



Eastern Association for the Surgery of Trauma

Engage the Masters Course

**January 15, 2015
Disney's Contemporary Resort
Lake Buena Vista, Florida**

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**This workshop qualifies for Self-Assessment Credit.



American College of Surgeons
Division of Education



**INJURY TO THE SURGICAL SOUL:
MANAGEMENT OF BAD TO WORSE**

Linda Ding, MD
Department of Surgery
University of Rochester
Strong Memorial Hospital

Disclosure

- Nothing to disclose



Patient History

- Level II Trauma Alert
- 44 y.o. female passenger in a high speed boating accident
- Boat struck pier twice
- Prehospital: BP 146/90 HR 96 RR 20 100% on supplemental Oxygen GCS 12



Physical Exam

HR: 106 BP: 125/65 RR: 26 T: 35.8 SpO2: 100

A: able to speak, large laceration of lower lip

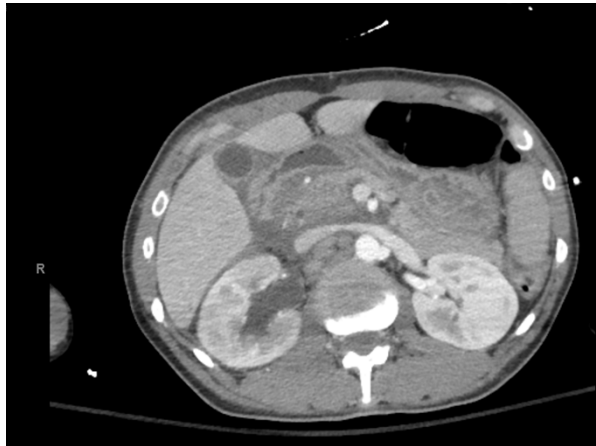
B: breath sounds auscultated bilaterally

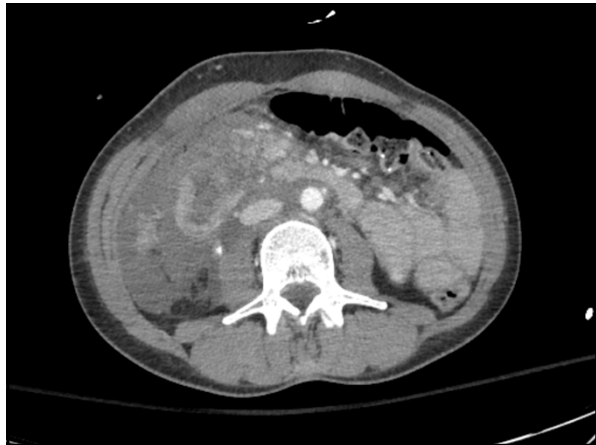
C: regular rate and rhythm, normotensive, palpable pulses throughout

D: GCS 14 (E4V4M6)

E: no obvious deformities elsewhere. Right elbow laceration








Imaging/Next Steps

- CXR/pelvis: no obvious injuries
- CT Chest: left anterior pneumothorax
 - Chest tube placed
- CT abdomen: bowel injury
 - To OR for exploration



Operative Finding

- Full thickness injury to the duodenum between the 1st and 2nd portion
- 50% circumferential
- Involved mesenteric border
- Minimal hepatic injury



Critical Decision #1

- Initial approach to duodenal injury



What Happened?

- Post Injury Day 1: Second look
 - ischemia of small bowel and cecum
 - Resection of necrotic cecum
 - Fluorescein/Woods lamp– near entire small bowel compromised
 - Concern for SMA thrombosis
 - Vascular surgery consult
 - SMA embolectomy



What Happened?

- Left small bowel unresected with planned return to OR in 6-8 hours
 - improved viability of small bowel segments
 - Resection of ischemic segments
 - Approximately 120cm remaining



Operative Course, continued

- Post Injury Day 3: Return to OR
 - ileocolic anastomosis, jejunojunostomy
 - Noted bile leakage near duodenal repair
 - Duodenal repair was intact and viable
 - Found pancreatic injury and complete transection of CBD



Critical Decision #2

- Management of injury to the pancreaticoduodenal complex in the setting of substantial small bowel resection/possible short gut

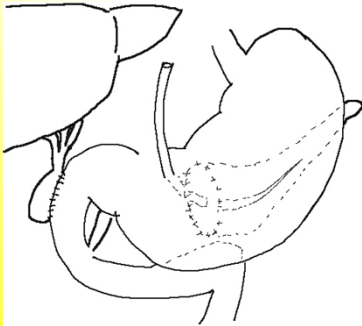


What Happened?

- Post Injury day 4: Return to OR for reconstruction.
 - Transplant surgery team
 - Pancreaticogastrostomy
 - Cholecystoduodenostomy
 - Ligation of CBD
 - Wide drainage



What Happened?





