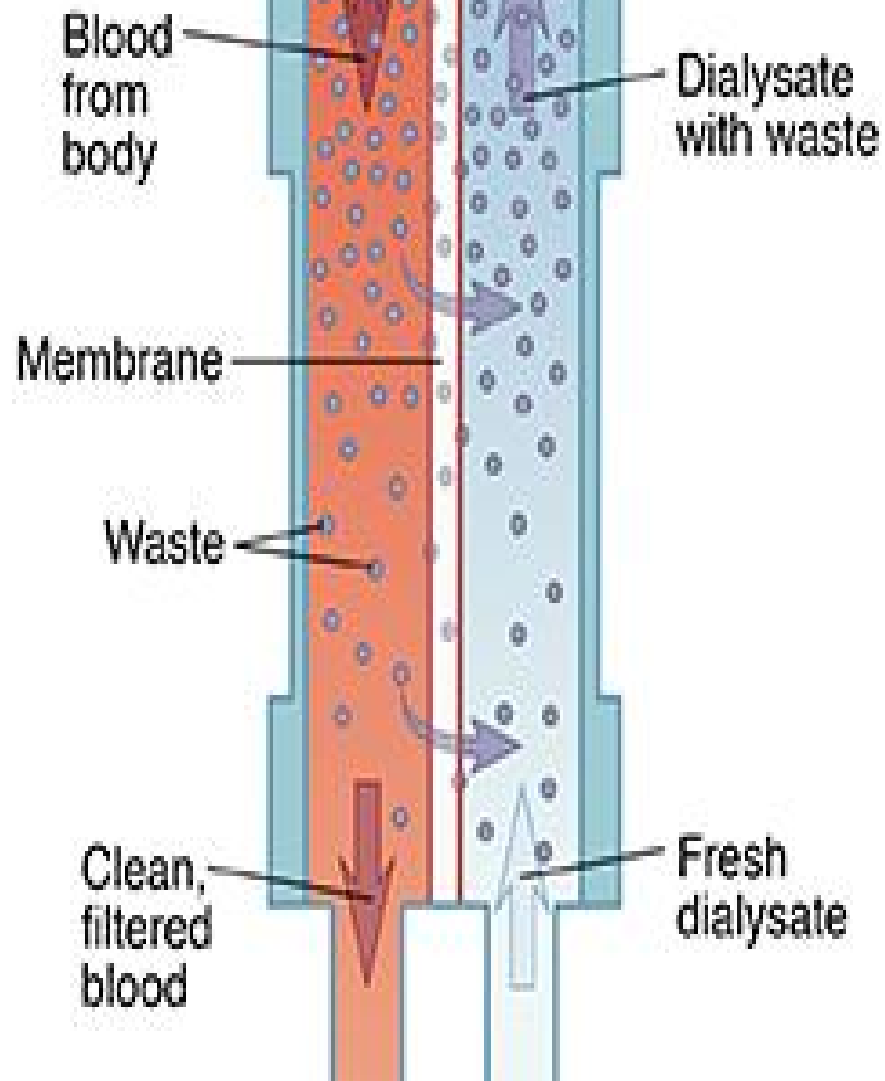
q**ULTRAFILTRATION:-** ULTRAFILTRATION IS DEFINED AS WATER MOVING UNDER HIGH PRESSURE TO AN AREA OF LOWER PRESSURE.

- THIS PROCESS IS MUCH MORE EFFICIENT AT WATER REMOVAL THAN OSMOSIS.

- ULTRAFILTRATION IS ACCOMPLISHED BY APPLYING NEGATIVE PRESSURE OR A SUCTIONING FORCE TO THE DIALYSIS MEMBRANE



Inside the Dialyzer



q EQUIPMENT:- DIALYZERS, OR ARTIFICIAL KIDNEYS, ARE EITHER FLAT-PLATE DIALYZERS OR HOLLOW-FIBER ARTIFICIAL KIDNEYS THAT CONTAIN THOUSANDS OF TINY CELLOPHANE TUBULES THAT ACT AS SEMIPERMEABLE MEMBRANES.

- THE BLOOD FLOWS THROUGH THE TUBULES, WHILE A SOLUTION (THE DIALYSATE) CIRCULATES AROUND THE TUBULES.

