Interesting Case

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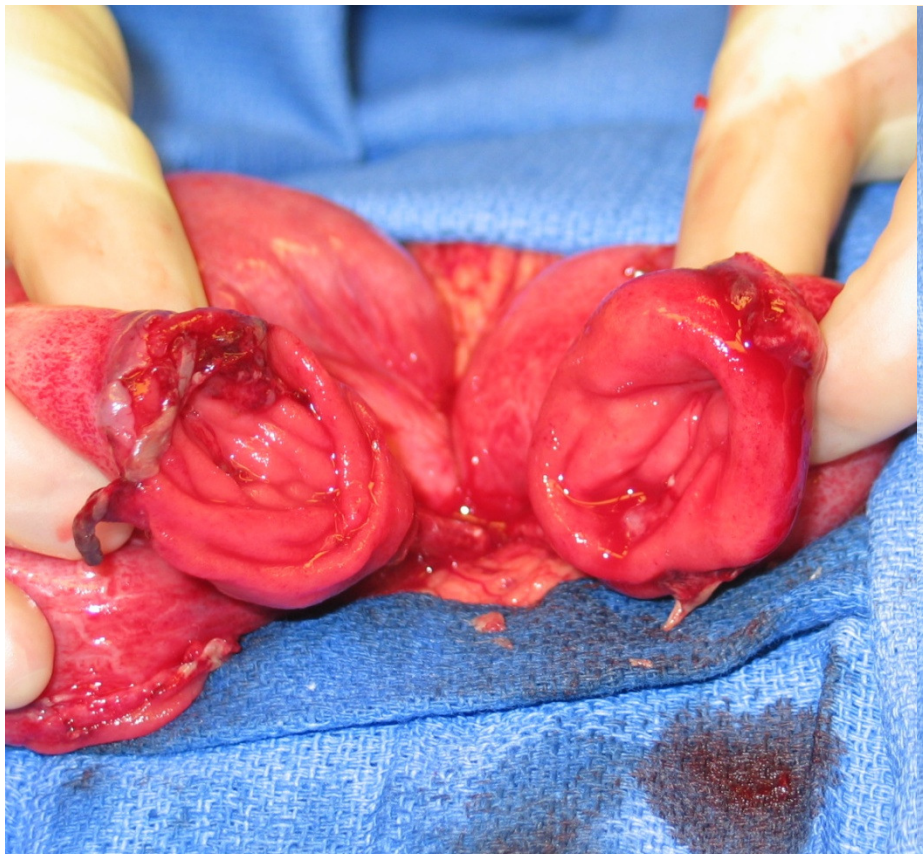
- 7 year old girl involved in MVC
- Backseat passenger, restrained with lap seat-belt, no booster seat. GCS 15, no LOC.
- Transported to outside hospital 4 hours away from Level I pediatric trauma center

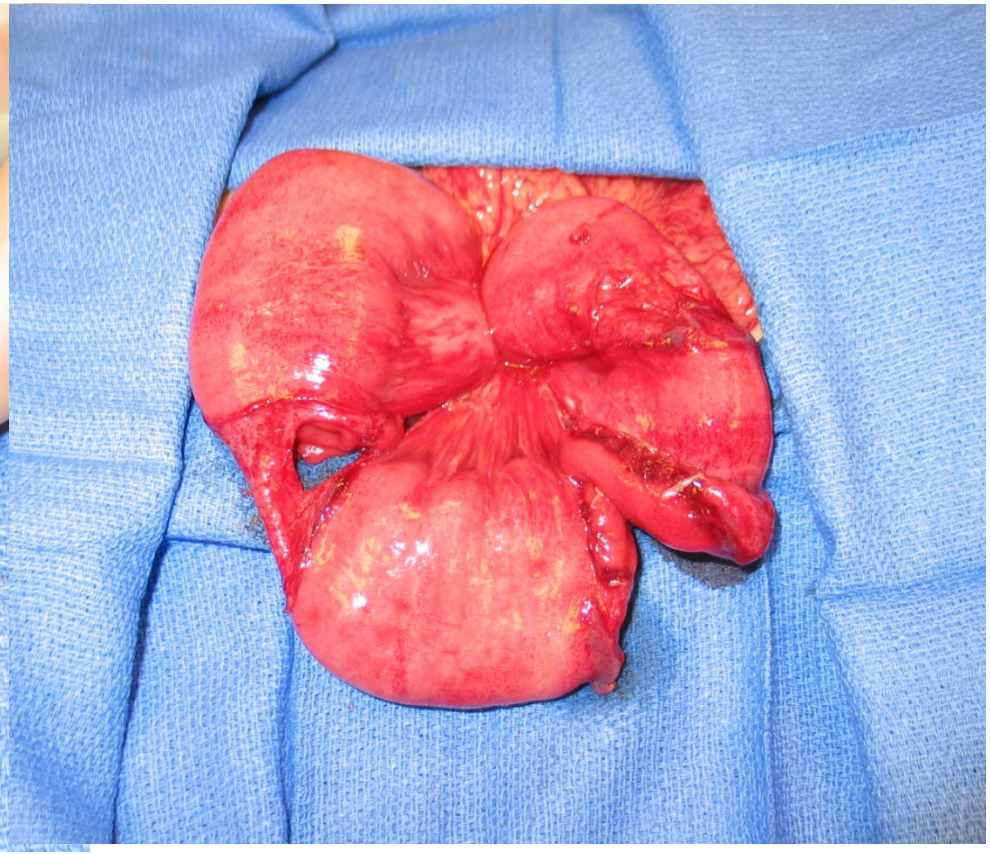
What are you worried about?

