Abdominal Complications after CPR

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Case Presentation

- 87 year old female
- PMH/PSH
  - HTN
  - CHF (EF 40%)
  - NSTEMI (August 2014); Cardiac Cath and stent
  - ESRD on HD via AVF
- Medications
  - Aspirin, metoprolol, enalapril, hydralazine, simvastatin
Complaint: SOB

- **Vitals:**
  - Temp 98.6, HR 88, BP 157/74, RR 22, O2: 100% 2L

- **Exam:**
  - Bilateral coarse breath sounds
  - Abdomen soft, non-distended, non-tender
  - No peripheral edema

- **Laboratory:**
  - K 4.5, BUN/Cr 41/6.2, BNP 6650, Trop 0.059, INR 1.2

- **CXR...**
Hospital Day 1

- Admitted to a medical service...many hours later...
- Hemodialysis removed 3 liters over 3 hours
- Post-Dialysis vitals: BP 142/29, HR 111, RR 34, 100% 2L
- Agonal breathing, lethargy and then asystole
- ACLS with ROSC
- CXR repeated...
Hospital Day 2

- Surgical Consultation
- Vitals: Temp 99, HR 72, BP 93/52
- Abdominal exam with tenderness and distention
- Medications: Levophed drip and broad antibiotics
- Family discussion: Full code and all surgical measures
- CT scan...
Operative Findings

- Exploratory Laparotomy
- Minimal contamination noted
- 9 cm gastric perforation of the lesser curvature with inflamed tissue and hematoma
- Debridement with hand-sewn closure of defect
- JP drain adjacent to resection margin
Postoperative Course

- NSTEMI
- Respiratory failure and pneumonia (Pseudomonas)
- Bacteremia: Serratia
- POD 16: Gastric leak with attempted endoscopic clipping followed by cardiac arrest x2 and increased pressor requirements
- POD 21: DNR; patient succumbed same day
- Pathology: Perforation with transmural hemorrhage and acute inflammation. H. Pylori positive
Complications of CPR

- Upper aerodigestive
  - Intubation related

- Thoracic
  - Musculoskeletal
  - Cardiac
  - Pulmonary

- Abdominal
  - Organ lacerations/perforation
  - Retroperitoneal
  - Other
Pneumoperitoneum Due to Gastric Perforation After Cardiopulmonary Resuscitation: Case Report
CPT Christina D. Hahn, LTC Yong U. Choi, LTC Daniel Lee and LTC James D. Frizzi
Prospective study analyzing autopsy data (1977-1979)

N = 705 (Cardiac arrest recognized and treated by trained personnel and autopsy by medical examiner)

Abdominal visceral complications noted in 30.8%
- Gastric dilation 29.1%
- Liver injury 2.9%
- Splenic injury 0.3%
- Gastric injury 1%
- Gastric perforation 0.1%
- Omental hemorrhage 0.1%
- Retroperitoneal hemorrhage 0.1%
Review

Gastric perforation after cardiopulmonary resuscitation: Review of the literature

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- Literature search (online, up to August 2009)
- 67 cases of gastric perforation after CPR (ages 5-87 years)
- 3 most common risk factors: bystander provided BLS, use of bag mask, difficult airway (esophageal intubation)
- All gastric perforations on the lesser curvature adjacent to the GE junction
  - Least elastic portion with fewer mucosal folds
  - Tethering by the gastrohepatic ligament and GE junction
- Gastric Mucosal lacerations: 9-12%
Pediatric Injuries From Cardiopulmonary Resuscitation

- Retrospective review (1988-1995) of children <12 years old given CPR
- 15/211 (7%) patients had post-CPR complications
- 1 Gastric perforation and 2 Retroperitoneal hematomas
- Multiple injuries noticed after CPR may suggest physical abuse
Take Home Points

- Life threatening abdominal complications after CPR occur less than 0.5% of the time

- Abdominal free air or fluid after CPR does not always require surgery - but hemodynamic or exam changes acutely after successful resuscitation warrant suspicion

- Risk factors for abdominal visceral injury after CPR include untrained personnel, extensive chest compressions and anticoagulation

- Risk factors for gastric perforation with CPR include maneuvers that move air into the stomach such as esophageal intubation or bag mask ventilation and lack of gastric decompression before chest compressions
References