Engage the Masters: 2015

**NECROTIZING PANCREATITIS: WHEN VARD IS
HARD AND INFECTION IS PRESENT**

Thomas Resch, MD

Disclosure

- Stock holder, 3M Corporation



H&P

- 56 M
- Gallstone Pancreatitis
- Amylase 3710, Lipase >5000
- Outside CT
 - Pancreatitis without necrosis or fluid collections
- Resp Failure
- Renal Failure
- Admitted to ICU, conservative management



H&P

- Transient improvement over 3 weeks then:
 - worsening pain, N/V, fever, leukocytosis and respiratory insufficiency
- Repeat CT:
 - diffuse necrosis without gas or fluid
- Blood Cx +GPCs
- Transferred to our facility



H&P

- PMH:
 - DM II
 - HTN
 - Hypercholesterolemia
- PSH:
 - R Total Hip
 - Tonsillectomy
- Social:
 - No ETOH
- Allergies:
 - NKDA
- Home Meds:
 - Glimeperide
 - Lisinopril
 - Pravachol
 - ASA
 - Vit C
- Inpatient Meds:
 - Meropenem
 - Flagyl
 - Insulin



H&P

T 37.4 P 122 BP 110/87 RR 30s 97% on NIPPV

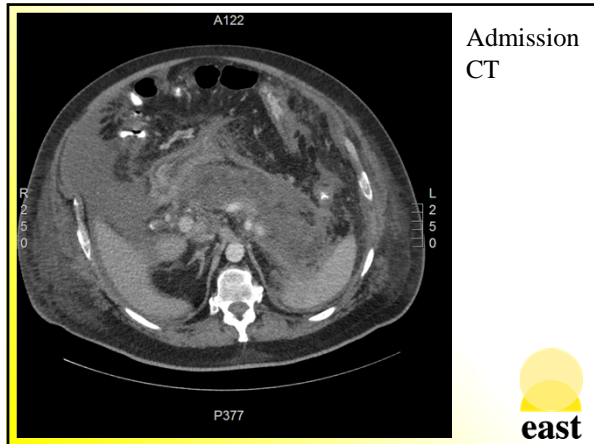
Abd: Distended/TTP throughout

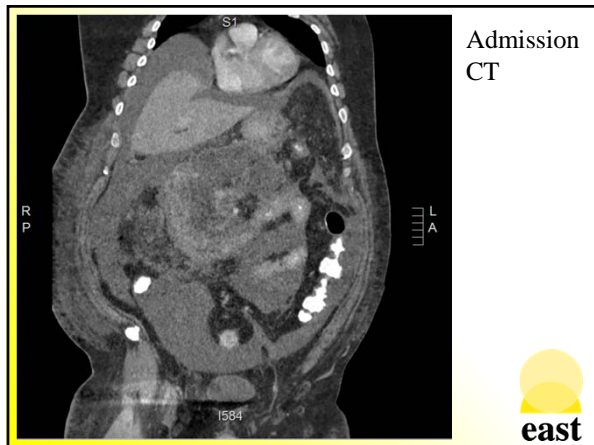
15	7.8	218	137	97	38	206
	24		4.5	24	7.83	

