



AL-Mustaqbal University College

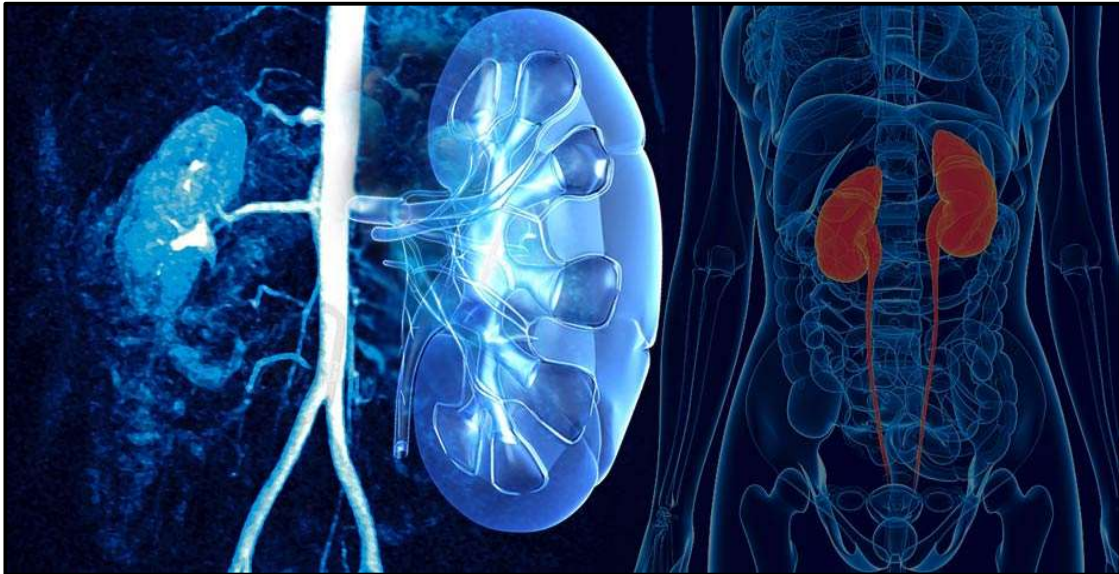
Pharmacy Department

Third stage

Practical Pathophysiology

(Disorders of Renal System)

Lab 8



Lecturer: Noor Muhsen Jawad

Disorders of Renal System

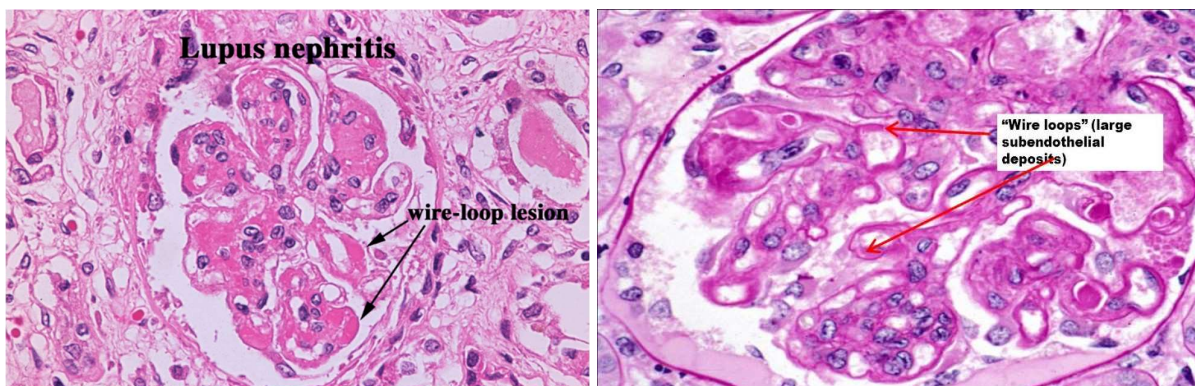
The **urinary system**, also known as the **renal system**, consists of the kidneys, ureters, bladder, and the urethra. Each kidney consists of millions of functional units called **nephrons**.

The kidney is responsible for excretion of the waste products of metabolism, the waste products being excreted in the form of an aqueous solution called **urine**.

Disorders may arise from a wide range of pathological causes, many of which are common in other organ systems (e.g., infections, tumors, drug reactions, vascular disorders). However, the kidney is unusual in that it is much more prone to immunological disorders than most other organs. **Vascular diseases** such as **hypertension, diabetes mellitus** and **vasculitis** may also have profound effects on renal function.