Lap Belt Complex

- Abdominal wall ecchymosis ("seat belt sign")
- Lumbar spine injury (Chance fracture; flexion-distraction)
- Bowel injury

Seat Belt Sign

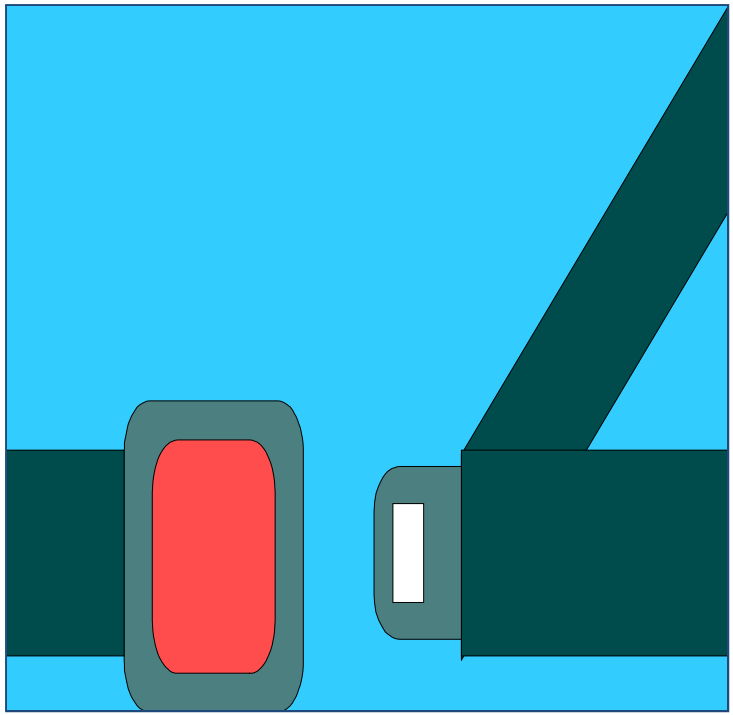




BOWEL INJURIES
The CHMC Experience

- Retrospective analysis of all children with bowel injuries admitted to CHMC between 1991 and 2000
  - 4760 trauma admissions
  - 99 children with bowel injuries
  - 2.1% of all trauma admissions

