CHOLELITHIASIS [GALL STONES]

CHOLESTEROL STONES

- >50% of crystalline cholesterol monohydrate
- Rest :- - Calcium salt
  - Bile pigments
  - proteins
  - FA

PIGMENT STONES

- Mainly Bilirubin - Calcium salts (unconj.)
  - 'Black' type
  - 'Brown' type

RISK FACTORS :-

CHOLESTEROL STONES :-

- Americans
- Advancing Age
- Female sex hormones
  - Female Gender
  - OCP
  - Pregnancy
- Obesity & metabolic syndromes
- Rapid weight reduction
- Gall bladder stasis/hypomotility
  - Prolonged parenteral nutrition
  - Fasting
  - Pregnancy
  - Drugs like octreotide

PIGMENT STONES :-

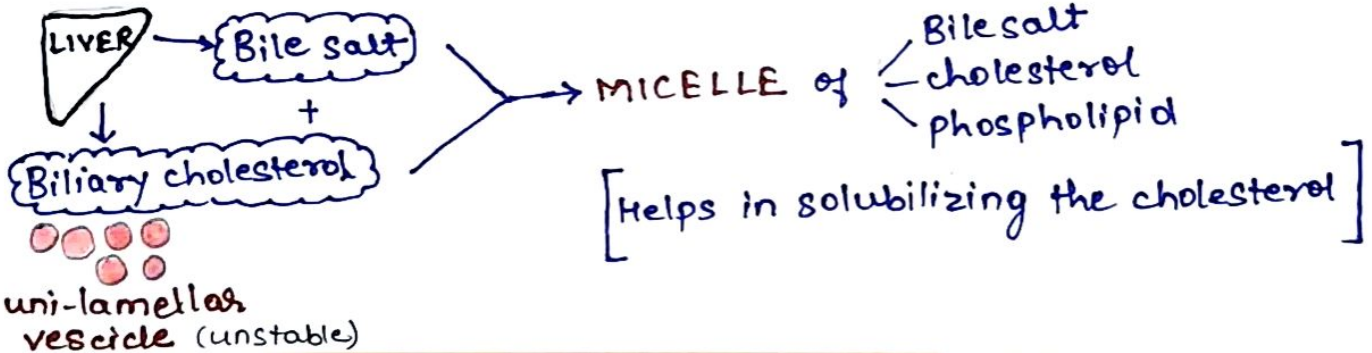
- Asians
- Alcoholic Liver Cirrhosis
- Biliary Infection
- Chronic Hemolytic Anemia
- Ileal disease / Ileal resection

PATHOGENESIS :-

Normally :- Liver → forms → Cholesterol (in form of uni-lamellar vesicle) (unstable)

uni-lamellar vesicle ⇓ means

Molecule of cholesterol surrounded by one phospholipid bilayer



Pathogenesis of cholesterol stones :-

If ↑ cholesterol or ↓ Bile salt } cholesterol exceeds solubilizing capacity of bile

k/a

Cholesterol SUPERSATURATION

↓

Unilamellar vesicles gets converted to multilamellar vesicles [multiple layer of phospholipi

↓

NUCLEATION [Aggregation]

