Role of Minimally Invasive Surgery In Pediatric Trauma

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Introduction

Purpose of Study: To validate the use of laparoscopic and thoracoscopic surgery for diagnostic and therapeutic modalities in the treatment of pediatric trauma

Advantages of minimally invasive surgery (MIS) in pediatric trauma:
- Avoids open procedures for negative findings or injuries that do not require repair (non-therapeutic)
- Overall less pain, quicker recovery time, shorter hospital stays and decreased financial burden
Laparoscopic surgery performed in pediatric trauma has been shown to reduce negative and non-therapeutic laparotomy rates by 40-60%.

Estimated missed injuries by diagnostic laparoscopy is close to 0% in pediatric trauma.

In addition to diagnostic capabilities, MIS therapeutic interventions are possible in up to 65% of cases without conversion to open procedures.
Methods

- We wanted to analyze our institution’s experience over past 20 years

- American College of Surgeons Level I Pediatric Trauma Center in Westchester County, New York

- Pediatric trauma patients (age 0-15 years old)

- Total of 23 patients with either abdominal or thoracic traumatic injuries
  - All underwent diagnostic laparoscopy or thoracoscopy first
  - Followed by either MIS or open therapeutic interventions
Age Demographics

- Infant (0-1)
- Pre-school (2-5)
- Grade school (6-12)
- Teenager (13-15)
Mechanism of Injuries

- Motor Vehicle Accident
- Bicycle Accident
- Impaled by foreign body
- Stab Wound
- Child abuse
- Swallowed Foreign body
- Sports Injury
- Pedestrian struck
Types of Injuries

- Bowel perforation
- Abdominal wall defect
- Diaphragmatic laceration
- Intra-abdominal hematoma
- Mesenteric tears
- Lung laceration
- Pancreatic injury
Case #1: Blunt Abdominal Trauma

Hemoperitoneum in hepatic flexure

Extravasation of gas from bowel perforation
Case #1: Blunt Abdominal Trauma

Jejunal perforation

Laparoscopic repair of jejunal perforation
Case #1: Blunt Abdominal Trauma

Laparoscopic repair of jejunal perforation
Case #2: Penetrating Abdominal Trauma

Omental evisceration from stab wound
Case #2: Penetrating Abdominal Trauma

Stab wound missing spleen

Small bowel stab injury
Case #2: Penetrating Abdominal Trauma

- Stab injury to colon
- Repair of small bowel
Results

- 21 patients underwent diagnostic laparoscopy
  - 16 of 21 (76%) had positive diagnostic findings
  - 6 (37.5%) patients had laparoscopic repair and the remaining 10 (62.5%) patients were converted to open repair

- 2 patients underwent diagnostic thoracoscopy
  - 2 of 2 (100%) had positive diagnostic findings
  - 1 patient underwent thoracoscopic repair and 1 patient was converted to open repair
Results

- There were 5 negative diagnostic and 2 non-therapeutic laparoscopies.
- Among the 5 negative diagnostic laparoscopies, there was one missed injury on initial laparoscopy.
- 12 y/o male s/p bicycle accident with handlebar injury and perforation of the 3rd portion of duodenum.
Conclusion

The use of minimally invasive surgery (MIS) helps avoid unnecessary open procedures in pediatric trauma.

Certain injuries can be repaired by MIS interventions. If conversion is necessary, MIS can help guide the placement of surgical incisions.

We recommend the use of MIS as primary intervention in hemodynamically stable pediatric trauma patients.


