Diseases of urinary system Part B

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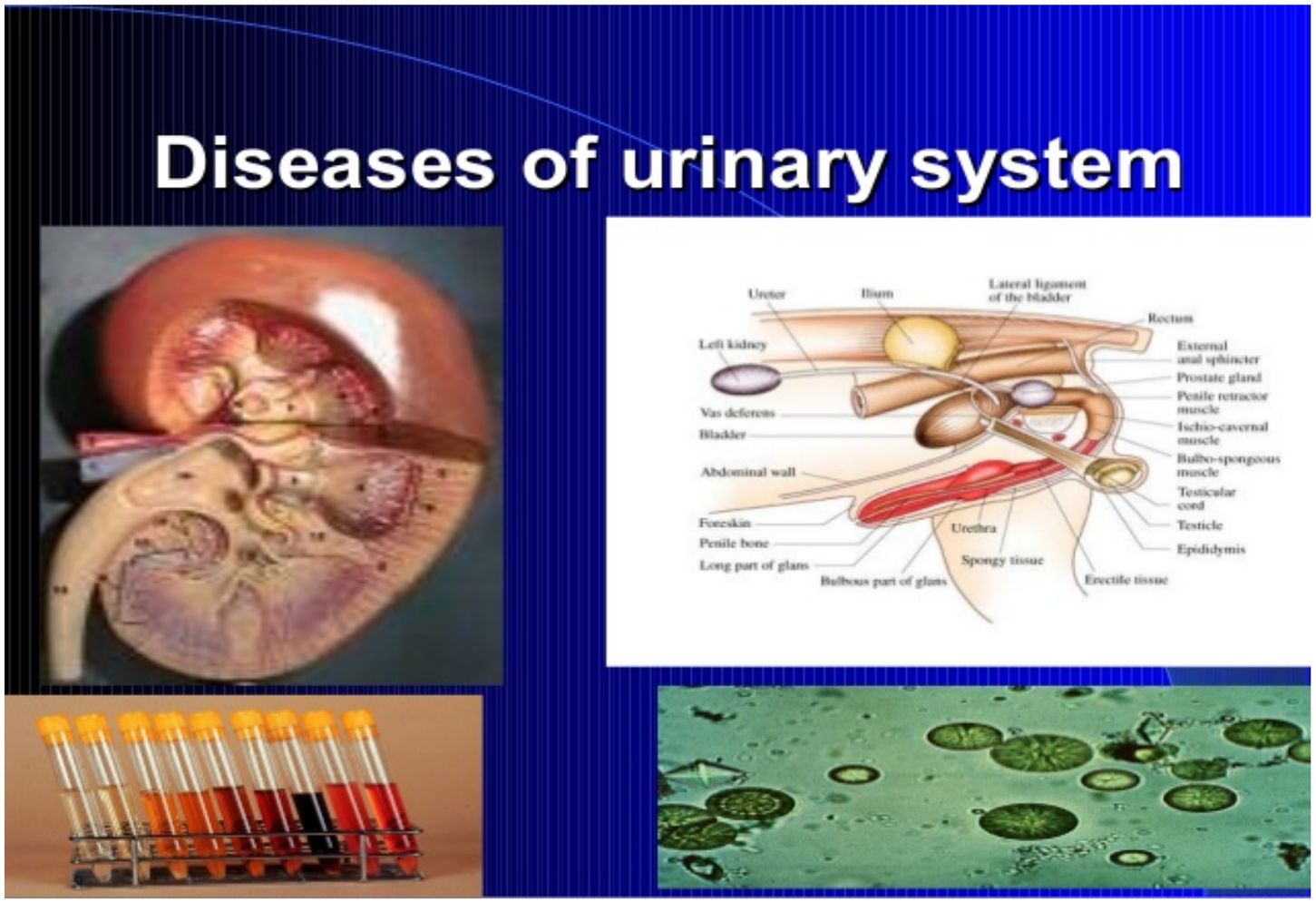

(5) Myoglobinuria

It is the presence of myoglobin (myohemoglobin) in the urine is evidence of severe muscle damage (azoturia).
Causes:

(1) It is rare in enzootic muscular dystrophy due to insufficient myoglobin in the muscles of young animals.
(2) Azoturia in equines.