Pronucleating factors
- Mucin
- Calcium

Antinucleating factors
- Apoprotein
- Lecithin

↓

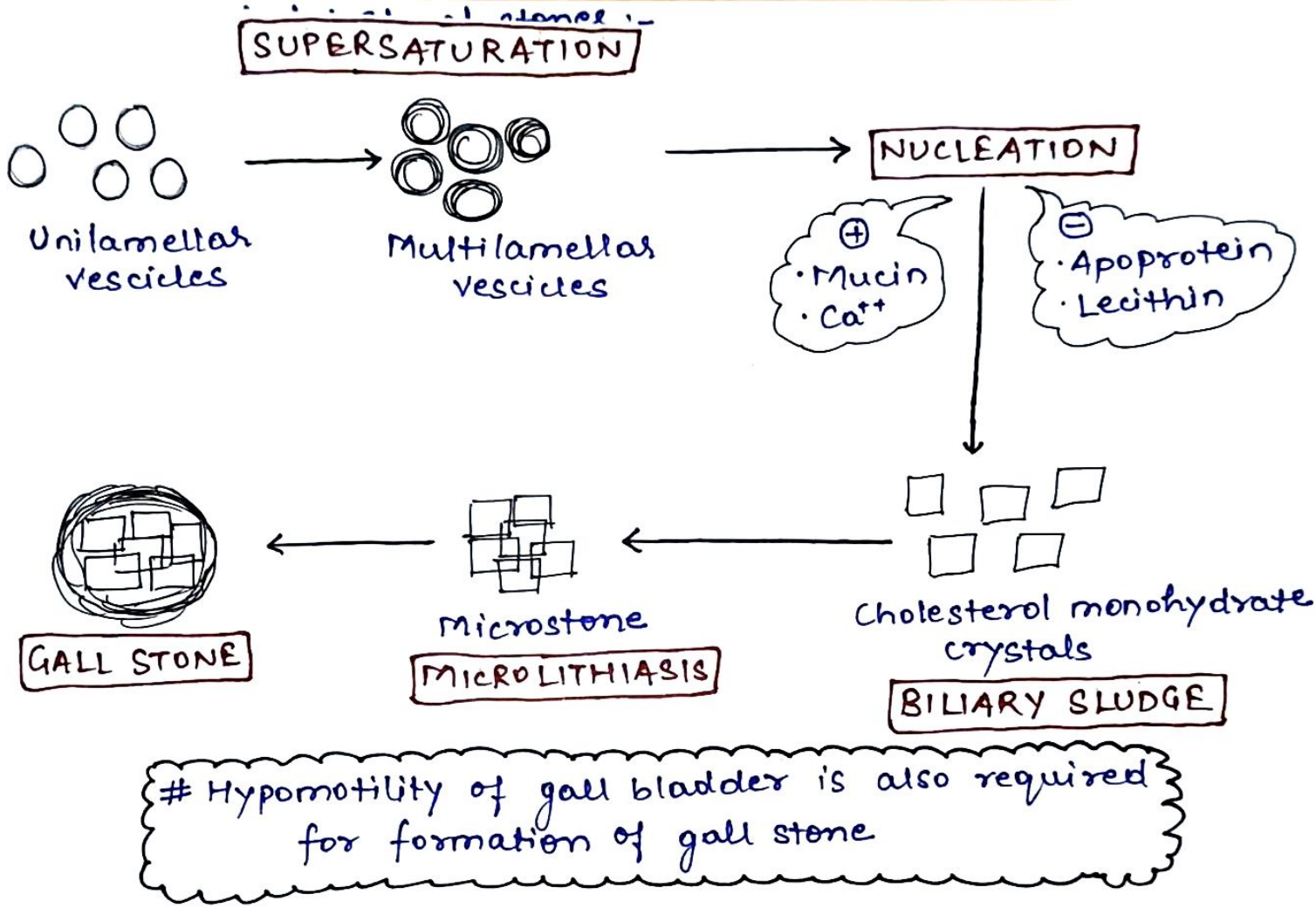
BILIARY SLUDGE

↓

MICROSTONE

↓

GALL STONE


SUPERSATURATION
Unilamellar vescicles
Multilamellar vescicles
NUCLEATION
⊕
·Mucin
·Ca++
⊖
·Apoprotein
·Lecithin
Cholesterol monohydrate crystals
BILIARY SLUDGE
Microstone
MICROLITHIASIS
GALL STONE
Hypomotility of gall bladder is also required for formation of gall stone

Pathogenesis of pigment stones :-

- Chronic hemolytic Anemia
- Bacterial contamination of biliary tree
- Ileal dysfunction / resection

⟹ ↑ unconjugated Bilirubin

⇓

Bilirubin - Calcium salts

Bacteria releases

↓

β - Glucuronidases

↓

hydrolyses bilirubin glucuronide

↓

unconjugated bilirubin

Morphology :-

Cholesterol stones :-

Pure cholesterol stones
- Pale yellow
- Round to ovoid
- fine & granular
- Hard external surface
- Radiolucent

Stone With ↑ proportion of Calcium, Bilirubin, phosphate
- Grey white to Black
- Lamellated
- Radioopaque

cholesterol stones may diffuse into mucosa k/a cholesterolosis

Pigment stone :-

BLACK pigment

- composed of pure Calcium Bilirubinate
- Mainly seen in sterile gallbladder bile

BROWN pigment

- composed of Calcium Bilirubinate $\bar{c}$ varying amount of < cholesterol / protein
- Mainly seen in infected gallbladder bile.

CLINICAL FEATURES :-

⇒ 70-80% patients remains asymptomatic throughout their lives

⇒ Symptoms → Biliary colic

- constant pain (Not colicky) =(Misnomer)
- pain follows fatty meal that induces GB contraction
- In epigastrium or Rt. upper quadrant of abdomen → Primary site

- Radiates to Rt. scapula / shoulder / interscapular area
- Begins suddenly & may persist with severe intensity for 30 mints to 5 hrs, subsiding gradually

An episode of pain persisting beyond 5hrs may be suspected to ACUTE CHOLECYSTITIS

⇒ Biliary colic + ↑ Bilirubin/ALP ⇒ Common duct stone

⇒ Biliary colic + Rigrous fever & chill ⇒ · cholecystitis
· pancreatitis
· cholangitis

#Diagnosis :-

Gallbladder USG is procedure of choice.

Treatment :-

⇒ Cholecystectomy (surgical removal)

⇒ UDCA (Ursodeoxycholic acid) → If radiolucent stone < 5mm in diameter