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#### DISCUSS THE DISEASES OF THE RENAL SYSTEM

Renal system disease, are the diseases or disorders that affect the human urinary system. They include benign and malignant tumours, infections and inflammations, and obstruction by calculi. Being the most important causes of death and disability in many countries throughout the world. Severe kidney diseases can be divided into two main categories:

(1) acute renal failure, in which the kidneys abruptly stop working entirely or almost entirely but may eventually recover nearly normal function, and

(2) chronic renal failure, in which there is progressive loss of function of more and more nephrons that gradually decreases overall kidney function. Within these two general categories, there are many specific kidney diseases that can affect the kidney blood vessels, glomeruli, tubules, renal interstitium, and parts of the urinary tract outside the kidney, including the ureters and bladder.

#### ACUTE RENAL FAILURE.

A condition in which the kidneys suddenly can't filter waste from the blood. The causes of acute renal failure can be divided into three main categories:

1. Acute renal failure resulting from decreased blood supply to the kidneys; this condition is often referred to as PRERENAL acute renal failure to reflect the fact that the abnormality occurs in a system before the kidneys. This can be a consequence of heart failure with reduced cardiac output and low blood pressure or conditions associated with diminished blood volume and low blood pressure, such as severe hemorrhage.

Some causes of prerenal acute renal failure are: i) Intravascular volume depletion

-Hemorrhage (trauma, surgery, postpartum, gastrointestinal)

-Diarrhea or vomiting

-Burns

ii) Cardiac failure

-Myocardial infarction

-Valvular damage

iii) Peripheral vasodilation and resultant hypotension

-Anaphylactic shock

-Anesthesia

-Sepsis, severe infections

iv) Primary renal hemodynamic abnormalities

-Renal artery stenosis, embolism, or thrombosis of renal artery or vein.

2. Intrarenal acute renal failure resulting from abnormalities within the kidney itself, including those that affect the blood vessels, glomeruli, or tubules.

Some Causes of Intrarenal Acute Renal Failure:

i) Small vessel and/or glomerular injury

-Vasculitis (polyarteritis nodosa)

-Cholesterol emboli

-Malignant hypertension

-Acute glomerulonephritis

ii) Tubular epithelial injury (tubular necrosis)

-Acute tubular necrosis due to ischemia

-Acute tubular necrosis due to toxins (heavy metals, ethylene, glycol, insecticides, poison mushrooms, carbon tetrachloride)

iii) Renal interstitial injury

-Acute pyelonephritis

-Acute allergic interstitial nephritis

3. Postrenal acute renal failure, resulting from obstruction of the urinary collecting system anywhere from the calyces to the outflow from the bladder. The most common causes of obstruction of the urinary tract outside the kidney are kidney stones, caused by precipitation of calcium, urate, or cystine.

Postrenal Acute Renal Failure is Caused by Abnormalities of the Lower Urinary Tract. Multiple abnormalities in the lower urinary tract can block or partially block urine flow and therefore lead to acute renal failure even when the kidneys' blood supply and other functions are initially normal. If the urine output of only one kidney is diminished, no major change in body fluid composition will occur because the

contralateral kidney can increase its urine output sufficiently to maintain relatively normal levels of extracellular electrolytes and solutes as well as normal extracellular fluid volume. With this type of renal failure, normal kidney function can be restored if the basic cause of the problem is corrected within a few hours. But chronic obstruction of the urinary tract, lasting for several days or weeks, can lead to irreversible kidney damage. Some of the causes of postrenal acute failure include (1) bilateral obstruction of the ureters or renal pelvises caused by large stones or blood clots, (2) bladder obstruction, and (3) obstruction of the urethra.

#### PHYSIOLOGIC EFFECTS OF ACUTE RENAL FAILURE.

A major physiologic effect of acute renal failure is retention in the blood and extracellular fluid of water, waste products of metabolism, and electrolytes. This can lead to water and salt overload, which in turn can lead to edema and hypertension. Excessive retention of potassium, however, is often a more serious threat to patients with acute renal failure, because increases in plasma potassium concentration (hyperkalemia) more than about 8 mEq/L (only twice normal) can be

fatal. Because the kidneys are also unable to excrete sufficient hydrogen ions, patients with acute renal failure develop metabolic acidosis, which in itself can be lethal or can aggravate the hyperkalemia.

In the most severe cases of acute renal failure, complete anuria occurs. The patient will die in 8 to 14 days unless kidney function is restored or unless an artificial kidney is used to rid the body of the excessive retained water, electrolytes, and waste products of metabolism.

#### CHRONIC RENAL FAILURE

This is an Irreversible Decrease in the Number of Functional Nephrons. Chronic renal failure results from progressive and irreversible loss of large numbers of functioning nephrons. Serious clinical symptoms often do not occur until the number of functional nephrons falls to at least 70 to 75 per cent below normal. In fact, relatively normal blood concentrations of most electrolytes and normal body fluid volumes can still be maintained until the number of functioning nephrons decreases below 20 to 25 per cent of normal.

In general, chronic renal failure, like acute renal failure, can occur because of disorders of the blood vessels, glomeruli, tubules, renal interstitium, and lower urinary tract. Despite the wide variety of diseases that can lead to chronic renal failure, the end result is essentially the same—a decrease in the number of functional nephrons.

## Some Causes of Chronic Renal Failure

### i) Metabolic disorders

- Diabetes mellitus
- Obesity
- Amyloidosis

### ii) Hypertension

#### Renal vascular disorders

- Atherosclerosis
- Nephrosclerosis-hypertension

### iii) Immunologic disorders

- Glomerulonephritis
- Polyarteritis nodosa
- Lupus erythematosus

### iv) Infections

- Pyelonephritis
- Tuberculosis

### v) Primary tubular disorders

- Nephrotoxins (analgesics, heavy metals)

### vi) Urinary tract obstruction

- Renal calculi
- Hypertrophy of prostate
- Urethral constriction

### vii) Congenital disorders

- Polycystic disease
- Congenital absence of kidney tissue (renal hypoplasia).