- THE EXCHANGE OF WASTES FROM THE BLOOD TO THE DIALYSATE OCCURS THROUGH THE SEMIPERMEABLE MEMBRANE OF THE TUBULES.

q VASCULAR ABSCESS:-

- ACCESS TO THE PATIENT'S VASCULAR SYSTEM MUST BE ESTABLISHED TO ALLOW BLOOD TO BE REMOVED, CLEANSED, AND RETURNED TO THE PATIENT'S VASCULAR SYSTEM AT RATES BETWEEN 200 AND 800 ML/MINUTE.
- SEVERAL TYPES OF ACCESS ARE AVAILABLE:
 1. SUBCLAVIAN, INTERNAL, JUGULAR, AND FEMORAL CATHETERS
 2. FISTULA
 3. AN ARTERIOVENOUS GRAFT

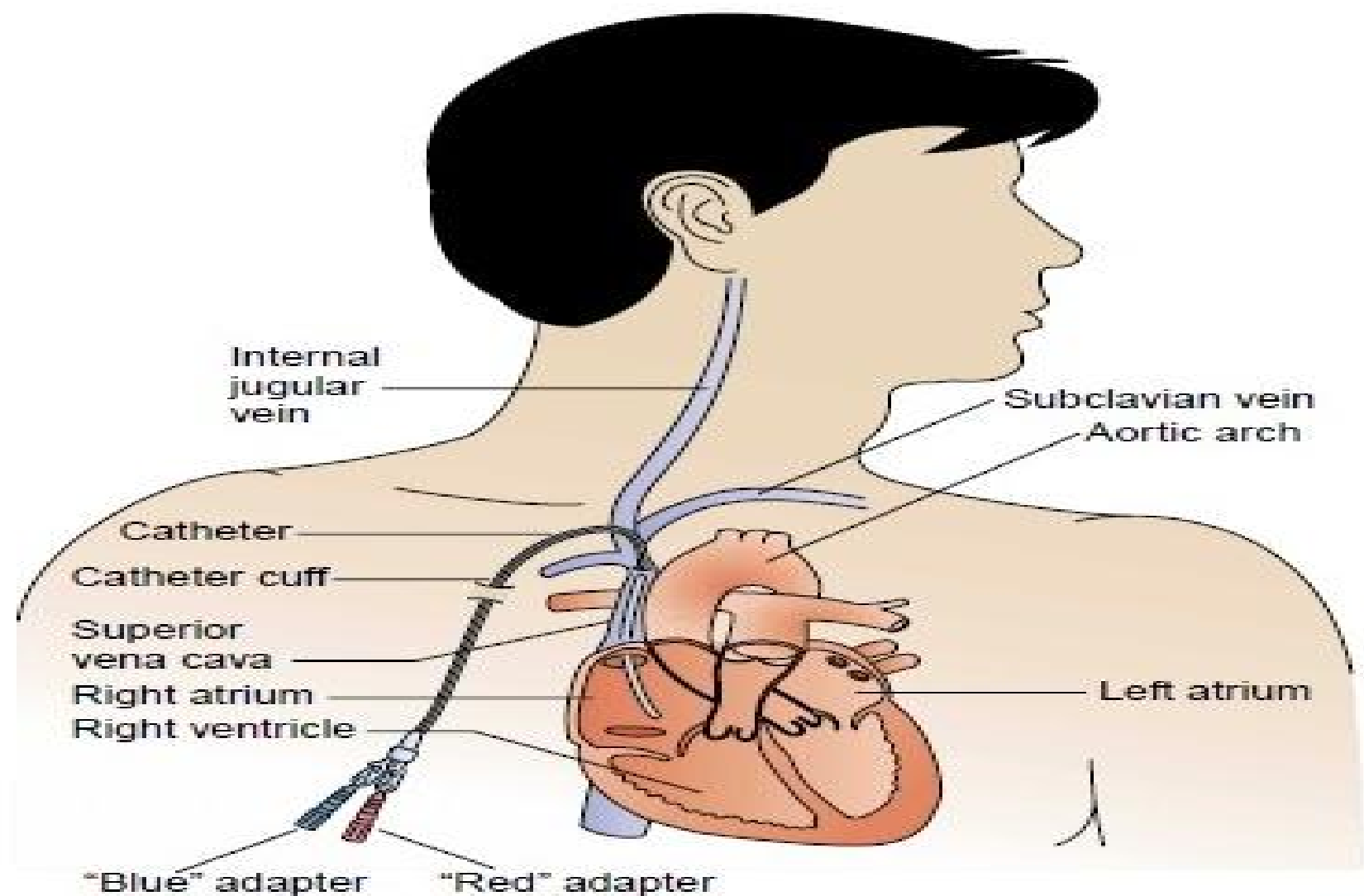


FIGURE 44-5 Double-lumen, cuffed hemodialysis catheter used in acute hemodialysis. The red adapter is attached to a blood line through which blood is pumped from the patient to the dialyzer. After the blood passes through the dialyzer (artificial kidney), it returns to the patient through the blue adapter.

1.SUBCLAVIAN, INTERNAL, JUGULAR, AND FEMORAL CATHETERS METHOD:-

- IMMEDIATE ACCESS TO THE PATIENT'S CIRCULATION FOR ACUTE HEMODIALYSIS IS ACHIEVED BY INSERTING A DOUBLE-LUMEN OR MULTILUMEN CATHETER INTO THE SUBCLAVIAN, INTERNAL JUGULAR, OR FEMORAL VEIN.
- THE CATHETERS ARE REMOVED WHEN NO LONGER NEEDED, BECAUSE THE PATIENT'S CONDITION HAS IMPROVED OR ANOTHER TYPE OF ACCESS HAS BEEN ESTABLISHED.
- THIS METHOD OF VASCULAR ACCESS INVOLVES SOME RISK Eg, HEMATOMA, PNEUMOTHORAX, INFECTION, THROMBOSIS OF THE SUBCLAVIAN VEIN