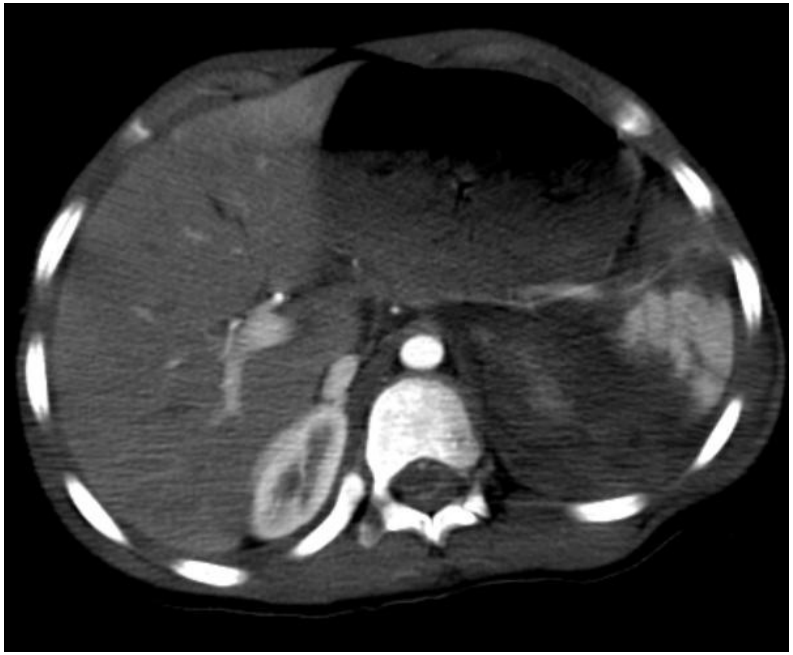
BOWEL INJURIES
The CHMC Experience

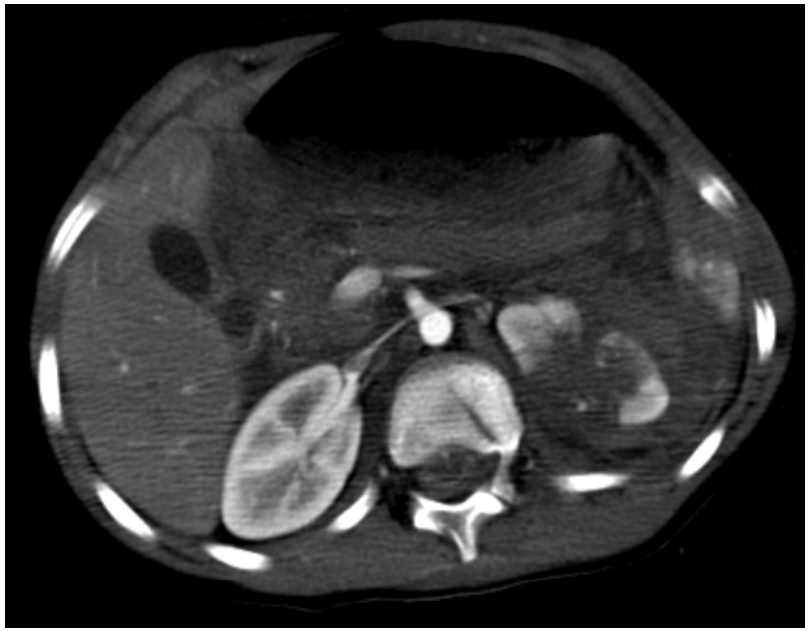


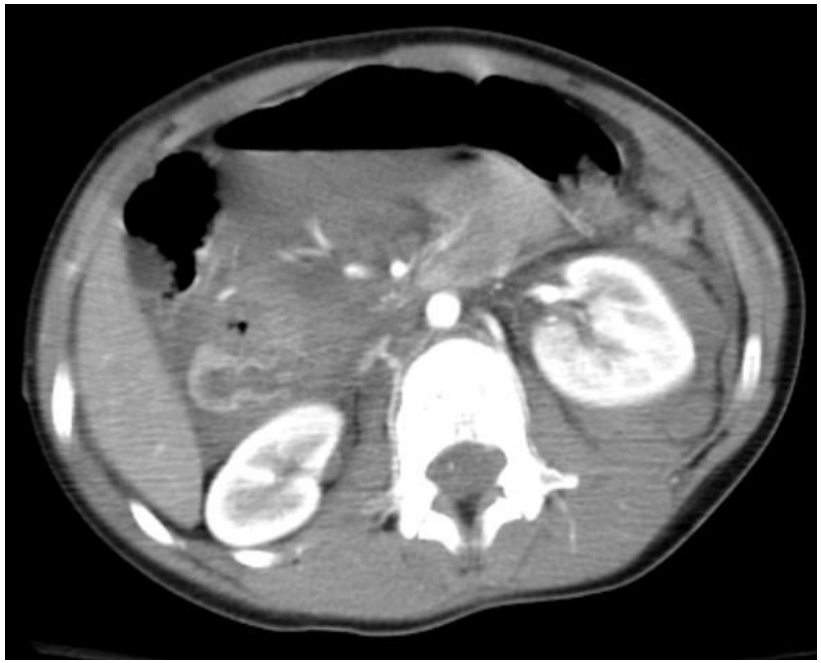
- 43/47 (91%) restrained
  - 40 (85%) lap belt
  - 2 (4%) 3-point restraint
  - 1 (2%) child safety seat
- 4/47 (9%) unrestrained
- 26/40 (65%) inappropriately restrained by lap belt (all ≤ 8 yrs or < 80 lbs; should have been in booster seats)