Nephrotic syndrome

- ❖ **Nephrotic syndrome:** Also called nephrosis, group of signs of kidney malfunction, including a low level of albumin (a protein) and a high level of lipids (fats) in the blood, proteins in the urine, and the accumulation of fluid in the tissues. Nephrotic syndrome typically results in the loss of more than 3.5 grams of proteins per day. It may result from streptococcal infection, lupus erythematosus, renal vein thrombosis, or heavy-metal poisoning.

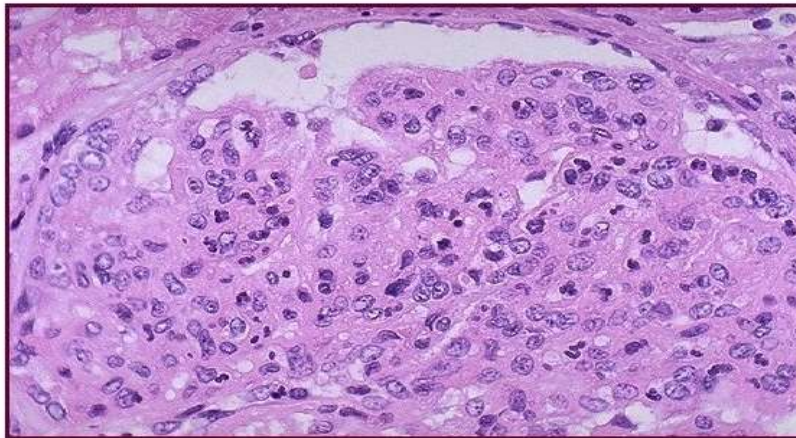


The nephrotic syndrome occurs usually in young children or young adults.

Glomerulonephritis

Glomerulonephritis is the disorder commonly known as **nephritis**, or Bright's disease. The primary impact of the disease is on the vessels of the glomerular tuft. The suffix “-itis” suggests an inflammatory lesion, and glomerulonephritis is indeed associated with infection, in the limited sense that it may begin soon after a streptococcal infection and may be aggravated in its later course by infections of various kinds.

Acute (Post-streptococcal) Glomerulonephritis



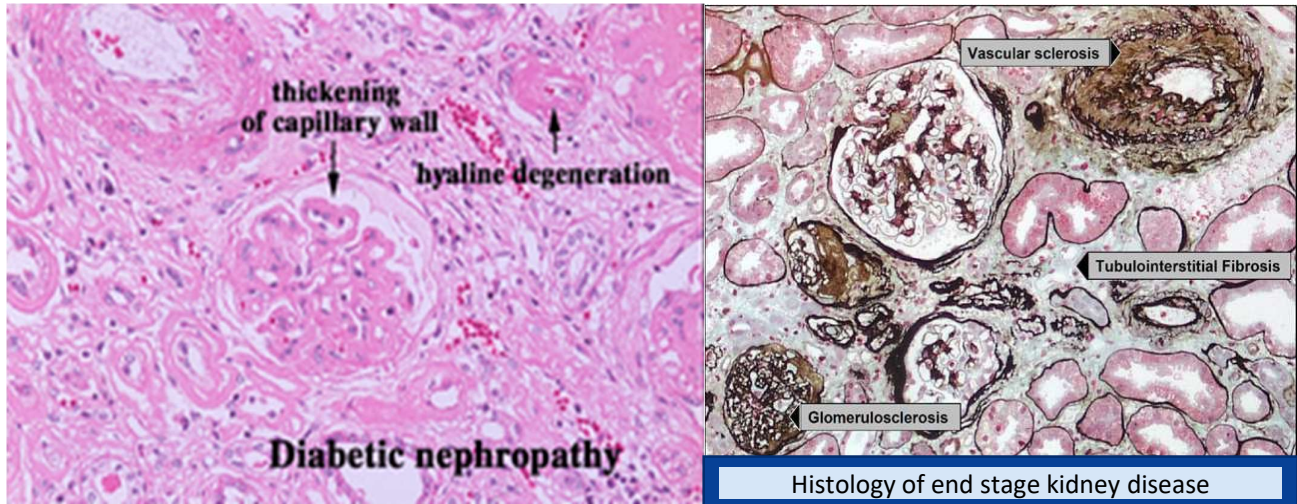
The hypercellularity of post-infectious glomerulonephritis is due to increased numbers of epithelial, endothelial, and mesangial cells as well as neutrophils in and around the glomerular capillary loops

Diabetic glomerulosclerosis

In **diabetes mellitus**, renal disease may occur in several ways. People with diabetes have an increased predisposition to the development of renal infections such as pyelonephritis. Longstanding diabetes mellitus may result in characteristic changes to the glomeruli (diabetic glomerulosclerosis).

