Abdominal Vascular Trauma

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Disclosure

• I have no relationships to disclose.
• There is discussion of off-label use of drugs or devices in my presentation.

Abdominal Vascular Trauma

- Abdominal Aorta
- Celiac/SMA
- Renal arteries
- Portal vein
- IVC/Iliac Veins

Zones of the Abdomen

- Approach dictated by mechanism and location
  - Blunt vs. Penetrating
- Abdomen divided into zones
- Classically no exploration for blunt trauma zones II-III
- Explore Zone I regardless

- Zone I injuries divided into supra-mesocolic and infra-mesocolic
- Supra-mesocolic addressed via visceral rotation (Mattox maneuver)
- Infra-mesocolic via standard anterior infrarenal aortic exposure

- Direct Control below the renal arteries
- Consider less extensive dissection until clamp in position
Specific Vessel Issues:

- Celiac
  - Ligate main celiac trunk
  - Ligate splenic, left gastric, common hepatic individually
  - Consider reconstruction of proper hepatic only if stable—otherwise ligate
- SMA
  - Reconstruct if proximal injury

Specific Vessel Issues:

- Infrarenal Aorta
  - Primary repair for minor defects
  - Prosthetic patch/interposition for larger defects

Renal Artery Trauma: Controversy in Management

- Penetrating trauma to renal artery almost universally requiring nephrectomy
- Blunt injury more controversial
  - Salvage reported as high as 80% in the most optimistic series
  - More realistic series with 25% salvage
- Timing of nephrectomy also an issue

RENAL ARTERY TRAUMA

AUGUST J. MAGGIO, JR., M.D.
STANLEY BROSMAN, M.D.
From the Divisions of Urology, Departments of Surgery, UCLA School of Medicine, Los Angeles, and Harbor General Hospital, Torrance, California

- 65 Nephrectomies
- 28 Repairs
- 9 Successful
**Consensus on Genitourinary Trauma**

Evaluation and management of renal injuries: consensus statement of the renal trauma subcommittee

R.A. SANTUCCI, H. WESSELLS

- A much more pessimistic view
- Nephrectomy or observation primary options

_In view of the poor results of surgery, arterial revascularization is seldom indicated in patients with a normal contralateral kidney (Level 3) [35,94]. Reconstruction of renal artery injuries should be attempted in patients with single kidneys, bilateral renal injury [127], or when simple arteriograpy is possible [94]. Incomplete arterial lacerations can be sutured primarily._

**Endovascular Interventions: A possible middle ground**

Endovascular Repair of a Traumatic Renal Artery Injury

Alan Simeone, MD, Thomas Demlow, MD, and Riyad Karmy-Jones, MD

- Stab wound presenting late
- Coil embolization of pseudoaneurysm

**Venous Injury:**

IVC and Iliacs

- Exposure via right visceral rotation (Cattell maneuver)
  - Kocherization
  - Right colon mobilization
- Repair via simple venorrhaphy if possible
  - Avoid narrowing >30-40%

- Midline open approach
  - Zone I hematoma noted
- Supra-celiac clamp application
- Division of left renal vein
- Pledged sutures for defect in aortic wall with renal artery avulsion

- Patch interposition if patient stable
- Ligation as a reasonable option for the unstable patient
  - Seriously consider fasciotomy
  - Swelling likely significant, but eventually resolves

_Wide Med Section 7 / Chapter 10 - Injuries to the Great Vessels of the Abdomen_
29yo male with GSW to pelvis
Massive hemoperitoneum at Ex-lap with 6L blood loss
Heavy damage to iliac artery and vein at bifurcation
Vein ligated and artery repaired with interposition graft-fasciotomy performed
Limb edema resolved completely at 6wks

Venous Injury: SMV and Portal vein
A special case due to lack of collateral visceral outflow
Traditionally more aggressive attempts made to repair—at virtually all costs
Exposure potentially requiring division of pancreas
Mortality rate for portal vein injury 50%

Lateral Exposure via extended Kocher maneuver
Avoids pancreatic division

Options for repair
- Lateral suture
- Oversewing
- End-to-end anastomosis
- Interposition graft

Choice of Conduit: Prosthetic vs. Native
70-90% of patients with associated major vascular injuries
Patients often with massive blood loss and coagulopathic
More recent move to de-emphasize complex repair-ligate complex injuries—Damage control
Ligation is survivable at a rate of 50%
  - Aggressive fluid resuscitation
  - Open abdomen due to excessive bowel edema

Abdominal Vessels often poor size match for GSV
Harvest of larger veins, IJ or SFV may be time consuming
Contamination with bowel contents often present
Vein graft may blow out with extensive infection
  - "Why use a dead collagen tube" Ken Mattox
Management of Contaminated field:

- Hypogastric artery
  - Often only a short-segment replacement required
- SFA with prosthetic replacement
  - Prosthetic in a non-contaminated field
- Extra-anatomic bypass
- Prosthetic in a contaminated field
  - Bowel repair
  - Abdominal washout
  - Pack injury away
  - Repair with prosthetic
  - Cover with Omentum

Summary

- For Blunt Trauma, Explore only Zone I (Central)
- Ligate Celiac and/or its major branches
- Reconstruct Aorta/SMA/Iliacs
- Usually Observation or Nephrectomy for Renal artery trauma
- OK to ligate most veins with the exception of the SMV/Portal vein
- OK to use prosthetic in a field which is not totally clean