7.34 / 44 / 156 / 23 / -1.9 97.1%

Amylase 49	Total Bili 0.7	Trigs 226
Lipase 17	Alk Phos 75	
Lactate 1.1	iCa 1.14	



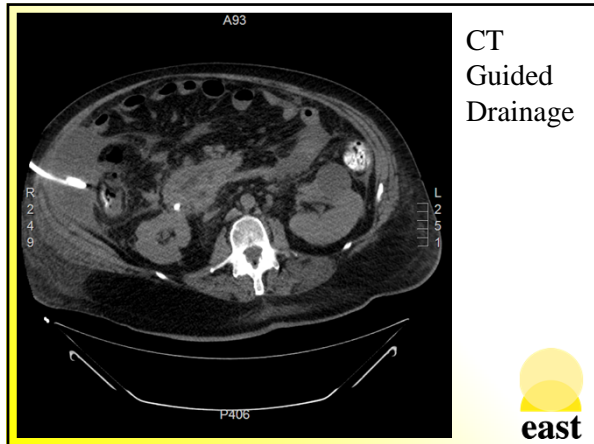


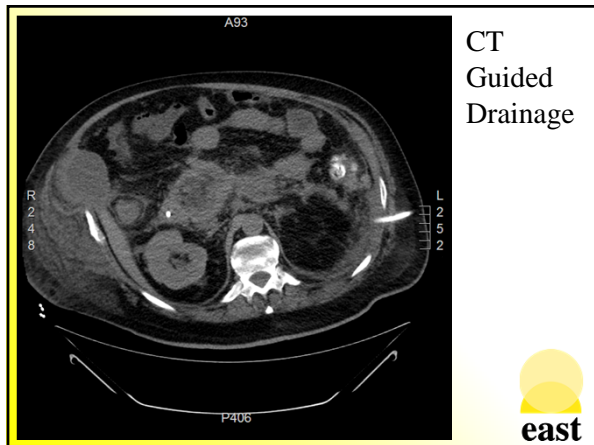


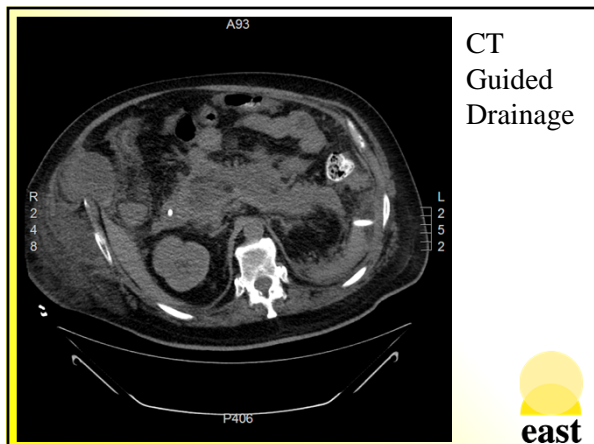
Hospital Course

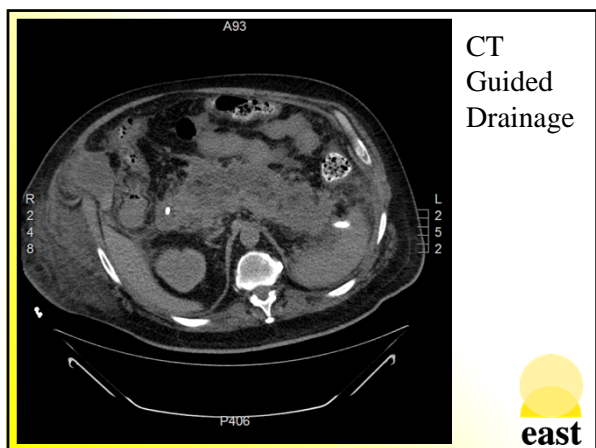
- ICU Resuscitation
 - Lines changed
 - Repeat cx: Negative
 - Antibiotics
 - Post-pyloric TFs
 - Tracheostomy
 - Serial CTs
 - Hep gtt for DVT (Right IJ, Femoral)
- HD#27-33 CT guided drainage
 - Drain fluid cx: +Enterococcus

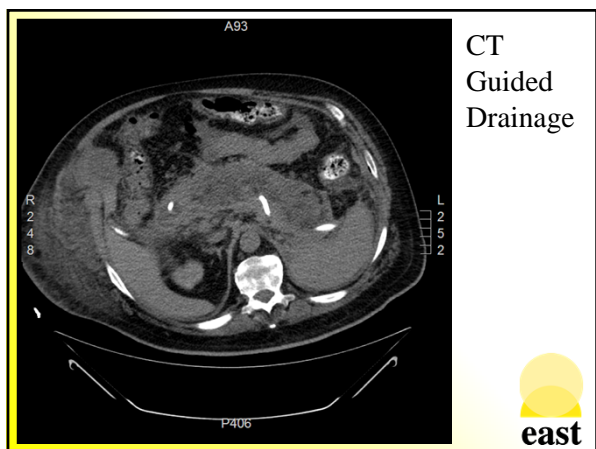
east

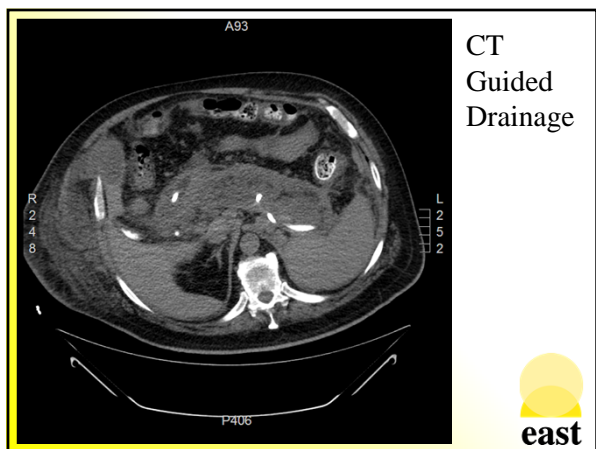


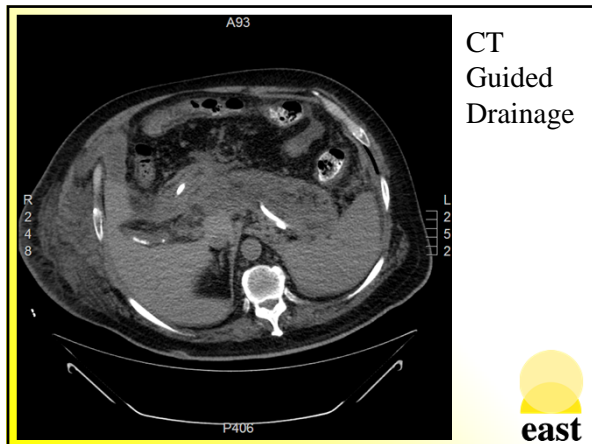












Critical Decision #1

- Infected pancreatic necrosis (via fluid culture)
 - Now 2 months since initial dx
 - Percutaneous Drains in place
 - Next Step?

east

Attempted VARD

- Cut down LUQ drain, near 10-11th rib
- L thoracic cavity inadvertently entered
- Some purulence
- Inadequate visualization
- Irrigation
- 19F Blake
- L chest tube

east

Post Op

- L chest tube removed HD#44
- Recurrent effusion
 - Fluid amylase and lipase negative
- Nocturnal TFs with pureed nectar thickened diet
- Trach collar
- Heparin bridged to warfarin
- Discharged HD#51



