Surgical Disease of the Liver and Biliary Tract

Anatomy

- Gall bladder lies between quadrate and right medial lobes of the liver
- Cystic duct (GB to first hepatic duct)
- Hepatic duct (liver to the cystic/common bile duct)
- Common bile duct (from first hepatic duct to papilla in duodenum)
    - Must remain patient at all costs or else we have an EHBDO

Blood supply

- Hepatic artery
    - 20% of blood supply and 50% of oxygen supply
- Portal vein
    - 80% of the blood supply and 50% of oxygen supply
- Hepatic veins
    - Drain into the caudal vena cava

Liver Surgery

- Be prepared for hemorrhage
    - Liver tissue is friable and difficult to control hemorrhage
    - Bleeding can be profuse and life-threatening
- Produces coagulation factors
    - Check coagulation panel

Liver Biopsy

- Suture fracture technique
    - For diffuse hepatopathy
    - Look for a liver lobe with pointed margin
- Placement of overlapping sutures
    - Helpful when areas that cannot be easily looped around need to be sampled
    - Only works for lesions on lobe margins
- Skin punch technique
    - Useful for biopsy away from margins of lobe
    - Can fill biopsy holes with gelatin sponge
- Laparoscopic liver biopsy
    - Camera port – subumbilical
    - Instrument port – cranial left or right quadrant
    - Usually to manage generalized liver disease

Reasons for surgery

- Liver neoplasia
    - CBC
        - Leukocytosis, anemia, thrombocytosis
    - Biochemistry
        - Elevations in liver enzymes are common but not always seen
    - Imaging
        - Radiographs – soft tissue opacity in the cranial abdomen
        - Thoracic radiographs for met check
        - Abdominal US – massive/nodular/diffuse/cavitated
        - CT/MRI – good for demonstrating location/extent of disease
    - FNA/core biopsy
        - Often non-diagnostic due to the hemorrhage and vascularity of the liver

Liver resection

- Can be partial or complete
    - Typically recommended for single tumors
- Mostly performed with surgical staplers
    - Blunt dissection and suture ligation is used in some cases
- Thoracoabdominal stapler
- 70% liver resection is tolerated acutely!
    - MST for single large liver tumors removed surgically >1470 days

Biliary Tract

Extra-Hepatic Biliary Obstruction

- Extraluminal
    - Pancreatitis (most common cause – not always surgical)
    - Neoplasia
- Intraluminal
    - Cholelithiasis
    - Gall bladder mucoceles (most common surgical problem)
- Intramural
    - Neoplasia

Feline

- Inflammatory disease ~70%
    - Cholangiohepatitis 93%

    - Cholecystitis 89%
    - Cholelithiasis 40%
    - Pancreatitis 47%
    - Hepatic lipidosis 28%
- Neoplastic 30%
    - Pancreatic adenocarcinoma
    - Biliary adenocarcinoma
- Triaditis
    - EHBDO
        - Cholangiohepatitis
        - Pancreatitis
        - IBD
    - Labratory diagnostics
        - Hyperbilirubinemia
        - Increase serum ALP, ALT, GGT
        - Leukocytosis - inflammation
        - Hypoalbuminemia
        - Urinalysis bilirubinemia
        - Coagulation profile
    - Imaging
        - Plain radiographs
            - Cholelithiasis
        - Abdominal US
            - CVD and GB distention
- Bile peritonitis
    - Secondary to biliary rupture/leakage
    - Most important underlying causes
        - Trauma
        - Necrotizing cholecystitis
        - Ruptured gall blader mucocele
        - Rupture secondary to EHBO
    - Bile causes severe chemical peritonitis
        - Potential for sepsis if bile was infected

Main goal of managing bile peritonitis

- Source control!
- Remove or repair the gall bladder
- Thorough abdominal lavage
- Bile peritonitis is a surgical emergency!

Mucoceles

- Underlying lesion is cystic mucinous hyperplasia of gall bladder
- GB full of thick gel-like congealed bile
- CSx from silent to EHBO +/- rupture
- Cholecystectomy is treatment of choice
    - High mortality rate ~5-26%
        - Depends on the criteria of the surgery (sick vs healthier animals)
- Ultrasound is the primary diagnostic method
    - Stellate appearance in mature cases
- Surgical options
    - Choledochal catheterizing and flushing
    - Cholecystectomy
        - Open or laproscopic
    - Re-routing
        - Cholecystoduodenostomy
        - Cholecystojejunostomy
    - Bile duct trauma
        - Primary repair

Biliary diversion

- Biliary stenting
    - Bypasses injury or obstruction in the common bile duct
    - Temporary
    - Permanent
- Cholecystoduostomy
    - Requires a healthy gall bladder

Decision making in surgical procedures

- Primary gall bladder dz with patient CBD (mucocele, cholecytolithiasis, GB neoplasia or trauma)
    - Cholecystectomy
- Bile duct not patent but can catheterize
    - Biliary stenting
- Bild duct not patent and cannot catheterize
    - Cholecystoduodenostomy
- Traumatic injury or rupture of common bile duct
    - Primary closure +/- stenting or Cholecystoduodenostomy

Post-operative management

- Biliary surgery has a high mortality rate
- Intensive medical management postoperatively is necessary
    - Continued IVF therapy
    - Electrolytes
    - Nutrition
    - Antibiotic therapy
        - Contamination from intestinal leakage possible
        - Abdominal drainage if deemed necessary

Post-operative complications

- Bile peritonitis
- Hemorrhage
- CBD ischemia/necrosis
- Pancreatitis
- Septic peritonitis secondary to enterotomy dehiscence
- Re-obstruction of bile flow
- Ascending cholangiohepatitis with re-routing procedures