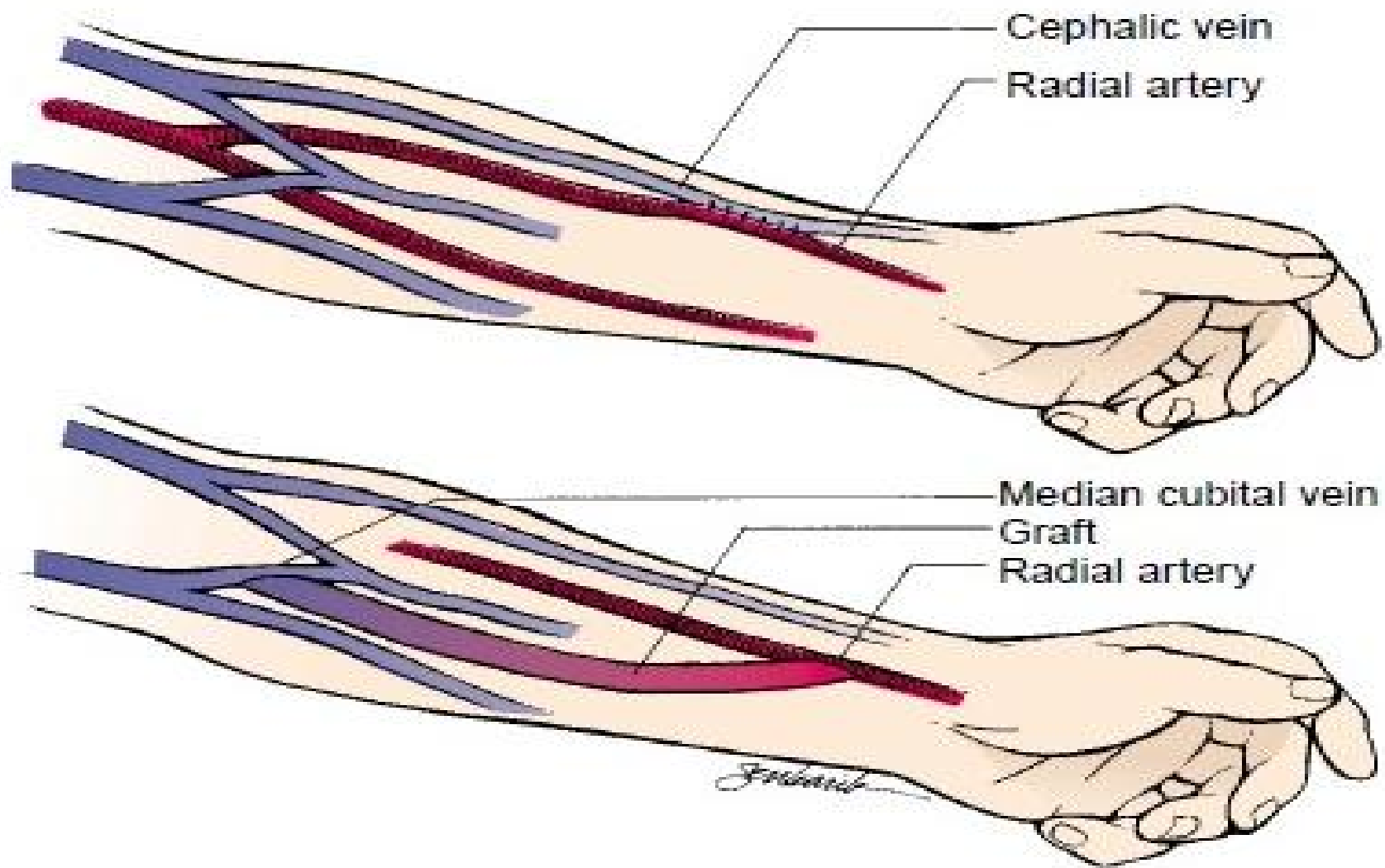