Second Hospitalization

- Transferred back (3 months since initial dx)
- Concern: possible sepsis with gas on recent CT surrounding the pancreas



Second Hospitalization

T 37.4 P 103 BP 101/74 RR 20s

5.2 $\begin{array}{c} \diagup 9.9 \diagdown \\ 33.2 \end{array}$ 168 $\begin{array}{c|c|c} 137 & 96 & 7 \\ \hline 3.3 & 29 & 0.65 \end{array}$ 211

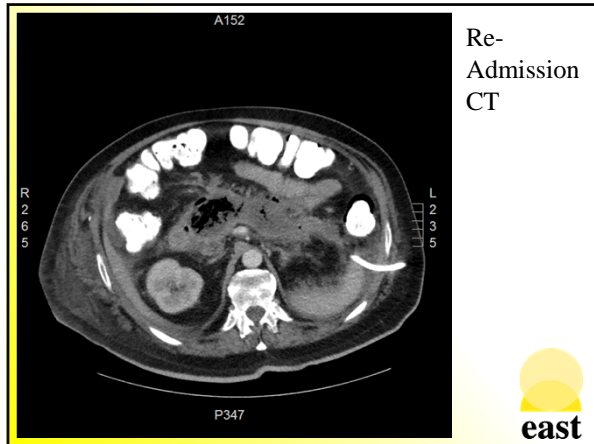
7.34 / 44 / 156 / 23 / -1.9 97.1%

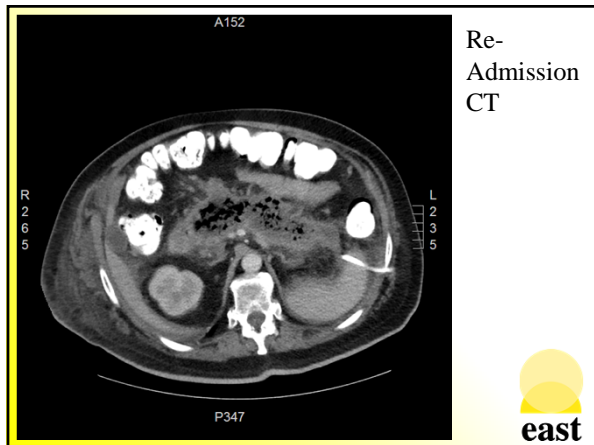
Amylase 50
Lipase 45

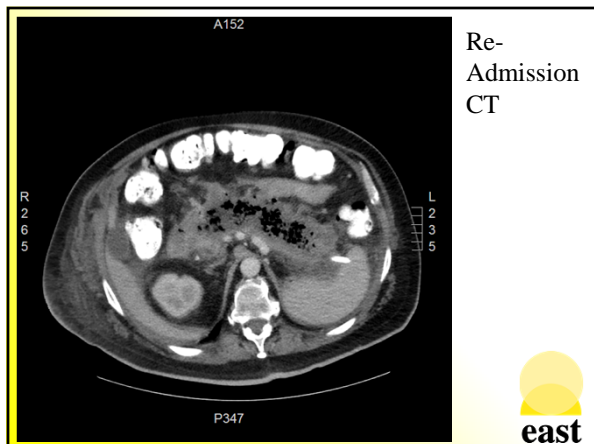
Total Bili 0.4
Alk Phos 113
AST 26 ALT 28