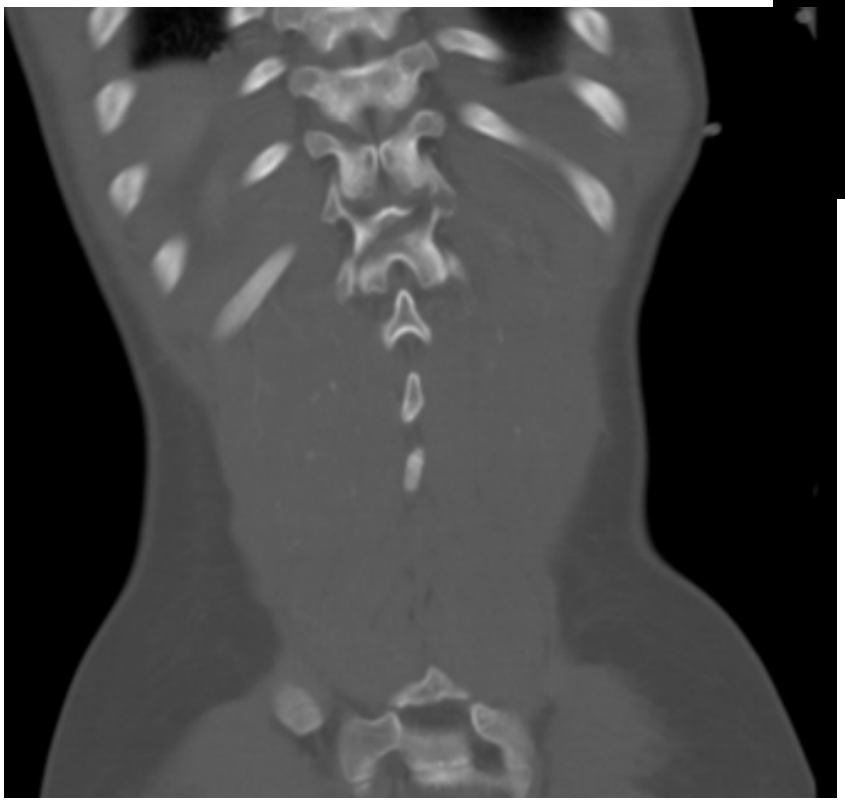
Evaluation at Level II Trauma Center

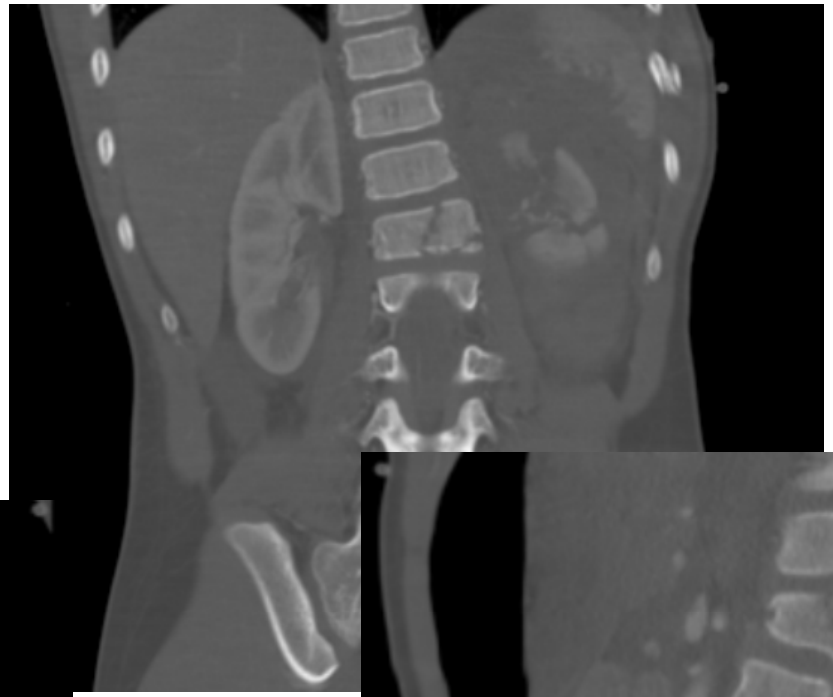
- Hemodynamically stable enough to undergo CT scan of the abdomen and pelvis, CT scan of the C-spine and dedicated CT of the lumbar spine