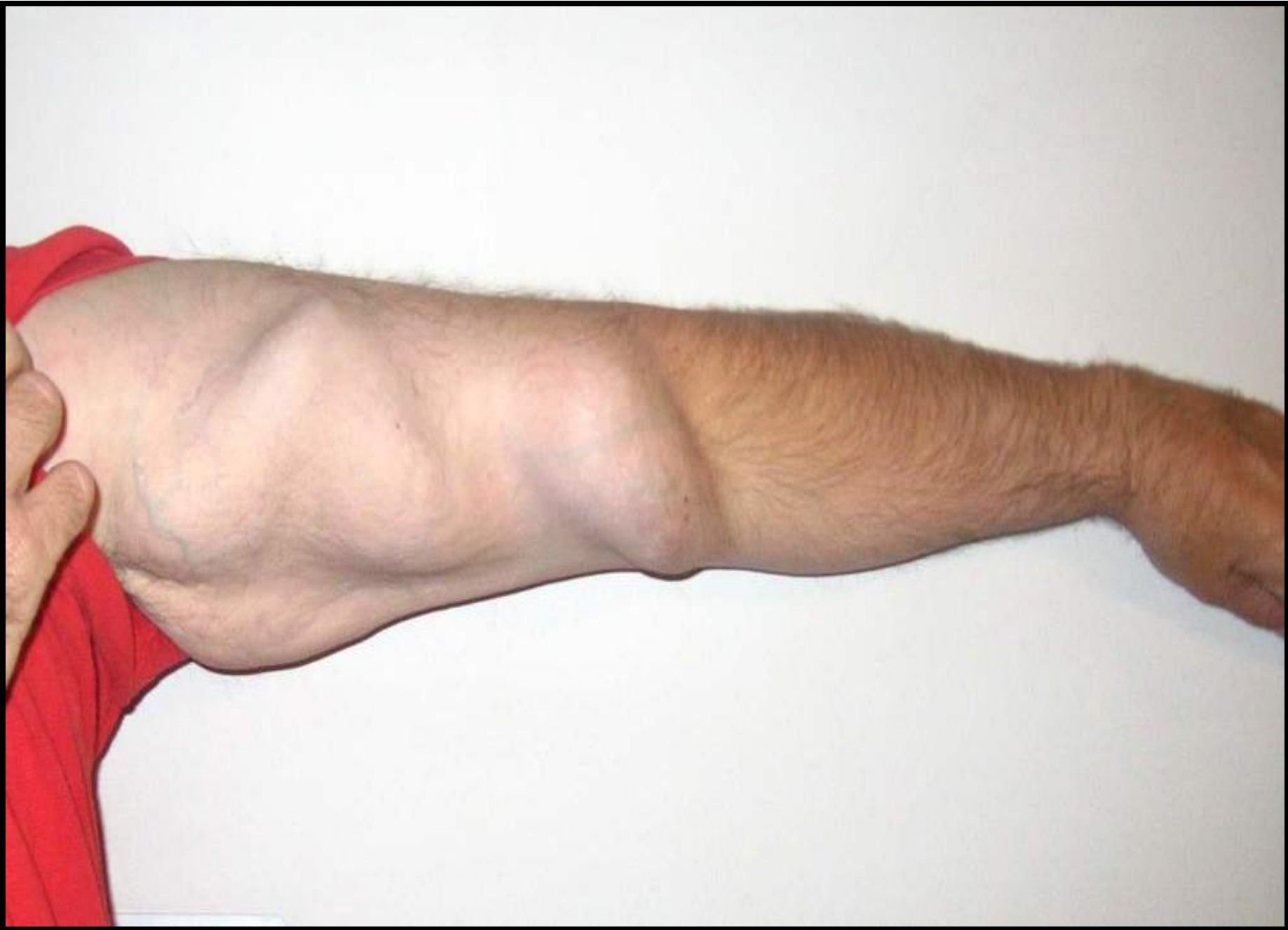
