**Splenic Injury and Hemoperitoneum**

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- Spleen is reticuloendothelial and immune system solid organ.
- Macrophages filter and phagocytose bacteria, present antigens to splenic lymphocytes; reduce bacterial load in circulation. In white pulp (PALS/periarterial lymphatic sheath), antibodies produced both to T-cell dependant and T-cell independent antigens
- Mechanical function: reservoir of platelets, retention and removal of senescent or abnormal RBC’s.

**HEMOPERITONEUM:**
Normal volume fluid in peritoneum is 100 cc. Blood in peritoneum will be eventually absorbed by diaphragmatic lymphatics. Blood causes chemical peritonitis, may cause bacterial peritonitis if bacteremia. In slow bleed, few signs of peritonitis.

**DIFFERENTIAL DX OF HEMOPERITONEUM:**
- Trauma to spleen (40% of blunt trauma injuries to abdominal organs)
- Trauma to liver (20% of blunt trauma injuries to abdominal organs)
- Trauma to GB bowel and mesentery (5%), stomach, duodenum, colon
- Ruptured bladder
- Ruptured ectopic pregnancy, ruptured graafian follicule, ruptured uterus
- Ruptured AAA or aortoiliac, hepatic, renal, splenic artery aneurysm
- Spontaneous in mononucleosis, malaria
- Iatrogenic

**WORK-UP IN SUSPECTED BLUNT TRAUMA:** US/DPL/CT
- **Diagnostic peritoneal lavage**
  Described 1965 by Root et al. Estimated iatrogenic injury to bowel, bladder, or vessels in 2%. No estimate of volume of blood. Criticized for leading to unnecessary surgery ‘nontherapeutic laparotomy’ in 19-39%.
- **Ultrasound/FAST** (‘Focused abdominal ultrasound for trauma’)
  Growing in favor as more physicians are trained in bedside use. Perform at bedside for hemodynamically unstable trauma pts who cannot be moved into a CT scanner. Limited ability to evaluate volume of fluid in peritoneum (scant/moderate/large). Most ER protocols d/c without imaging an adult blunt trauma pt who is stable with normal sensorium, normal abdominal exam, and no distracting injuries. Any patient with altered mental status, distracting injuries, or pediatric patients needs prolonged observation or CT scan. Blaivas et al report 6 cases of large volume (1-2 L) hemoperitoneum found serendipitously on U/S during training or certification of physicians in a Level I trauma ctr.
- **Helical CT scan**
  Recommended for pts stable for transport to X-ray. Can distinguish blood from other fluids, assess vessel integrity/outline of vessels with IV contrast, assess solid organ damage/laceration, detect active bleeding if IV contrast is extravasated from higher to lower cuts. Novelline et al review use of helical CT in abdominal trauma.
**SPLenic ORGAN INJURY SCALING**
I – subcapsular hematoma <10% of surface. Laceration < 1cm deep.
II – subcapsular hematoma 10-50% of surface. Laceration 1-3 cm deep.
III – subcapsular hematoma >50% of surface or expanding. Intraparenchymal hematoma >5cm or expanding.
IV – laceration of segmental or hilar vessels with major devascularization.
V – completely shattered spleen or hilar vessel injury with devascularization.

**CLINICAL ASPECTS OF SPLENIC RUPTURE**
May be painless, or LUQ/diffuse abd pain, hypotension.
Kehr’s sign: referred L shoulder pain in splenic laceration

**TREATMENT OF SPLENIC RUPTURE OR LACERATION:**
Emergency splenectomy vs. non-operative management. Knudson et al review studies of nonoperative management, which may be preferred in a stable patient, with monitoring available in an ICU setting. Follow-up imaging is recommended if initially acute extravasation was seen or any subcapsular hematoma or if patient coagulopathic, exam unreliable, etc.

**OVERWHELMING POSTSPLENECTOMY INFECTION (OPSI)**
- Mortality 50-70% in literature, 50-70% of cases within first 2 years after splenectomy
- Encapsulated organisms Strep pneumoniae in 50-90% of series (incl resistant), H influenzae b, Neisseria meningitides, also Group A Strept, others. 15% polymicrobial. Risk from babesiosis
- Prevention: triple immunizations 14 days before splenectomy: H. flu, meningococcus, pneumococcus. Repeat in 5-6 years. Annual flu vaccine
- Antibiotic prophylaxis as a ‘standby’ in case of fever: PCN or Amoxicillin
  Warn pts of potential medical emergency, need for early tx if febrile.
- Brigden et al review OPSI, and mention study of 5902 post-splenectomy. OPSI developed in 4.4% of children, 0.9 of adults. Increased risk if splenectomy done for heme malignancy or condition (Hodgkin's staging, CML, hereditary spherocytosis) vs trauma. Often in trauma pts an accessory spleen or surgical splenic implant remains.
- Empiric treatment: Cefotaxime 2g IV q8, Ceftriaxone 2g IV q12-24, +/- Gentamycin 5-7 mg/kg, +/- Cipro 400mg IV q12, +/- Vanc 1-1.5 g IV q12. If PCN or Ceph allergic, Vanc +/- Rifampin or Chloramphenicol.

References

Brigden ML. Prevention and management of overwhelming postsplenectomy infection. Crit Care Med 01 Apr 1999; 27(4); 836-42.


Townsend. Sabiston Textbook of Surgery, 16th Ed.
Case: S.H.

CC: nausea/vomiting/abd pain x 1 day

HPI: 23 yo BF c h/o OLTX and hep C virus and Fe-deficient anemia who reported N/vom/abd pain since day prior to adm after eating a cheeseburger at McDonald’s. Post-transplant course notable for medication noncompliance, missed appointments and labs. She was recently hospitalized. Otherwise in fair health after d/c home now c sxs starting 1 hour after eating at McDonald’s. There was diffuse abdominal pain, w/emesis and diarrhea at home. She reports assoc dizziness and ‘blacked out’, and weakness since then. Denies LOC. Had L shoulder pain. No F/C/NS/wt change. She presented to Roanake Rapids ER where records are missing but she was advised to come to UNC, pt holding OSH records. (U/S no GB, small ascites, nl ducts)

PMH: ● OLTX 8/12/98 for ESLD 2ary to Hep C. Early Hep C recurrence in allograft (bx 9/25/98)
● Adm 6/25-28/02 transaminitis and noncompliance/need for liver bx/anemia (AST 318, ALT 275, alk phos 160.)
● Grade I esophageal varices (EGD 6/26/02)
● Graves

Psurg H:

Meds: Prograft 3 mg po bid
ASA 325 mg po qd
Synthroid .150 mg po qd
FeSO4 325mg po tid
TMP/SMX DS 1 poqd
All: NKDA

Soc Hx: living with sister near Ahoskie. Recently moved away from boyfriend. States no cigs, EtOH, not sexually active in 1 yr. Unemployed, prev worked as surgical tech.

F Hx: M died heroin addiction, F died cancer

ROS: heavy periods, but only 3-4 days

PE: unable to stand for orthostatics (later HR 86 to 143, BP 10/46 to 103/46, could not stand up.
T 37.2, BP 90/59, HR 109, RR 16
NAD, NC/AT, anicteric, no LAN, drinking contrast material, pleasant interactive
Neck supple
RRR S1S2 no m/r/g
CTAB
Abd mildly distended, c Mercedes benz scar, mild tender suprapubic & B/L LQ’s , no
HSM
Pelvic: dk red-tinged serous fluid in vaginal vault. R adnexal tenderness, no mass.
No C/C/E
Skin no rash, lesions, bruises
A&O x3, no asterixis

Labs