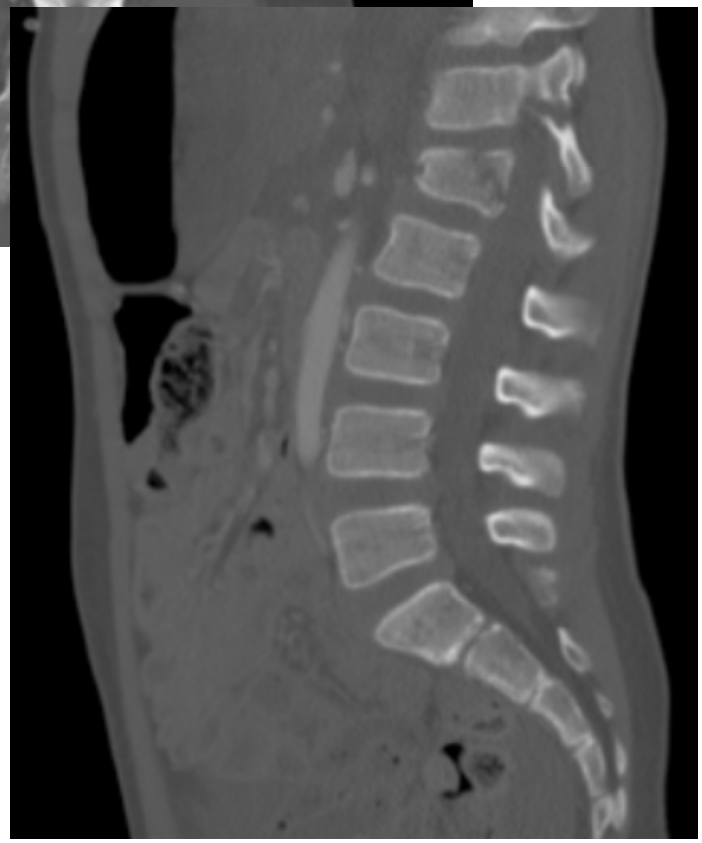








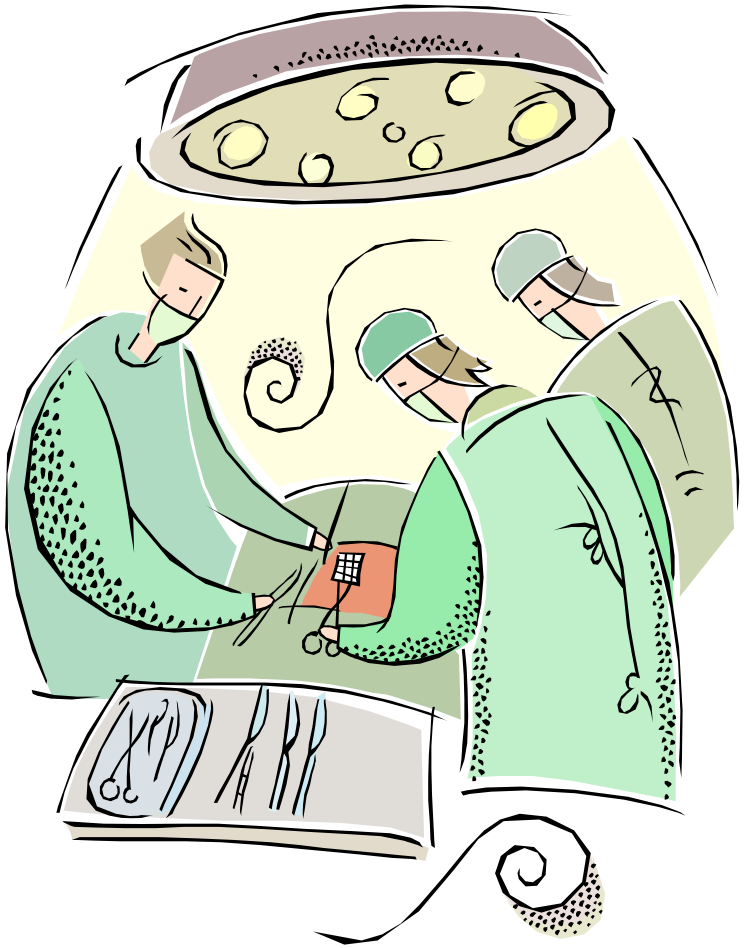




- **01/01:** exploratory laparotomy at OSH:
  - Splenectomy
  - Primary repair of duodenal perforation
  - Small bowel resection without anastomosis
  - Temporary closure of the abdomen
- **01/02:** Transferred to CCHMC for management of lumbar fx. Unstable on arrival and taken back to the OR.

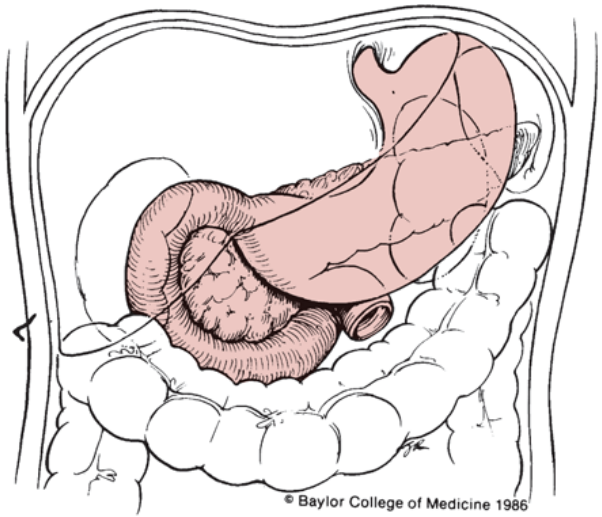
- In the OR:
  - Duodenal perforation on anterior aspect of D2 (ampulla seems intact) with leak despite previous repair
  - Bruising in the tail of the pancreas
  - Ischemic right and transverse colon
  - s/p small bowel resection without anastomosis
  - No bleeding from splenic bed
  - Tachycardia (140-150) BP 80/40, epi drip started at 19:30 during surgery

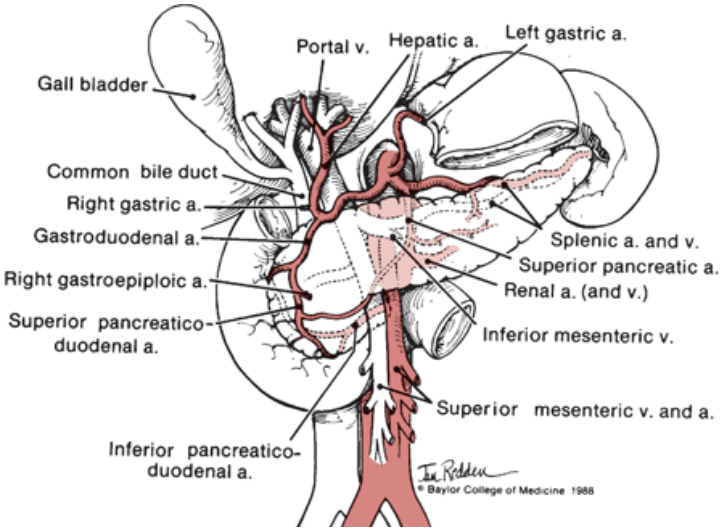
How do we manage the duodenal injury?



