**Causes of renal insufficiency and uremia**

The causes of renal insufficiency and therefore of renal failure and uremia ,can be divided into pre renal ,renal ,and post renal groups.

**Pre renal causes :**  included :-

congestive heart failure ,acute circulatory failure , either cardiac or peripheral in which acute renal ischemia occurs.

Hemoglobin uric and myoglobin uric nephrosis are also included in this category.

In ruminants severe bloat can interfere with cardiac output and lead to renal ischemia.

**Renal causes include:**

Glomerulonephritis ,interstitial nephritis, pyelonephritis ,embolic nephritis and amyloidosis .

**Postrenal uremia**

May also occur ,specifically complete obstruction of urinary tract by vesicle or urethral calculus, or more rarely by bilateral urethral obstruction .

Internal rupture of any part of the urinary tract will also cause post renal uremia.

**Pathogenesis of renal insufficiency and renal failure**

Damage to the glomerular epithelium destroys its selective permeability and permits the passage of plasma protein into the glomerular filtrate .

The protein is principally albumin ,probably because it has a lower molecular weight that than globulins.

Glomerular filtration may cease completely when there is extensive damage to glomeruli ,particularly if there is acute swelling of the kidney ,but it is belived that anuria in the terminal stages of acute renal disease is caused by back diffusion of all glomerular filtrate through the damage tubular epithelium renal than failure of filtration.

When the kidney damage is less severe ,the remaining nephrous compensate to maintain total glomerular filtration by increasing their filtration rates . when this occurs ,the volume of glomerular filtration may exceed the capacity of the tubular epithelium to reabsorb fluid and solutes .

The tubules may be an able to achieve normal urine concentration , As a result, an increased volume of urine with a constant specific gravity is produce and solute diuresis occurs. this is exacerbated if the tubular function of the compensating nephrous is also impaired.

The inability to concentrate urine is clinically evident as poly uric and is characteristic of developing renal insufficiency .

Deceased glomerular filtration also results in retention of metabolic waste products such as urea .

Phosphate and sulfate retention also occurs when total glomerular filtration is reduced and may contribute to renal metabolic acidosis .

Phosphate retention also causes a secondary hypocalcemia . due in part to an increase in calcium excretion in the urine.

In horses the kidneys are an important route of excretion of calcium so the decreased glomerular filtration rate may resulting hypercalcemia if there is a large dietary intake of calcium.

Variations in serum potassium level also occur and appear to depend on potassium intake .

Hyperkalemic can be a serious complication in renal insufficiency in man when it is one of the principal causes of the myocardial asthenia and fatal heart failure which occur in uremia .

Loss of tubular receptive function is evidenced by a continued loss of sodium , hypernatremia eventually occur in all cases of renal failure .

The continuous loss of large quantities of fluid due to solute diuresis may cause clinical dehydration.

The terminal stage of renal insufficiency renal failure is the result of the cumulative effects of impaired renal excretory and homeostatic function.

Continued loss of large volumes of dilute urine causes dehydration .

If other circulatory emergencies arise .acute renal ischemia may result leading to acute renal failure.

Prolonged hypoproteinemia results in rapid loss of body condition and muscle weakness .

Acidosis is also a contributing factor to muscle weakness and mental attitude  Hyponatremia and hyperkalemia cause skeletal muscle weakness and myocardial asthenia .

**Clinical features of urinary tract disease**

The major clinical manifestation of urinary tract disease are :

1-Abnormal constituents of urine.

2-Variations in daily urine flow .

3-Abdominal pain and painful and difficult urination (dysuria and strong urine).

4-Abnormal size of kidneys.

5-Abnormalities of the bladder and urethra .

6-Acute and chronic renal failure .