HEPATIC SURGERY

Susanne Åkerblom
Chief of Surgery
Swedish Specialist in Surgery (Small Animal)
ANATOMY

• Majority of the liver lies on the right side of the median plane

• Four lobes, four sublobes and two processes

• Left lobe is the largest

• Quadrate lobe almost in the midline
• Loosely attached to surrounding structures by
  • The caudal vena cava
  • The coronary ligament
    • Large right-sided triangular ligament
    • Small right-sided triangular ligament
    • Left-sided triangular ligament
  • The hepatorenal ligament
  • The lesser omentum
• Vascular supply
  • Hepatic artery (20% of blood, 50% of oxygen)
  • Portal vein (80% of blood, 50% of oxygen)
  • Hepatic veins (6-8)
PREOPERATIVE CONSIDERATIONS

• Risk of life threatening hemorrhage
  • Coagulation profile, blood type, cross match
  • Preoperative treatment with fresh whole blood, fresh frozen plasma and vitamin K may be necessary

• Hypoglycemia
  • Small or debilitated patients

• Bacteria
  • Most common isolates in dogs Clostridium perfringens, Staphylococcus spp
  • Cats E.coli, Enterococcus spp, Bacteroides spp, Clostridium spp

• Anaesthesia
  • Avoid halothane
  • Be prepared for mechanical ventilation
HEMOSTASIS IN HEPATIC SURGERY

- Capsular hemorrhage
  - Pressure
  - Surgical clips or staples
  - Vascular occlusion
  - Topical hemostatic agents

- Extensive hemorrhage
  - Vascular occlusion techniques
HEMOSTASIS IN HEPATIC SURGERY

- Capsular hemorrhage
  - Pressure
  - Surgical clips or staples
  - Vascular occlusion
  - Topical hemostatic agents

- Extensive hemorrhage
  - Vascular occlusion techniques
Pringle manoeuver

- Occlusion of vascular inflow
- Total occlusion time must be less than 20 minutes

- Identify epiploic foramen
  - Caudal vena cava dorsally
  - Portal vein ventrally
  - Celiac artery caudally
  - Porta hepatis cranially

- Digitally compress hepatic artery and portal vein
LIVER BIOPSY

- Fine needle aspiration
- Cutting needle aspiration (Tru-Cut)
- Punch biopsy
- Wedge biopsy
- Suture fracture technique
- Harmonic scalpel, LigaSure
- Laparoscopic biopsy
Punch biopsy

- Lesion located away from the periphery of the lobe

- Pieces of hemostatic sponge cut with same punch

- Punch inserted in the desired site
  - Do not penetrate more than half the thickness of the liver

- Biopsy is removed and plug of hemostatic sponge is inserted in the hole
Wedge biopsy

- Only lesions at the periphery

- Cut a triangular biopsy from the edge

- Suture with a horizontal mattress
  - Do not overtighten – just appose the edges
  - 0 to 2-0 polyglactin 910, polydioxanone, polyglyconate

- Alternatively preplace several overlapping guillotine sutures around margin of lesion
Suture fracture technique

- Only lesions at the periphery

- Place a crushing Kelley clamp across the tip of the lobe
- Place an encircling loop of suture proximal to the clamp
  - Monofilament absorbable suture
- Hepatic parenchyma distal to the suture is excised
PARTIAL HEPATIC LOBECTOMY

- Smaller more peripheral lesions
- Cases when liver hilum is not accessible
- Transect liver capsule
- Blunt dissection to identify larger vessels and bile ducts
  - Larger vessels/ducts ligated or sealed with vessel-sealing devices
  - Smaller vessels/ducts can be sealed with electrocautery or staples
- Surgical stapling devices may be used
COMPLETE HEPATIC LOBECTOMY

• Indicated in focal lesions involving 1-2 hepatic lobes

• Most lobes have a single lobar portal vein and a single lobar hepatic vein

• Left lobes maintain separation near hilus
  • In small dogs and cats an encircling ligature around the base of the lobe sufficient

• Right lateral and caudate lobes careful dissection around hepatic vena cava necessary
• Limits of acute hepatic resection unclear
• Staged resection makes larger resection possible

