Concretions

- Calculi
  - Urinary Calculi
  - Biliary Calculi
  - Salivary Calculi
  - Pancreatic Calculi
  - Enteric Calculi
- Piliconcretions
- Phytoconcretions
- Polyconcretions

Model Questions
CONCRETIONS
Concretions are solid, compact mass of material endogenous or exogenous in origin found in tissues, body cavities, ducts or in hollow organs. Concretions are stone like bodies commonly occur in urinary system, gall bladder and gastrointestinal tract. Concretions of endogenous origin are known as calculi while those formed from exogenous material are known as pilconcretion (Hair), phytoconcretion (plant fibers) and polyconcretion (Polythenes).

Calculi
Calculi are formed due to deposition of salts around the nucleus/nidus consisting of either fibrin, mucus, desquamated epithelial cells or clumps of bacteria. Due to the gradual and repeated precipitation of salts, calculi becomes laminated. In the formation process of calculi the inner structural arrangement gets shrinkage producing a rough superficial surface. Calculi formation is more common in urinary system and in gall bladder of man and animals; however, they may also occur in salivary gland, pancreas and intestines.

URINARY CALCULI
Urinary calculi are formed in renal tubules, pelvis or in urinary bladder which may carried away through urine and may cause obstruction in ureter or urethra. Urinary calculi is also known as urolith and the process of formation of calculi is termed as urolithiasis (Fig. 10.1 & 10.2).

Etiology
- Vit A deficiency
- Bacterial infection e.g. E.coli, Micrococci, Streptococci.
- Sulfonamide therapy
- Hormonal therapy
- Hyperparathyroidism

Macroscopic features
- May vary in size from 1 mm to several mm
- Mostly rounded, pearl like, laminated.
- Brown, grey and yellowish in colour.
- Enlargement and fibrosis of kidneys.

Microscopic features
- In kidney sections tiny, laminated bodies of concretion.
- Hydronephrosis
- Chemical composition of urinary calculi may vary in various species of animals.
- Horse- Calcium carbonate, calcium phosphate, magnesium carbonate
- Ruminants- Calcium phosphate, magnesium phosphate, aluminium phosphate, calcium oxalate.
- Pigs- Ammonium phosphate, magnesium phosphate, calcium carbonate, magnesium carbonate, magnesium phosphate, magnesium oxalate.
- Dogs- Calcium carbonate, calcium phosphate, sodium urate, ammonium urate.

BILIARY CALCULI
Biliary calculi are formed in gall bladder and bile ducts and are also known as choledolith. These are common in man; however, in cattle and pigs gall stones are also seen. They are semisolids but become hard and brittle on drying.

Etiology
- Bacteria
- Sand particles
- Particles of ingesta / intestinal contents
- Desquamated epithelium

Macroscopic features
- In gall bladder and bile duct
- 1 mm to 3-4 cm in diameter.
- Their number vary from 1 to many
- Obstructive jaundice
- Cholecystitis and cholangitis

Microscopic features
- In sections, concentric layers of cholesterol, bilirubin, calcium carbonate and coagulated material.
- Cholecystitis, cholangitis.
Fig. 10.1. Photograph of kidney of bullock showing presence of calculi A. Gross intact kidney B. Cross section of kidney and C. Microscopic structure of kidney having concretion.

Fig. 10.2. Diagram showing predilection site of calculi in sigmoid flexure of urethra in bullocks

Fig. 10.3. Photograph of enterolith A. Intact B. Cross section of enterolith

Fig. 10.4. Photograph of Piliconcretion

Fig. 10.5. Photograph of Polyconcretion
SALIVARY CALCULI
Salivary calculi are formed in excretory ducts of the parotid, sublingual and submaxillary salivary glands. Size of such calculi vary upto 25-30 mm diameter. They are made up of salts like calcium carbonate, calcium phosphate, magnesium carbonate, sodium carbonate, calcium carbonate, around the plant fibers. Salivary calculi also known as sialolith.

PANCREATIC CALCULI
Pancreatic calculi or pancrealolith are rare in occurrence in animals but may be found in cattle. Pancreatic calculi is gray in colour with size upto few centimeter. They are made up of calcium carbonate, calcium oxalate and calcium phosphate around a nidus of cholesterol or fatty acids.

