Survive a Grade 5: Management of Severe Juxtahepatic Venous Injury in a Pediatric Patient

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Case Presentation

• 5 yo female unrestrained passenger, Mother intoxicated drove off the road and crashed. Parent extricated child and carried her to a home where 911 was called.

• Patient arrived intubated sedated (by lifeflight)
• HR= 155
• BP = 55/38
• Temp 36.3
• Sat 100%
• Wt: 18 kg Estimate
Case Presentation

- Head: atraumatic, intubated
- Neck: In C- Collar
- Chest: CTA-BL
- Abdomen: Distended, no seat belt sign
- Pelvis: Stable
- Extremities: abrasions
- Back: abrasions
Case Presentation

• Interventions: 2 peripheral IV’s and Left tibial IO.
• ET checked
• 500 cc of NS, BP improved to 85/44, HR = 128
• Patient opened eyes and shrugged shoulders
• Labs and films were obtained while vitals improved
Case Presentation

- h/h: 7.4/22.9, Lip = 1908, AST887
- C-Spine: Neg
- CXR: RUL Contusion (sat 100%)
- CT Abd/Pel: “significant injury involving the superior intrahepatic inferior vena cava... there may be a more extensive injury to the inferior vena cava just above the takeoff of the hepatic veins and below the right atrium which is difficult to see due to the extensive hemorrhage in this area.”
Case Presentation

- CT Abd/Pel:
  - Liver laceration, dome, adjacent to the IVC
  - Avulsion of the hepatic veins from IVC?
  - Laceration Inferior Vena Cava (with active blush)
  - Extensive Intraabdominal Hemorrhage
  - Edematous Pancreas
  - Right Adrenal Hematoma

- Update: vitals improving: BP 87/44, HR 148, abdomen more distended
  - 1 Unit PRBC’s, h/h = 10.6/32.6
CT Findings
Management of Liver Injury

- Options are injury severity and patient specific.
  - Observation
  - Interventional Radiology
  - Operative intervention

- What influences your decision making?
Juxtahepatic Venous Injury

• What are your options?

• How do you prepare?

• What are the keys to success?
Case Presentation

• Thought Process
  • IR
  • Conservative Management
  • OR
  • OR: On Bypass

• To the OR
  • Cordis
  • Back-up Trauma Surgeon
  • CT Surgery (Pump Team Called)
  • 2\textsuperscript{nd} unit of blood, Massive Transfusion Protocol
Exploration

• Blood everywhere
• RUQ and all other quadrants packed
• Active hemorrhage from the dome of the liver/IVC.
• Retraction of liver increased bleeding
• Median sternotomy: Schrock Shunt attempt
  • Difficulty Dissecting IVC, hematoma
• Split the Diaphragm
Exploration

- 3 cm longitudinal laceration to IVC
- Vitals were labile
- DeBakey Vascular clamps to control the IVC
- 3-0 Prolene repair
- Liver continued to bleed:
  - Packed initially then
  - 2-0 PDS Mattress Sutures to approximate 2 halves of the liver
  - Caudate laceration, pancreatic contusion
- Abdomen Packed and Closed Temporarily
- 11 Units PRBCs, 2 Platelets, 5 FFP
Continuing care

• POD 2: Packing removed, temp. abd. closure
• POD 4: partial closure
• POD 6: Closure
• Pod 12: Enlarged Liver, Ascites, Questionable turbulence at location of IVC repair, Increased INR, Budd-Chiari physiology
• IR Catheter based thrombolysis, Heparin
• POD 23: Re-exploration with CT, Circulatory arrest, Gor-Tex graft replacement, Avulsed hepatic vein oversewn
Outcome

- POD 65: DC to Rehab Service
- POD 81: Discharged home

- Currently 8 yo who participates in Gymnastics and Cheerleading, lives with foster mom, no liver or abdominal issues, mainstream classroom with speech therapy.
Juxtahepatic Venous Injury
Survive a Grade 5

• Timely recognition of injury severity

• Massive transfusion protocol

• Successful Trauma System
  • Pre-hospital
  • ED/trauma bay resuscitation
  • Blood bank
  • Anesthesia
  • CT Surgery
  • OR staff
  • ICU
Thank You