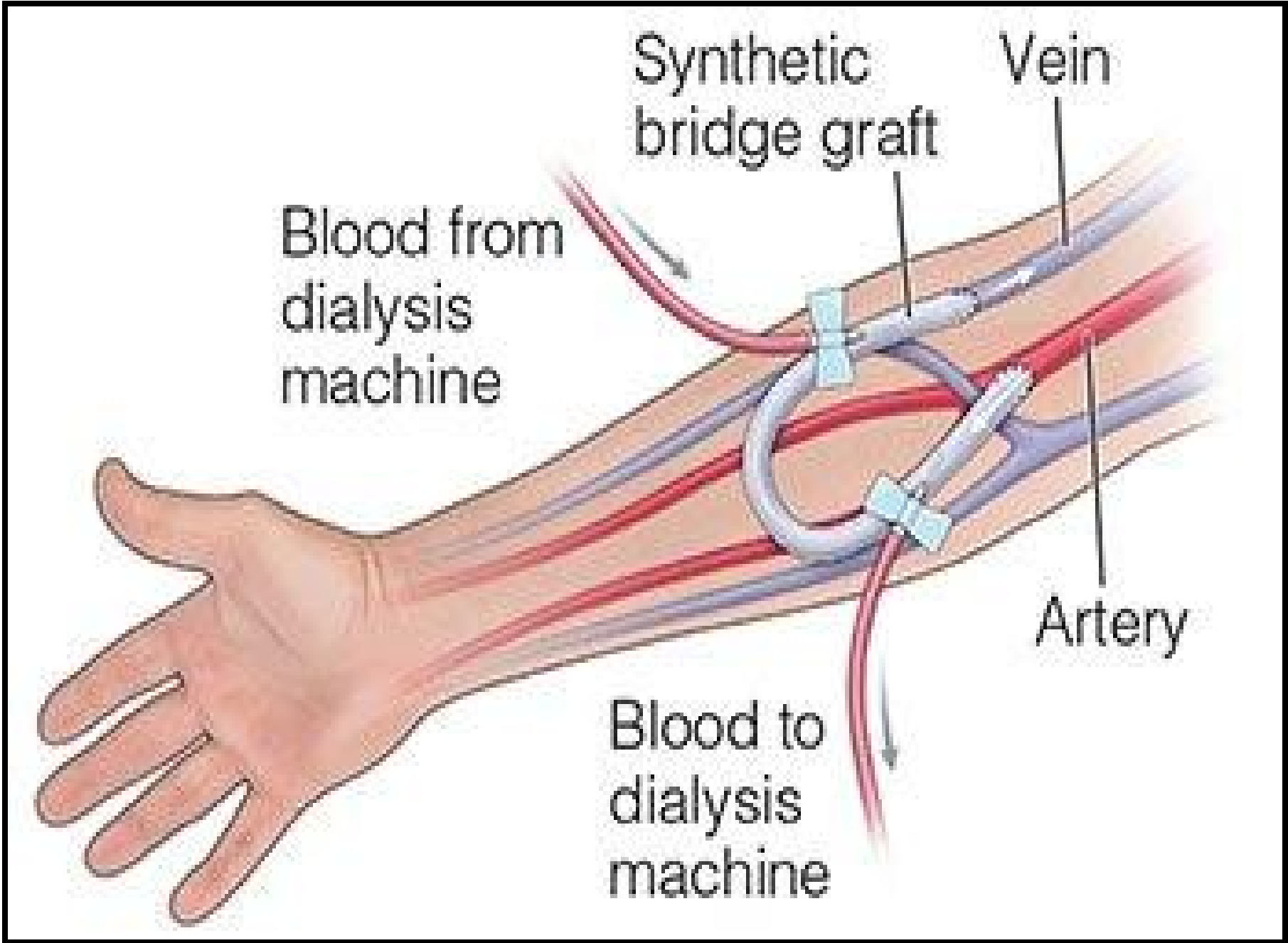


