Chapter (1)

Initiation of Dialysis

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CHAPTER OUTLINES

• Structure of Normal Kidneys
• Function of Normal Kidney
• Kidney Failure (Renal Failure)
• Renal Replacement Therapy (RRT)
• Final remarks and conclusions

CHAPTER OBJECTIVES

• Describe the main functions of the human kidney.
• Describe the main structure of the normal kidney
• Discuss the main types of kidney failure.
• Describe the most common metabolic changes that occur during kidney failure.

• Discuss the methods of performing dialysis.
• Discuss kidney transplantation as a method of renal replacement therapy.

KEY TERMS

• Kidney Function
• Acute Kidney Injury (AKI)
• Chronic Kidney Disease (CKD)
• Hemodialysis (HD)
• Peritoneal Dialysis (PD)
• Continuous Renal Replacement Therapy (CRRT)
• Kidney Transplantation

ABSTRACT

The function of the kidney system is to remove waste products of human metabolism and to eliminate extra fluids. When end-stage renal disease (ESRD) occurs, renal replacement therapy (RRT) - dialysis, transplantation - is required. There are two types of dialysis treatment: extracorporeal blood purification (mainly hemodialysis) and intracorporeal blood purification (peritoneal dialysis). All patients with ESRD should be considered for kidney transplantation. Patients without absolute contraindications should be placed on the transplant waiting list, and receive a kidney, if possible. Patients should be educated about each procedure of RRT.
1.1 STRUCTURE OF NORMAL KIDNEYS

The kidney is an essential organ for the healthy functioning of human beings and is the functional organ in the urinary system. Each person normally has two functioning kidneys which are located in the dorsal abdominal cavity in the retro peritoneal space. They are a bean shaped organ about 11 cm in length, 5 to 6 cm wide, 3 to 4 cm thick. Each kidney weighs 120-160 g. The normal human kidney is pictured in Fig. 1.1. The kidneys are protected and kept in place by a tight fitting capsule (renal capsule) and by layers of fat which cushions them from blunt trauma. The kidneys receive blood from the renal arteries which branch off the abdominal aorta and return blood via the renal vein to the inferior vena cava. The kidney has two layers, the outer layer is called the cortex and the medulla is the inner layer. The kidneys receive from 1000 to 1200 mL of blood every minute which is about 25% of the cardiac output. Blood enters the kidney via the renal artery and splits into anterior and posterior