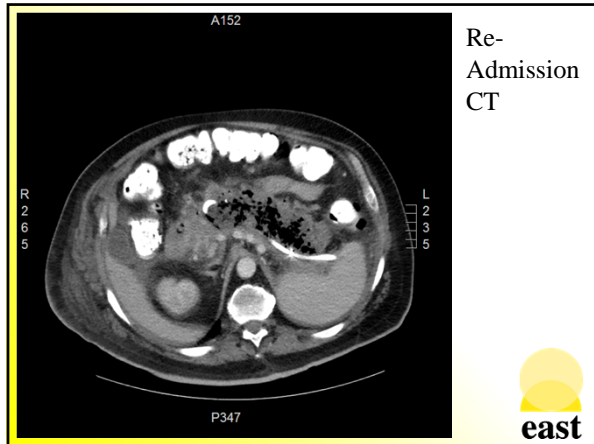
INR 2.7
PTT 39

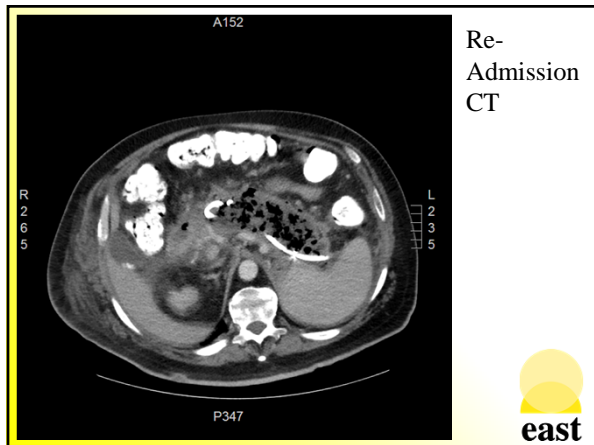


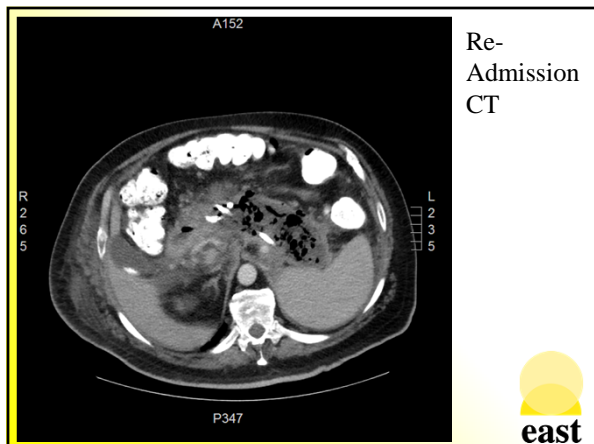


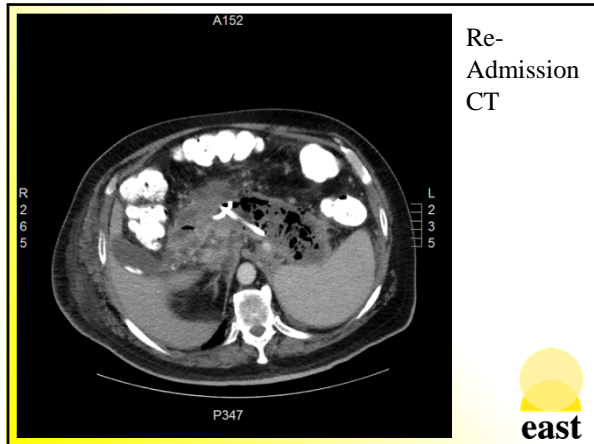


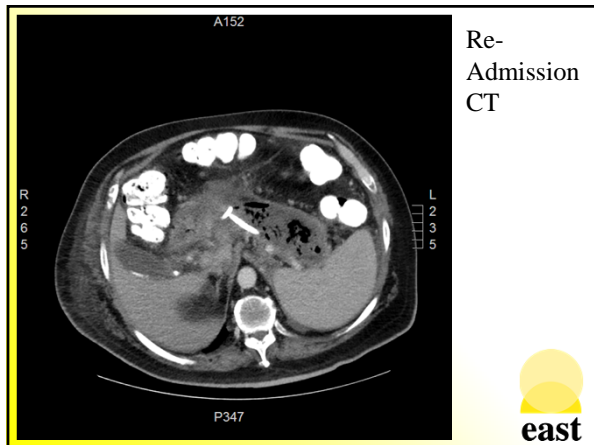


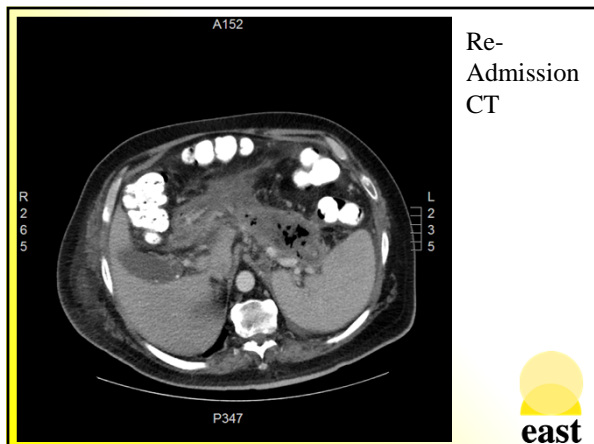










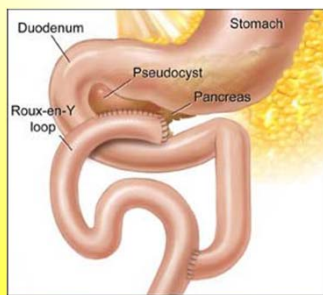


Critical Decision #2

- Chronically infected pancreatic necrosis
- Prior failed VARD
- On anticoagulation for DVT
- Still has Gallbladder
- What is next best step?
 - Repeat VARD?
 - Open Necrosectomy?
 - Other?



Roux-En-y cystenterostomy



<http://depts.washington.edu/surgstus/VirtualPt/surgeryhtml/896detail.htm>



Second hospitalization

- Multiple washouts
 - HD#9 Partial cholecystectomy
 - HD#11 Fascial closure
- HD#12-23
 - weaned off vent, tol thin liquids, all drains removed, sugars controlled off gtt
- HD#24 DC to Rehab



Questions?