Pathogenesis

The myoglobin molecule is much smaller than hemoglobin and passes the glomerulus much more readily, so a detectable dark brown staining of the urine occurs without very high plasma levels of myoglobin. It is determined by spectrographic examination. It is accompanied by myopathy and hemoglobin. Myoglobin can precipitate in tubules and may contribute to uremia.


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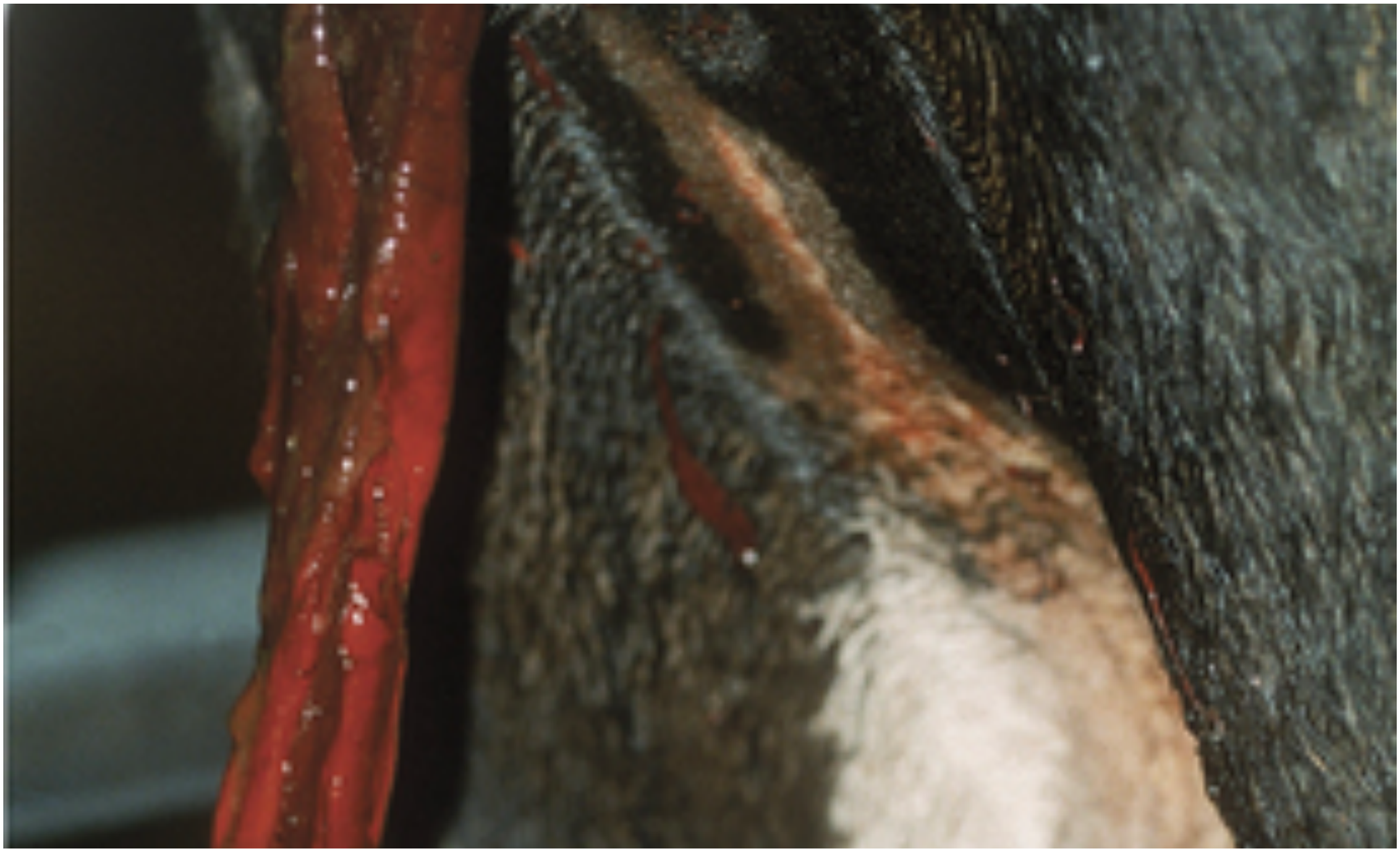
B