ENTERIC CALCULI
Enteric calculi or enterolith are common in horses, which occur mostly in large intestine ‘colon’. In horse, a nidus is surrounded by wheat and rye bran containing magnesium phosphate. The nidus may be a piece of metal or sand on which concentric layers are deposited. They may be looking like a ball in round or oval in shape (Fig. 10.3). Colour of enterolith may vary from grayish to dark brown. In dogs, bone in diet may provide a nidus and such concretions are known as coproliths.

PILICONCRETIONS
Piliconcretions are hair balls occur due to excessive licking of skin in calves or in adults. Due to licking, animals swallow large amount of hairs taking a shape of ball due to movements of stomach. Mostly, the hair balls are found in stomach or in colon (Fig. 10.4).

PHYTOCONCRETIONS
Phytoconcretions are formed around the food materials and may occur in stomach and intestine of animals and in crop of poultry. They may cause obstruction of bowel. They are also known as phytobezoars.

POLYCONCRETIONS
They are made-up of polythenes and excessive deposition of salts around them. They may vary in size from few centimeters to several centimeters and weighed upto kilograms. They cause obstruction leading to death of animals (Fig. 10.5).

MODEL QUESTIONS

Q. 1. **Fill in the blanks with suitable word(s).**
1. Concretions of endogenous origin are known as …………………. Which occurs due to nidus provided by …………………. …………………. …………………. and ………………….
2. In ruminants, the urinary calculi is made up of …………………. …………………. …………………. and ………………….
3. Gall stones may cause………………. …………………. and …………………. which may lead to ………………….
4. Enterolith commonly occurs in …………………. in horses.
5. Coprolith occurs in …………………. due to eating of ………………….

Q. 2. **Write true or false against each statement and correct the false statement.**
1. …………………Vitamin B deficiency may lead to formation of urinary calculi.
2. …………………Polyconcretions are made up of polythenes.
3. Hair balls are also known as phytobezoars.
4. Choleliths may lead to toxic jaundice.
5. Uroliths may cause hydronephrosis.

Q. 3. Write short notes on:
1. Urolithiasis
2. Piliconcretions
3. Enteroliths
4. Polyconcretions

Q. 4. Define the followings:
1. Phytobezoars
2. Coproliths
3. Piliconcretions
4. Sialolith
5. Nidus
6. Cholecystitis
7. Cholangitis
8. Hydronephrosis
9. Pancrealolith
10. Obstructive jaundice

Q. 5. Select appropriate word(s) from the four options given with each statement.
1. Calculi are stone like bodies which have ……………….origin.
   (a) Endogenous (b) Hematogenous (c) Exogenous (d) None of the above
2. Piliconcretions are made up of ……………..
   (a) Plant fibers (b) Polysterene (c) Hairs (d) Desquamated cells
3. Urinary calculi are formed in renal tubules and in horse they are made up of ……………..
   (a) Calcium carbonate (b) Calcium phosphate (c) Magnesium carbonate (d) All of the above
4. Choleoliths may cause ………..
   (a) Toxic jaundice (b) Post hepatic Jaundice (c) Prehepatic jaundice (d) Hemolytic jaundice
5. Sialoliths occur in ……………..
   (a) Pancreas (b) Salivary gland (c) Sinus (d) Seminal vesicle
6. Coprolith may occur in dogs due to presence of ………………in food.
   (a) Sand (b) Muscles (c) Plant fibers (d) Bones
7. Cholelithiasis may lead to inflammation of ………
   (a) Gall bladder (b) Intestine (c) Stomach (d) Pancreas
8. Enteric calculi are more common in horse due to feeding of ………
   (a) Grams (b) Wheat bran (c) Grass (d) Beans
9. Polyconcretions are formed due to accumulation ………………. in G.I. Tract.
   (a) Hairs (b) Polysaccharides (c) Polyuria (d) Polysterene
10. Vitamin ………. deficiency may lead to formation of urinary calculi.
    (a) A (b) B (c) D (d) K