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**Diseases of the renal system.**

Common signs and symptoms of disorders of the urinary system

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| Signs/symptom | Definition and description |
| oliguria    | Urine output less than 400ml per day |
| Haematuria | Presence of blood in the urine. Leaky glomeruli allow red blood cells to escape from the glomerular capillaries and they cannot be reabsorbed from the filtrate as they are too large. Bleeding in the urinary tract also causes haematuria |
| Proteinuria  | Presence of protein in the urine. This is abnormal and occurs when leaky glomeruli allow plasma proteins to escape into the filtrate but they are too large to be reabsorbed |
| Anuria  | Absence or urine |
| Dysuria  | Pain on passing urine, often described as a burning sensation |
| Glycosuria  | Presence of sugar in the urine. This is abnormal and occurs in diabetes mellitus. |
| Ketonuria | Presence of ketones in the urine. This is abnormal and occurs in, e.g., starvation, diabetes mellitus |
| Nocturia | Passing urine during the night |
| Polyuria  | Passing unusually large amounts of urine |
| Frequency of micturition  | Requiring to pass, often small amounts of, urine frequently |
| Incontinence  | Involuntary loss of urine |

**Glomerulonephritis (GN)**

This term suggests inflammatory conditions of the glomerulus, but there are several types of GN and inflammatory changes are not always present. In many cases immune complexes damage the glomeruli. These are formed when antigens and antibodies combine either within the kidney or elsewhere in the body, and they circulate in the blood. When immune complexes lodge in the walls of the glomeruli they often cause an inflammatory response that impairs glomerular function. Other immune mechanisms are also implicated in GN.

Classification of GN is complex and based on a number of features: the cause, immunological characteristics and findings on microcopy. Microscopic distinction is based on:

• The extent of damage:

-diffuse: affecting all glomeruli

-focal: affecting some glomeruli

     Appearance:

             -proliferative: increased number of cells in the glomeruli

             -membranous: thickening of the glomerular basement membrane.

         

**Acute nephritis**

This is characterized by the presence of:

• Oliguria ( lesser than 400ml urine/day in adults)

• Hypertension

• Haematuria

• Uraemia

Loin pain, headache and malaise are also common.

**Chronic renal failure**

This occurs when nephrons are progressively and irreversibly damaged after the renal reserve is lost.

**Hypertension and the kidneys**

Hypertension can be the cause or the results of renal disease. Essential and secondary hypertension both affect the kidney when there is renal blood vessel damage, causing ischaemia. The reducing blood flows stimulates the renin-angiotensin-aldosterone system, raising the blood pressure still further.

**Essential hypertension**

**Benign hypertension**

This causes gradual and progressive damage to the glomeruli, which may lead to renal failure after the renal reserve has been lost or to malignant hypertension.

**Malignant hypertension**

This causes arteriolosclerosis which spreads to the glomeruli with subsequent destruction of nephrons, leading to a further rise in blood pressure and a variable degree of renal impairment in most people. In a few people there are more serious effects: increased permeability of the glomeruli allows escape of plasma proteins and red blood cells into the filtrate causing proteinuria and haematuria, which may progress to renal failure.

**Secondary hypertension**

This is caused by long-standing kidney diseases and may lead to chronic renal ischaemia, worsening hypertension and renal failure.

**Acute pyelonephritis**

This is acute bacterial infection of the renal pelvis and calyces, spreading to the kidney substance causing formation of small abscesses. The infection may travel up the urinary tract from the perineum or be blood-borne. It is accompanied by fever, malaise and loin pain.

**Ascending infection**

Upward spread of microbes from the bladder is the most common cause of this condition. Abnormal reflux of infected urine into the ureters when the bladder contracts during micturition predisposes to upward spread of infection to the renal pelves and kidney substance. Normally the relative positions of the ureters and bladder prevents access of microbes into the kidneys.

**Blood-borne infection**

The source of microbes may be from septicaemia or elsewhere in the body, e.g. respiratory tract infections, infected wounds or abscesses. Due to their large blood flow (20% of cardiac output) the kidneys are susceptible to infection by blood-borne microbes.

**Pathophysiology**

When the infection spreads into the kidney tissues it causes suppuration and destruction of nephrons. The prognosis depends on the amount of healthy kidney remaining after the infection subsides. Necrotic tissue is eventually replaced by fibrous tissue but there may be some hypertrophy of healthy nephrons. There are a number of outcomes: healing, recurrence, especially if there is a structural abnormality of the urinary tract, and reflux nephropathy. Perinephric abscess and papillary necrosis are complications, usually if the condition is untreated.

**Urinary tract infections (UTIs)**

Infection of any part of the urinary tract may spread upwards causing pyelonephritis and kidney damage.

**Ureteritis**

Inflammation of a ureter is usually due to the upward spread of infection in cystitis.

**Urethritis**

This is inflammation of the urethra

**Tumours of the bladder**

It is not always clear whether bladder tumours are benign or malignant. Tumours are often multiple and recurrence is common. Predisposing factors include cigarette smoking, taking high doses of analgesics over a long period and occupational exposure to some chemicals e.g aniline dyes used in the textile and printing industries.

**Urinary incontinence**

In this condition normal micturition is affected and there is involuntary loss of urine. Several types are recognized.