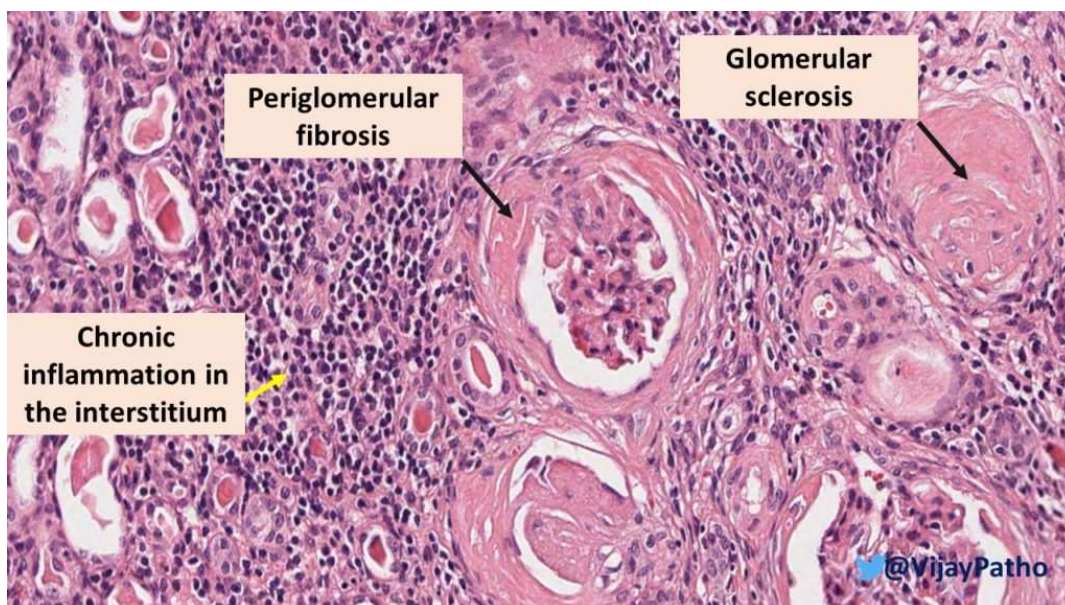
Diabetic nephropathy, also known as Kimmelstiel-Wilson disease or **diabetic glomerulosclerosis**, deterioration of kidney function occurring as a complication of diabetes mellitus. The condition is characterized primarily by increased urinary

excretion of the protein albumin, increased blood pressure, and reduced glomerular filtration rate (the average rate at which wastes are filtered out of the blood plasma by the kidneys). Diabetic nephropathy is a leading cause of end-stage renal disease (ESRD), which is characterized by kidney failure.



Pyelonephritis

Pyelonephritis: Infection and inflammation of the kidney tissue and the renal pelvis (the cavity formed by the expansion of the upper end of the ureter, the tube that conveys urine to the bladder). The infection is usually bacterial. The most common type of renal disorder, pyelonephritis may be chronic or acute.



- ❖ **Acute pyelonephritis** generally affects one specific region of the kidney, leaving the rest of the kidney structure untouched.

In acute pyelonephritis the lining of the renal structures into which urine drains, the renal pelvis and the calyces, may be inflamed. Abscesses may form in the kidney tissue, and some of the nephron tubules (urine-producing structures) may be destroyed.

- ❖ **Chronic pyelonephritis** results from bacterial infections in the kidneys over a period of years.

Acute renal failure

Acute renal failure: occurs when renal function suddenly declines to very low levels, so that little or no urine is formed, and the substances, including even water, that the kidney normally eliminates are retained in the body.

There are two main mechanisms that can produce acute renal failure.

When the cardiac output—the amount of blood pumped into the general circulation by the heart—is lowered by hemorrhage or by medical or surgical shock, the renal circulation is depressed to an even greater extent. This leads directly to inefficient excretion, but, more importantly still, the kidney tissue cannot withstand prolonged impairment of its blood supply and undergoes either patchy or massive necrosis (tissue death).

The second common mechanism of acute renal failure is toxic. Many poisons are excreted by the kidney, and in the process, like other urinary constituents, they become concentrated and thus reach levels in the tubular fluid that damage the lining cells of the tubules.

Chronic renal failure

The term **uremia**, though it is sometimes used as if it were interchangeable with chronic renal failure, really means an increase in the concentration of urea in the blood. This can arise in many acute illnesses in which the kidney is not primarily affected and also in the condition of acute renal failure described above. Uremia ought to represent a purely chemical statement, but it is sometimes used to denote a clinical picture, that of severe renal insufficiency.

As with acute renal failure, there are many conditions that can lead to chronic renal failure. The two most common causes are pyelonephritis and glomerulonephritis (kidney inflammation involving the structures around the renal pelvis or the glomeruli), and other common causes are renal damage from the effects of high blood pressure and renal damage from obstructive conditions of the lower urinary tract.