**TRAUMA PNEUMONECTOMY: HOW TO COPE
WITH “FAILURE”**

A Landmann, MD; E Bedolla, MD;
WS Havron, MD; M Peyton, MD;
PR Roberts, MD; RM Albrecht, MD

Disclosure

- Nothing to disclose



Patient History

- 15 yo M sustains GSW to right chest
- Chest tube placed at outside hospital
- Intubated prior to transport
- 4 units pRBC in route
- Norepinephrine drip



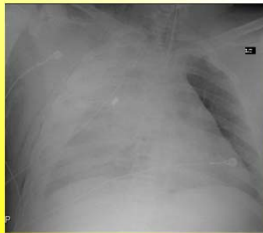
Exam Findings

- A- intubated
- B- diminished on right, right chest tube
- C- diminished heart sounds, tachycardic, intra-osseous iv
- D- GCS 3T (meds)
- E- single ballistic injury to right chest
- + Cardiac FAST

- Vital signs:
 - HR 137
 - BP 135/115
 - RR 18
 - Temp 36.5



Imaging



- To OR
- Right pulmonary artery and vein injured
- Right pneumonectomy
- Receives 7L crystalloid, 61 units blood products, 3900 cellsaver
- Arrives to ICU in shock



Critical Decision #1

- How to manage right heart failure in the setting of hemorrhagic shock?
 - Concern for left pulmonary edema after hilum clamped
 - Profound hypotension
 - Ongoing need for vasoactive agents



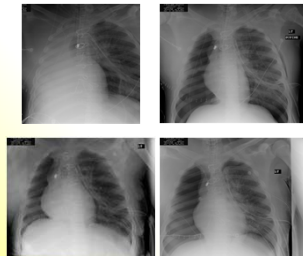
Outcome

- Vasopressors: phenylephrine, norepinephrine, vasopressin
- Minimize fluids
- Inhaled nitric oxide for pulmonary vasodilation
- Early CRRT
- Lasix drip



Critical Decision #2

- How to manage severe respiratory failure with hypercarbia and barotrauma in a pneumonectomy patient?



Outcome

- Nonconventional ventilator- high frequency oscillatory ventilation
- Frequent bronchoscopy
- Inhaled nitric oxide
- Rotational therapy
- Multiple chest tubes
- Sildenafil





**SCAPULOTHORACIC DISSOCIATION AND
ASSOCIATED COMPLICATIONS**

**D. Dante Yeh, MD
Massachusetts General
Hospital**

Disclosure

- Nothing to disclose



HPI

- 22 year-old man involved in a helmeted motorcycle crash.
- GCS5 at the scene (E1V1M3), flexure posturing to painful stimuli on L side only
- HR 120s, SBP 140-180s initially, in elevator down to trauma bay (from helicopter pad) unable to obtain BP with cuff



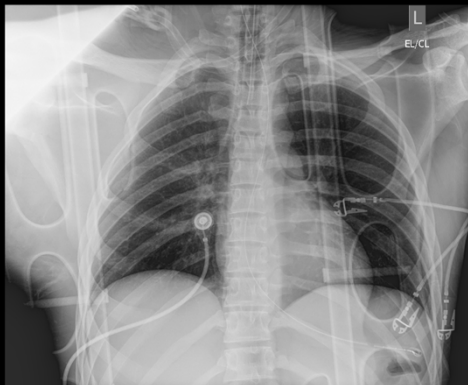
Physical Exam

- HEENT:
 - R hemotympanum
 - Pupils 1mm and *unreactive* bilaterally
- Chest:
 - Deformity over R clavicle
- Abdomen:
 - abrasions to the right upper abdomen
 - FAST negative
 - Pelvis is *unstable*
 - decreased rectal tone
- Extremities
 - Right upper extremity has obvious deformity with open fractures. **No radial pulse or Doppler signal; R hand cool and blue-ish** with cuts and abrasions over fingertips
 - Right lower extremity has obvious deformity with open fractures of femur and tibia

east



east



east



Index Operative procedure

- Pre-peritoneal pelvic packing - minimal hematoma
- Exploratory laparotomy
 - non-expanding, small retroperitoneal hematoma (Zone 3)
 - non-therapeutic
- Transdiaphragmatic pericardial window - negative
- On-table pelvic angiogram - negative
- R subclavian angiogram





Index Operative procedure

- Temporary balloon occlusion for proximal control
- Exploration revealed transected subclavian vein and artery
- No transected nerve trunks were identified.
- Ischemia time was 4 hours and there was good back flow from the brachial artery



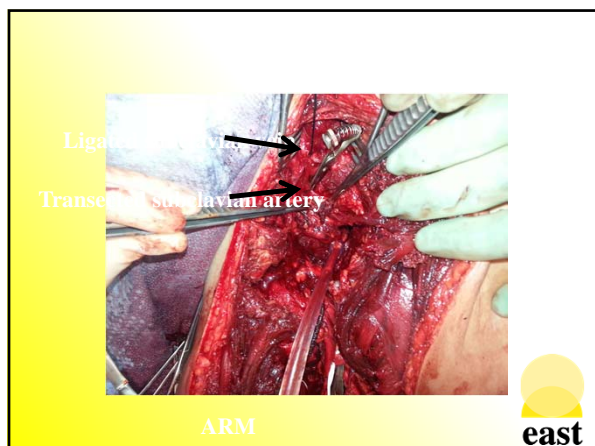
CRITICAL DECISION #1:

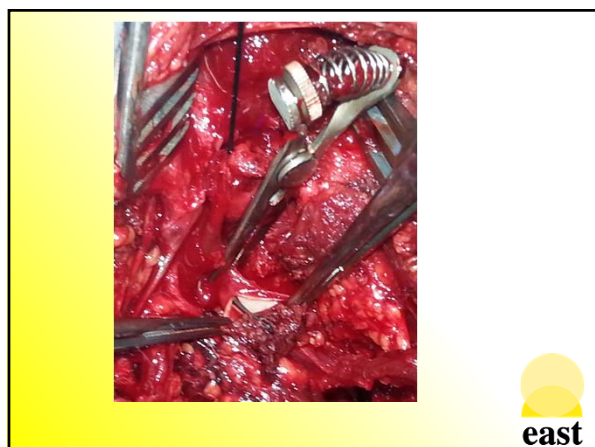
Attempt re-perfusion now or amputate the arm?