Duodenal injuries

- More often associated with penetrating trauma (up to 75%)
- 0.2% of all blunt abdominal traumas
- Mortality rate 17-20%
- Often associated with other injuries



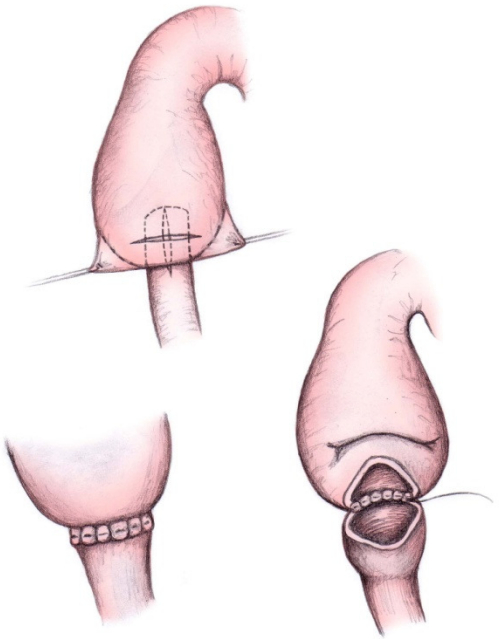


Management of duodenal injuries

- Duodenal hematoma
  - More common in children
  - Associated with child abuse
  - Most often treated non-operatively with spontaneous recovery in 7-10 days
    - IVF
    - TPN vs. naso-jejunal feeds
  - If discovered intra-operatively
    - Gastric decompression and distal feeds vs. evacuation of hematoma

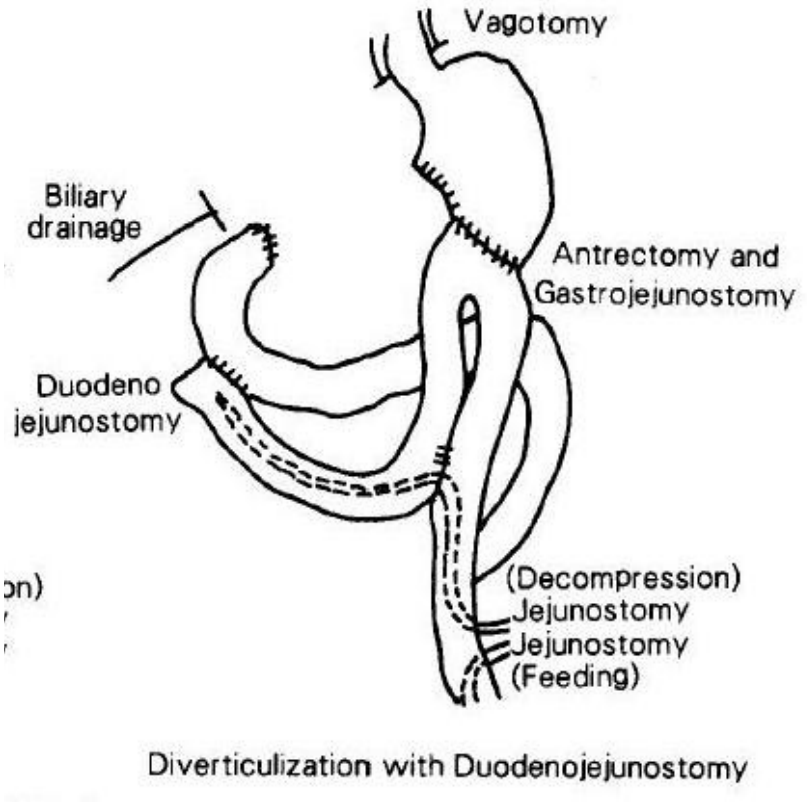
Management of duodenal injuries

- Duodenal laceration
  - Primary repair alone will most likely fail if more than 50% of the circumference involved
  - Other options…
    - Duodeno-duodenostomy
      - Rarely feasible, especially if injury in D2 or D3
    - Jejunal or omental patch
      - Alone=a little bit scary…



Management of duodenal injuries

- Duodenal laceration
  - Other options…
    - The ancestor of the pyloric exclusion: **diverticulization**
      - Antrectomy
      - Vagotomy
      - Gastro-jejunostomy
      - Primary repair vs. Duodenostomy vs. Duodeno-jejunostomy
      - Decompression jejunostomy
      - Feeding jejunostomy
      - Biliary T-tube
      - Gastric decompression (NGT vs. G-tube)