• Left lateral and medial lobes - 44%
• Right lateral and caudate lobes - 28%
• Right medial and quadrate lobes - 28%

• Complications
  • Hemorrhage
  • Portal hypertension
  • Liver failure
• Left lobectomy small dogs and cats
  • Transect triangular ligaments
  • Crush parenchyma near hilus with finger or forceps
  • Pass an encircling ligature around the crushed area and tighten
  • Resect liver lobe distal to ligature
• Lobectomy of right, caudate or left lobes in larger dogs
  • Transect triangular ligaments
  • Carefully dissect the lobe from the vena cava
  • Isolate and ligate blood vessels and bile ducts near the hilus
  • Resect parenchyma distal to ligature

• Surgical stapling devices preferred over suturing if possible because of lower risk of ligature slipping
HEPATIC ABSCESSES AND CYSTS

- Uncommon in both dogs and cats
- Most common isolates
  - Dogs: *E.coli*, *Staphylococcus spp*, *Enterococcus spp*, *Klebsiella spp*
  - Cats: *E.coli*
- Cats mostly in the right liver lobes
- Dogs better prognosis than cats

- Combination of medical and surgical management
• Percutaneous drainage and alcoholization reported to be effective

• Abscess aspirated percutaneously under ultrasounded guidance
• 95% ethanol (half of aspirated volume) injected into the abscess and left for 3 minutes
• No reported complications
• Only one single treatment required
LIVER LOBE TORSION

• Uncommon disease
• Middle-aged to older large-breed dogs

• Usually left lateral lobe

• Surgical emergency
  • Lobectomy
  • +/- prophylactic gastropexy

• Prognosis excellent if treated promptly
HEPATIC TRAUMA

- Usually the result of blunt abdominal trauma
- Small capsular lacerations and parenchymal fractures often resolve spontaneously

- Aim of treatment
  - Control of hemorrhage
  - Debridment of devitalized tissue

- Omentalization
HEPATIC NEOPLASIAS

• 0.6-2.6% of all neoplasias involve the liver

• Primary hepatic neoplasms
  • 30% benign hepatocellular adenomas
  • 50-70% hepatocellular carcinomas
  • Other forms neuroendocrine carcinomas, mesenchymal tumours, mast cell tumours, histiocytic sarcoma

• Liver a common place for metastatic neoplasia
• Hepatocellular tumours
  • Metastasize to regional lymph nodes, lungs and peritoneum
  • Surgical resection treatment of choice if massive form
  • Favourable prognosis (MST >1460 days)
  • Poorer prognosis if situated in the right side of the liver

• Neuroendocrine tumours
  • Mainly intrahepatic in dogs, extrahepatic in cats
  • Metastazise to regional lymph node and peritoneum
  • Aggressive tumour with poor prognosis
• Hepatocellular tumours
  • Metastasize to regional lymph nodes, lungs and peritoneum
  • Surgical resection treatment of choice if massive form
  • Favourable prognosis (MST >1460 days)
  • Poorer prognosis if situated in the right side of the liver

• Neuroendocrine tumours
  • Mainly intrahepatic in dogs, extrahepatic in cats
  • Metastazise to regional lymph node and peritoneum
  • Aggressive tumour with poor prognosis
• Mesenchymal tumours
  • Dogs:
    • hemangiosarcoma, leiomyosarcoma, osteosarcoma, fibrosarcoma, mesenchymoma, chondrosarcoma
  • Cats:
    • hemangiosarcoma most common, leiomyosarcoma, rhabdomyosarcoma, osteosarcoma, fibrosarcoma

• Surgical resection treatment of choice

• Prognosis very guarded due to metastatic behaviour
• Mast cell tumours
  • Usually metastatic, but may be primary hepatic
  • Surgery useless
  • Medical management
  • Grave prognosis

• Histiocytic sarcoma
  • Focal or disseminated (malignant histiocytosis)
  • 41% of dogs have hepatic involvement
  • Medical management
  • Poor prognosis
QUESTIONS?

Hospitals to avoid