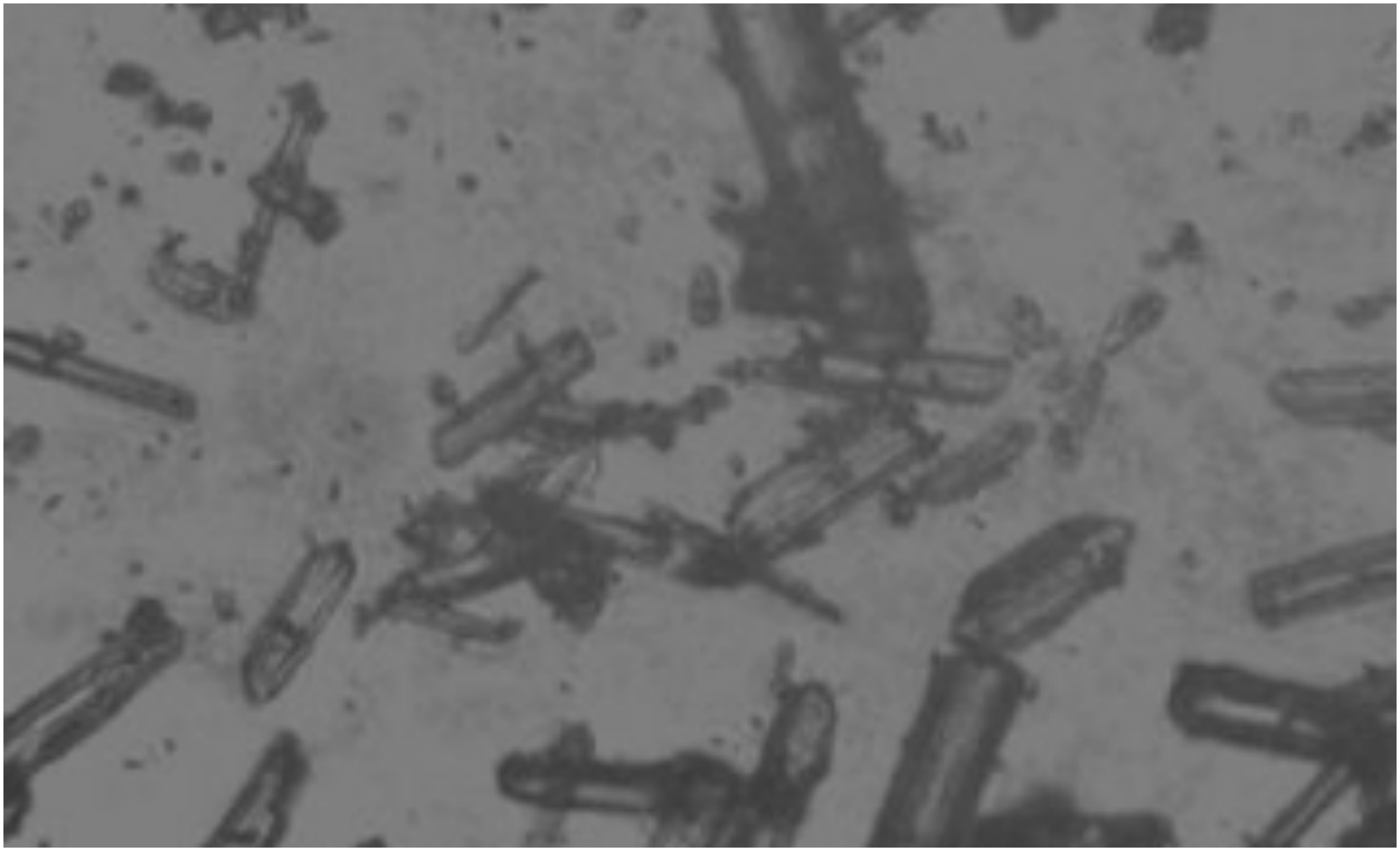
(6) Pyuria

(1) It means presence of leukocytes, or pus and bacteria in urine, indicates inflammatory exudation at some point in the urinary tract, usually the renal pelvis or bladder.
(2) It is detected by microscopic examination of urine sediment.

(7) Crystalluria

(1) Crystals in the urine of herbivorous animals have no special significance unless they occur in very large numbers and may predisposed to urolithiasis.
(2) Ca carbonate and triple phosphate crystals are common.





(8) Glycosuria and ketonuria

Glycosuria in combination with ketonuria occurs only in diabetes mellitus, a rare disease in large animals.