Diverticulization with Duodenojejunostomy

Management of duodenal injuries

- Duodenal laceration
  - Other options…
    - Pyloric exclusion, gastro-jejunostomy and feeding jejunostomy, with or without primary repair, leave a JP drain vs. duodenostomy, gastric decompression

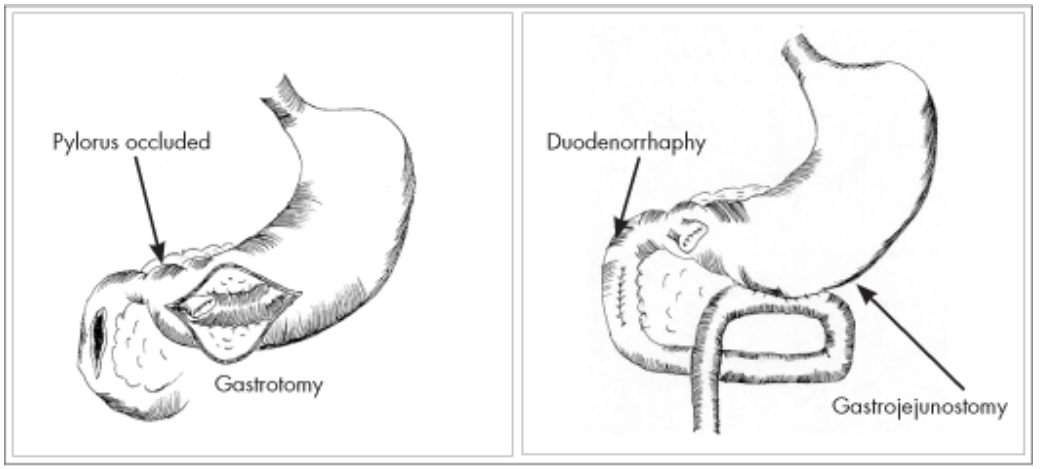
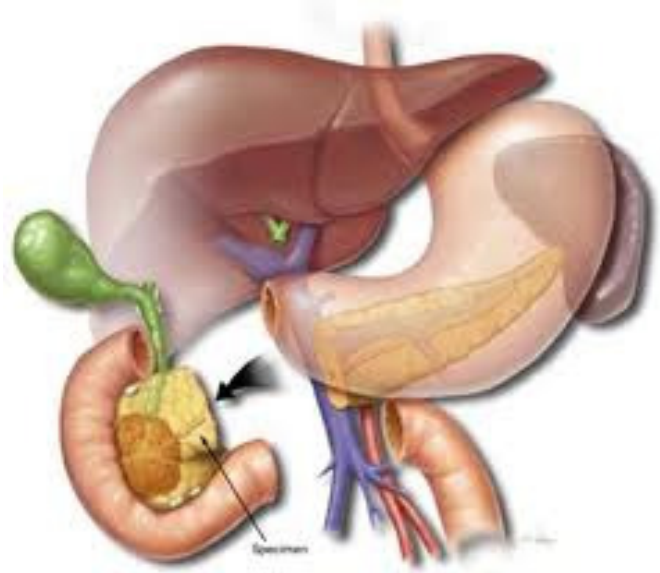
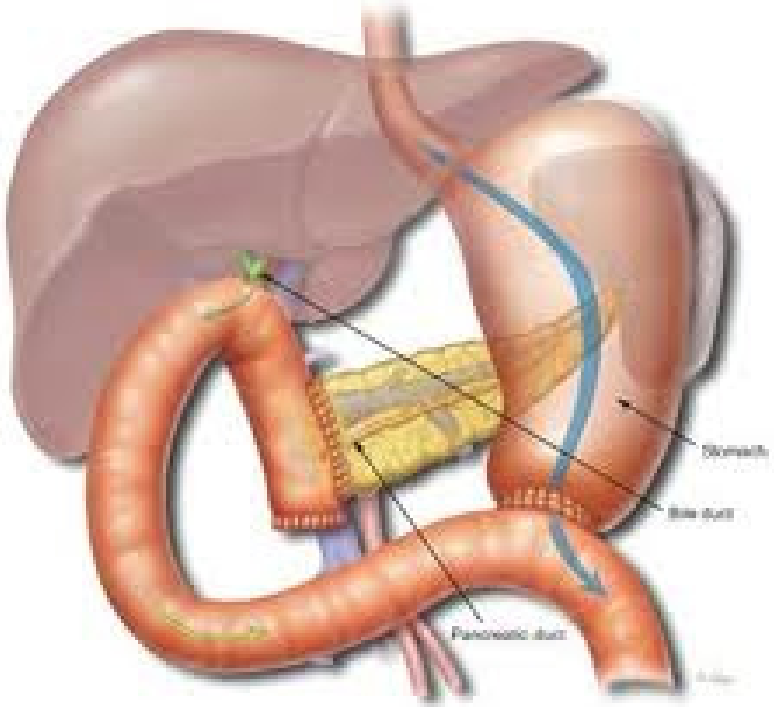