FIGURE 44-6 An internal arteriovenous fistula (*top*) is created by a side-to-side anastomosis of the artery and vein. A graft (*bottom*) can also be established between the artery and vein.



2. FISTULA METHOD:-

- A MORE PERMANENT ACCESS, KNOWN AS A FISTULA, IS CREATED SURGICALLY (USUALLY IN THE FOREARM) BY JOINING (ANASTOMOSING) AN ARTERY TO A VEIN, EITHER SIDE TO SIDE OR END TO SIDE.
- NEEDLES ARE INSERTED INTO THE VESSEL TO OBTAIN BLOOD FLOW ADEQUATE TO PASS THROUGH THE DIALYZER. THE ARTERIAL SEGMENT OF THE FISTULA IS USED FOR ARTERIAL FLOW AND THE VENOUS SEGMENT FOR REINFUSION OF THE DIALYZED BLOOD.
- THE FISTULA TAKES 4 TO 6 WEEKS TO MATURE BEFORE IT IS READY FOR USE.
- THE PATIENT IS ENCOURAGED TO PERFORM EXERCISES TO INCREASE THE SIZE OF THESE VESSELS (SQUEEZING A RUBBER BALL FOR FOREARM FISTULAS) AND THEREBY TO ACCOMMODATE THE LARGE-BORE NEEDLES USED IN HEMODIALYSIS.



3. AN ARTERIOVENOUS GRAFT METHOD:-

- AN ARTERIOVENOUS GRAFT CAN BE CREATED BY SUBCUTANEOUSLY INTERPOSING A BIOLOGIC, SEMIBIOLOGIC, OR SYNTHETIC GRAFT MATERIAL BETWEEN AN ARTERY AND VEIN.**
- THE MOST COMMONLY USED SYNTHETIC GRAFT MATERIAL IS EXPANDED POLY TETRA FLUORO ETHYLENE(PTFE).**
- USUALLY, A GRAFT IS CREATED WHEN THE PATIENT'S VESSELS ARE NOT SUITABLE FOR A FISTULA. PATIENTS WITH COMPROMISED VASCULAR SYSTEMS (Eg, FROM DIABETES).**
- GRAFTS ARE USUALLY PLACED IN THE FOREARM, UPPER ARM, OR UPPER THIGH.**
- INFECTION AND THROMBOSIS ARE THE MOST COMMON COMPLICATIONS OF ARTERIOVENOUS GRAFTS.**

q NUTRITION THERAPY DURING HEMODIALYSIS:-

- PROTIEN RESTRICTED DIET
- RESTRICTION IN EXCESS SODIUM, POTASSIUM, & FLUID INTAKE.
- CALORIE RICH, ADEQUATE PROTIEN DIET
- VITAMIN RICH DIET

q COMPLICATIONS OF HEMODIALYSIS:-

- HYPOTENSION
- MUSCLE CRAMPS
- NAUSEA & VOMITING
- FEVER
- HEMOLYSIS
- SEIZURE
- AIR EMBOLISM
- ARRYTHMIA
- CHEST & BACK PAIN
- ALLERGIC REACTIONS
- GI DISTURBANCES

◆ HEMODIALYSIS PROCEDURE LINK ◆

<https://www.youtube.com/watch?v=Yq6TrHJDO2A>