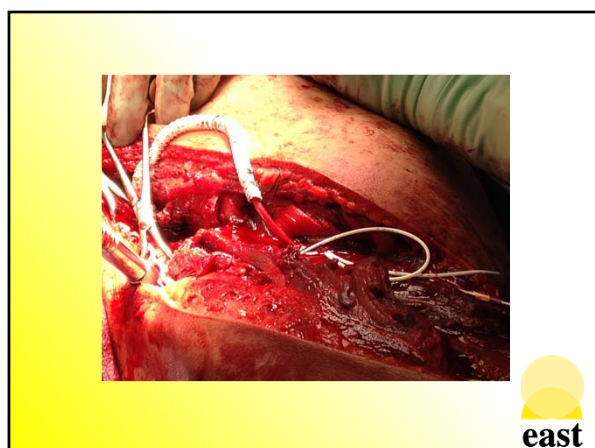
Index Operative procedure

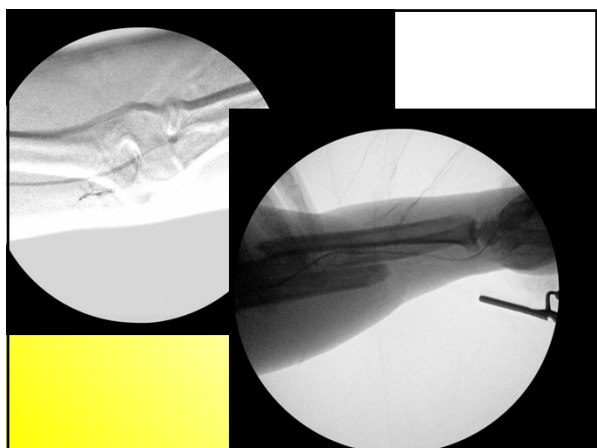
- R subclavian vein ligation
- R subclavian artery bypass graft
 - Resection of medial 1/3 R clavicle
 - Proximal subclavian artery-to-PTFE graft (6mm ringed) anastomosis with Argyle shunt to brachial artery
 - Plate stabilization of R sternal clavicular and acromioclavicular joints
 - Distal PTFE-to-brachial artery anastomosis
 - Completion arteriogram
- Open reduction of R shoulder dissociation
- ORIF R humeral shaft fracture

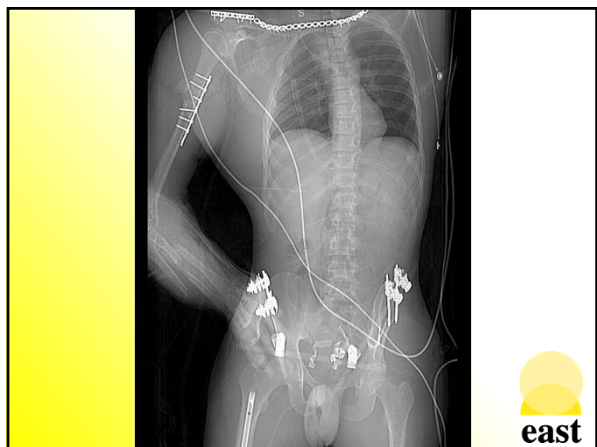














HD #2

- Secondary compartment syndrome secondary to resuscitation (26 u PRBC, 23 u FFP, 30 u platelets, 1 L cell saver, 4 L albumin, 2.5 L NS)
- Cumulative fluid balance since injury: +15.3 L
 - Bilateral thigh fasciotomies
 - Bilateral four-compartment fasciotomies
 - Left upper extremity fasciotomies
- CVVH and furosemide gtt started for anuric acute kidney injury
 - Rhabdomyolysis
 - Hemorrhagic shock
 - Contrast-induced nephropathy



HD#3 (POD#1, 2)

- CVVH circuit clogging frequently secondary to myoglobin deposition
- Persistent hyperkalemia and acidemia
- CK levels increased from 786 U/L to 118,580 U/L

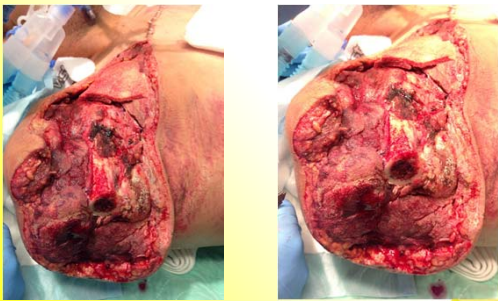


HD#3



- Emergency transhumeral amputation for life-threatening rhabdomyolysis
- Graft had pulsatile flow
- Brachial artery ligated several centimeters distal to distal anastomosis
- Graft covered with viable muscle