Causes

(1) Enterotoxemia due to Clostridium Perferenges type D.
(2) After IV treatment with dextrose solution, adrenocorticotrophichormones or Cortisone analogs.
(3) Acute tubular nephrosis due to failure of tubular resorption.
(4) Ketonuria, acetonemia of cattle and pregnancy toxemia of ewes and also occurs in starvation.

[2] Variations in daily urine flow

An increase or decrease in urine volume over 24 hours.

(1) Polyuria

It is an increase in urine volume over 24 hours period, diagnosed by determine of specific gravity or osmolality, blood urea and creatinine.

1) Extra renal causes

1- Diabetes insipidus.

2- Diuretic drugs including corticosteroids.

3- Transient: e.g. excessive water intake, Diet deficient in Na Cl, Hyperglycemia, Fear or Emotion stress.

2) Renal cause

1- Exceeded resorptive capacity of remaining tubules.

2- When the osmotic gradient in the renal medulla is not adequate to produce concentrated urine.

(2) Oliguria and Anuria

It is a reduction in the daily output (oliguria) and complete absence of urine (anuria).

Oliguria is caused by dehydration, CHF, peripheral circulatory failure and terminal stages of all forms of nephritis.

Anuria is caused by urolithiasis,

NB: It leads to retension of solutes and disturbances of acid base balance that contribute to uremia.

(3) **Pollakiuria**

It is an abnormal frequent passage of urine. It may occur with or without an increase in the volume of urine excreted and: is commonly associated with disease of the lower urinary tract such as cystitis, the presence of calculi in the bladder, urethritis, and partial obstruction of the urethra.

(4) Dribbling

It is an intermittent passage of small volumes of urine due to lack of sphincter control. Occurs in cases of non-obstruction urolithiasis and persistent urachus.

[3] Abnormal painful or difficult urination

(1) Dysuria or painful or difficult urination

It is accompanied by a frequent passage of small amounts of urine. It occurs in cystitis, vesical calculus and urethritis. Grunting and abdominal pain may occur with painful urination and: the animal may remain in the typical posture after urination is completed.

(2) Stranguria

It is a slow and painful urination which accompanied by strains to pass each drop of urine. It occurs in cystitis, vesical calculus, urethral obstruction and urethritis.

(1) Urine scalding of the perineum or urinary burn: It is caused by frequent wetting of the skin with urine.

(2) Abnormalities of the bladder: Gross enlargement of the bladder, rupture of the bladder, a shrunken bladder following rupture.

(3) Abnormalities of the urethra include enlargement and pain of the pelvic urethra and its external aspects in male cattle and ram with obstructive urolithiasis.


B

[5] Acute and chronic renal failure

The clinical findings of urinary tract disease vary with the rate of development and stage of the disease. In horses, mental depression, colic and diarrhea are common with oliguria or polyuria. Cattle with uremia are similar and in addition are frequently recumbent and may have a bleeding diathesis. In chronic renal disease of all species, there is a severe loss of body weight, anorexia, polyuria, polydipsia and ventral edema.

[6] Uremia

It is the systemic state that occurs in the terminal stages of renal insufficiency due to retention of some solutes and disturbances of acid base balances. Anuria or oliguria may occur with uremia.

Clinical signs

(1) Depressed, anorexic with muscular weakness and tremor.
(2) In chronic uremia: Poor body condition (due to continued loss of protein in the urine) and dehydration may occur.

(3) The respiration is usually increased in rate and depth but is not dyspenic; in the terminal stages it may become periodic in character.
(4) The heart rate is markedly increased because of terminal dehydration and myocardial asthenia.
(5) The term uremia is normal except in infections processes of acute tubular nephrosis.
(6) The animal becomes recumbent and comatose in terminal stages then temperature falls and death occurs quietly,
Clinical pathology:
There is a progressive metabolic alkalosis, hypercapnia and an elevation of blood urea (up to 90mmol/L) and creatinine.

Special l examination of the urinary system

Collection of urine samples

(1) Urine samples obtained by catheterization are preferred for microbiological examination. A finger can be inserted into the suburethral diverticulum to direct the tip of the catheter over the diverticulum and into the external urethral orifice. Hygienic measure is essential to avoid ascending infection. Metal or rubber cather is used to female cows and buffaloes. Male horses can also be catheterized easily if the penis is related. It is usually relaxed when the urethral obstruction is present but administration of an ataractic drug makes manipulation of the penis easier and often results in its complete relaxation. The catheter should be lubricated and rigid enough to pass through the long urethra but flexible enough to pass around the ischial arch. Rams, boars and young calves usually cannot be catheterized because of inaccessibility of the penis and the small diameter urethra.

