

## Charcot's Triad

### Definition

- The triad consists of fever, right upper quadrant (RUQ) pain, and jaundice
  - Fever: > 100.4
  - Abdominal pain: typically severe
  - Jaundice:
    - Normal direct bilirubin level: 0.1-0.3 mg/dL (1.71-5.13 mcmol/L)
    - Normal indirect bilirubin level: 0.2-0.7 mg/dL (3.42-11.97 mcmol/L)
    - Note: the yellow tint of the eyes/skin associated with jaundice is caused by yellow bile pigments accumulating in the blood which are eventually deposited in the skin

### Etiology

- Acute cholangitis (inflammation of the wall of bile ducts; usually caused by bacterial infection of the lumen)

### Anatomy

- **Bile:** an alkaline solution containing bile salts, bile pigments, cholesterol, triglycerides, phospholipids, and electrolytes; produced in the liver and stored in the gallbladder
- **Bile canaliculi:** tiny canals that bile flows through toward the bile duct branches
- **Bile duct:** fusion of the cystic duct and the common hepatic duct
- **Bilirubin:** a yellow-pigmented waste product formed by the breakdown of erythrocytes; found in bile; removed from the body through elimination of feces
- **Common hepatic duct:** composed of several bile ducts that fuse together; travels downward toward the duodenum
- **Cystic duct:** drains the gallbladder
- **Portal triad:** contains a branch of the hepatic artery, a branch of the hepatic portal vein, and a bile duct; located at each of the six corners of the right/left lobule

### Pathophysiology

1. Obstruction of bile flow
  - a. Most commonly caused by choledocholithiasis (stones within the biliary tree) but can also be caused by surgery, tumors, indwelling stents/catheters, acute pancreatitis, and benign strictures
2. Bacteria enters the biliary tract through the sphincter of Oddi
  - a. Usual pathogens are: *E. Coli*, *Klebsiella*, *Enterococci*, *Clostridium*, and *Bacteroides*

### Pearls

- The additional presence of altered mental status and hypotension (known as Reynolds pentad) signifies acute suppurative cholangitis and is an endoscopic emergency
- Bile duct obstruction lasting > 30 days results in liver damage leading to cirrhosis

### References

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3. Marieb EN, Hoehn K. Anatomy & Physiology. 3<sup>rd</sup> ed. San Francisco, CA: Pearson Benjamin Cummings. 2008; 802-806.
4. Papdakis MA et al. Current Medical Diagnosis and Treatment. 53<sup>rd</sup> ed. McGraw-Hill Education; 2014; 643, 685-687.