Figure 1. Pyloric exclusion procedure.[12]

Management of duodenal injuries

- Duodenal laceration: grade IV and V
  - "Attache ta tuque avec d'la broche" (or "hold your snow cap with staples" for non-french-speaking persons)
    - Damage control
    - Whipple procedure





Back to our patient…

B.S. #11198367

- **01/02:** exploratory laparotomy at CCHMC:
  - Primary repair of duodenal perforation, JP drain left in place
  - Surgical gastro-jejunostomy
  - Pyloric exclusion
  - Bruising at the tail of the pancreas, JP drain left in place
  - Right and transverse colectomy without anastomosis
  - Temporary closure with VAC dressing

Pyloric Exclusion

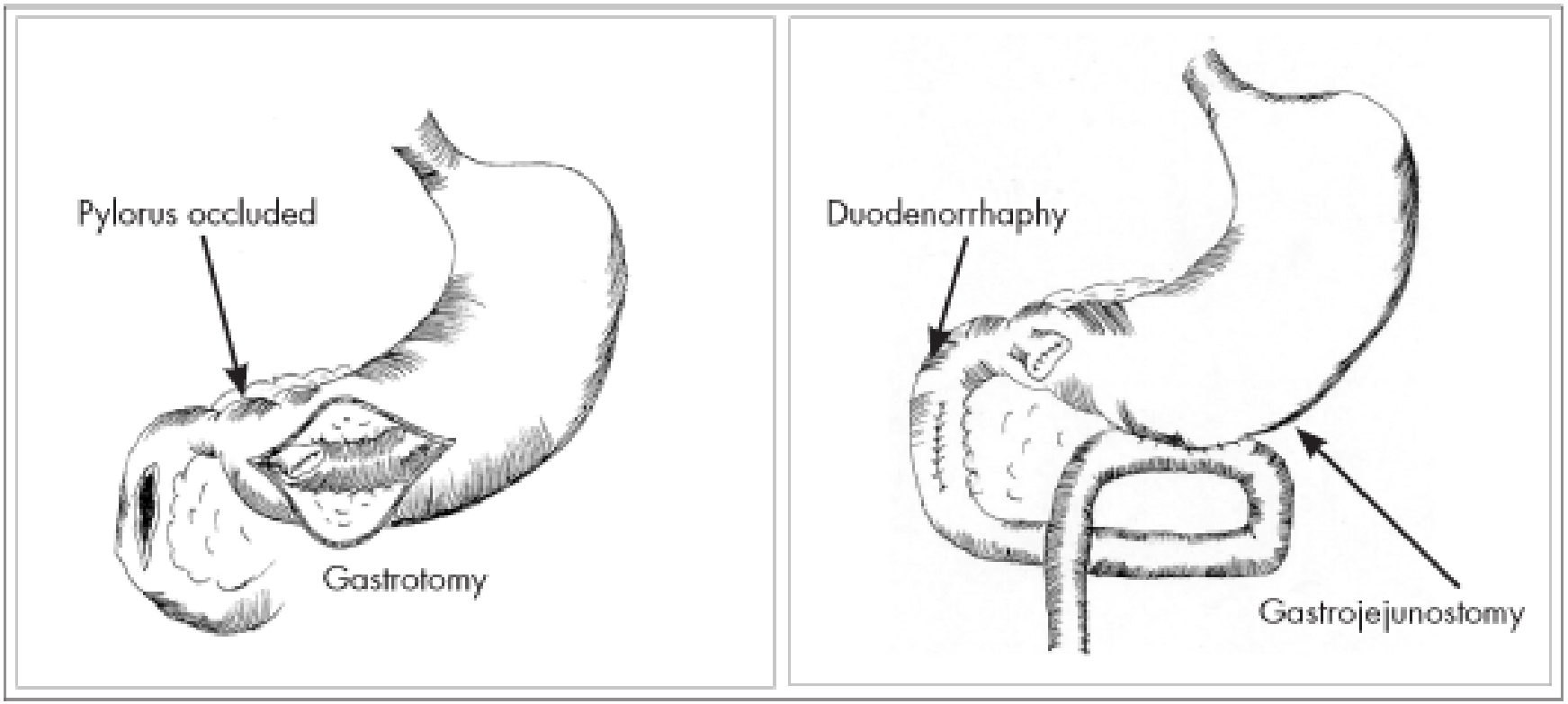


Figure 1. Pyloric exclusion procedure.[12]

In summary…

- Duodenal injuries are difficult to manage
- Use of contrast studies and endoscopy have been crucial in the management of our patient
- It often pays to be patient…