*Steers and bulls may urinate if the preputial orifice is massaged and splashed with warm water.
*Ewes often urinate immediately after rising if they have been recumbent or occluding their nostrils.

(2) An IV injection of furosemide (0.5-0.8mg/kg BW) produces urination in most animals in about 20 minutes.
The sample is useful for microbiological examination, but composition has been drastically altered by the diuretic.

Renal function tests

They evaluate the functional capability of the kidney and, in general assess blood flow to the kidneys, glomerular filtration and tubular function.

(1) Tests of urine
1) Specific gravity of urine to measure the capacity of renal tubules to conserve fluid and excrete solute. For most species, normal specific gravity range is 1.028- 1.032. In chronic renal disease it decreases to about 1.010 but it increased in dehydration.
2) The urine osmolality gives a more direct assessment of the tubule's ability to conserve or excrete solute than does specific gravity. Sodium and inorganic phosphate are reabsorbed from the glomerular filtrate by the renal tubules and therefore, the fractional clearance of sodium and phosphate are indices of tubular function.

(3) The measurement of enzymes in urine (gammaglutamyl- transferase activity) may be useful as early indicator of tubular degeneration before the onset of renal dysfunction.

(2) Tests of blood

The tests are done by serial sampling of blood and over 12-24hour periods. Blood urea and creatinine concentrations are marked increases only after 60-75% of nephrons are destroyed and may be increased in prerenal uremia.

NB: Glomerular filtration rate and renal blood flow are evaluated by measuring the time of disappearance of the dye (phenol sulfon phthalein or sodium sulfanilate) after IV injection.

(3) Radiography

It is limited in farm animals but may be used to examine the lower urinary tract in neonatal animals.

(4) Renal biopsy

Percutaneous renal biopsy is done in cows and horses. A sample is collected by introducing a biopsy needle through the abdominal wall.

(5) Ultrasonography

In equines, It is used to visualize he kidney, to guide the biopsy needle before collecting the tissue sample, techniques for endoscopic and ultrasound.

Principles of treatment of urinary tract disease

(1) Urinary sedatives

Sedation is achieved by removing the causes of irritant by using antimicrobial, urinary acidifiers or alkalizers.

(2) Urinary antiseptics

1) Hexamine 4.8-8 g/horse, cow; 1.3-2.6 g/sheep, goat; 0.15-0.3g/dog,cat, given per os daily with sufficient quantity of water.

2) Antimicrobes (Antibiotic and or sulphonamides): After urine culture and sensitivity test. The first antimicrobials include penicillin in ruminant and trimethoprim-sulfa in horses. Treatment should continue for at least seven days and 2-4 weeks for upper urinary tract infections.

(3) Diuretics: It is used after correction of dehydration.

1) Lasix amp 1 ml/50 kBW IM or IV (Furosemide 1-2 mg/kg BW every 12 hours).
2) Osmotic diuretic e.g. glucose or mannitol (0.25-2 g/kg BW in a 20% solution). If anuria or oliguria is present, the rate of fluid administration should be monitored to prevent over hydration.
3) Electrolyte osmotic diuretic e.g. balanced electrolyte solutions or normal saline (IV) supplemented with oral potassium salts (K nitrate 2-12g/cow, horse: 1- 2g/sheep, goat or K citrate and K acetate 15+15 g/large animal daily till complete recovery).
3) Ammonium chloride 4-30g/cow, horse; 0.3 g three times daily/dog, cat, per os. It is diuretic, urinary acidifier and respiratory expectorant.

(4) Urinary acidifiers:

1) Sodium acid phosphate or monobasic sodium phosphate / o s / 0.3 g/ three times daily for dog, cat; 30 g as initial dose for cow, horse then 15 g twice daily.
2) Oral dosing of hexamine or ammonium chloride after 15-20 minutes of dosing acid phosphate give good results.
3) Saline (Isotonic or hypertonic) solution up to 5 liters for large animal.

(5) Urinary alkalizers
K or Na bicarbonate 120g/cow, 60g/horse, l-5g/dog per os daily till complete recovery for alkalizer acidic urine especially when sulphonamide are used.

(6) Renal wash
Slowly IV glucose 5-25% (Renal wash, diuretic, energy supply) and or saline solution.

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