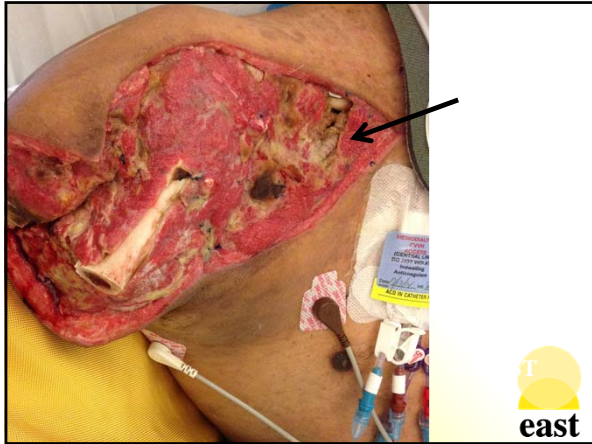




HD#24

- Bedside dressing VAC change revealed exposed PTFE graft just distal to clavicle
- Doppler confirmed pulsatile flow
- Patient in stable condition awaiting transfer to the floor







CRITICAL DECISION #2:

What to do about the exposed vascular graft?

HD#25

- OR
 - Removal of hardware from right medial clavicle and right distal clavicle
 - excision of right clavicle and disarticulation of the right shoulder
 - extensive debridement of muscle, right shoulder, and temporary soft tissue closure
 - excision of vascular graft



- HD#45 - discharged to Rehab





A PAIN IN THE NECK

Abid Khan MD
John H. Stroger Hospital of
Cook County

Disclosure

- Nothing to disclose



Cook County Trauma Unit

- 21 year old male presented to OSH after he was sitting at home when an unknown intruder 'punched' him in the back of the neck.
- 2cm wound to the right posterior neck where he was struck
- Complained of severe head and neck pain
- Believed he lost consciousness



Cook County Trauma Unit

- OSH obtained CXR, CT head and C spine, and the patient was transferred to the Cook County Trauma Unit



Cook County Trauma Unit

- Primary survey
 - airway intact
 - breath sounds equal bilaterally
 - HR-87, BP-163/93
 - 2+ Carotid pulses bilaterally with intact neurologic exam
- Secondary survey
 - notable for 2cm wound to right posterior neck 2 cm lateral to midline at level of C3, severe posterior neck tenderness, slight bleeding from posterior wound



Cook County Trauma Unit



Cook County Trauma Unit



Cook County Trauma Unit

- Soon after presentation, the patient complained of difficulty breathing.
- Airway re-examined. Increased swelling to posterior oropharynx noted.
- Patient intubated for airway protection
- CXR and plain films of neck obtained



Cook County Trauma Unit



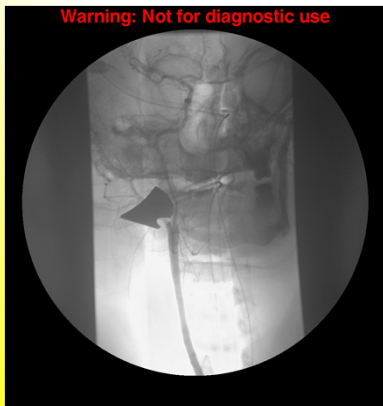
Cook County Trauma Unit



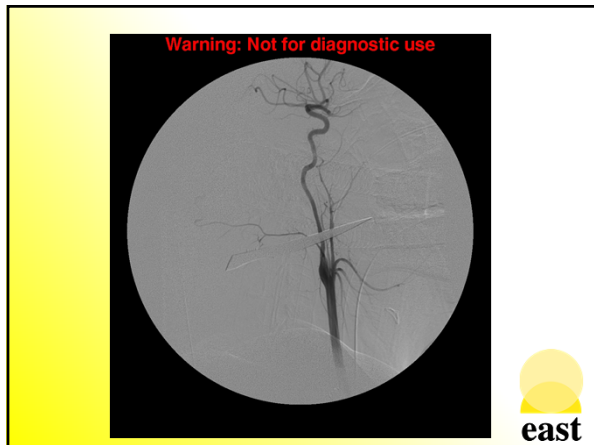
Cook County Trauma Unit

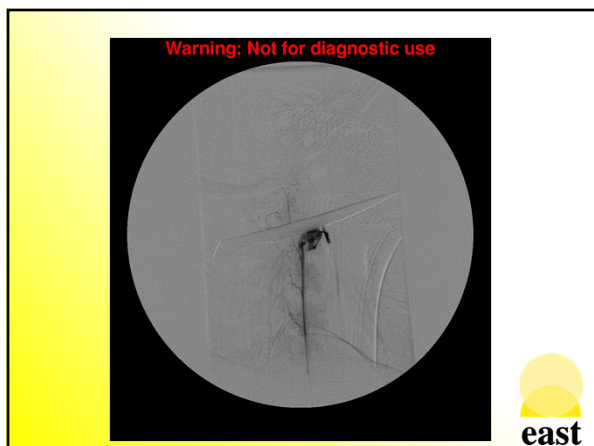
- Critical Decision #1
 - What further workup/imaging, if any, should be obtained?







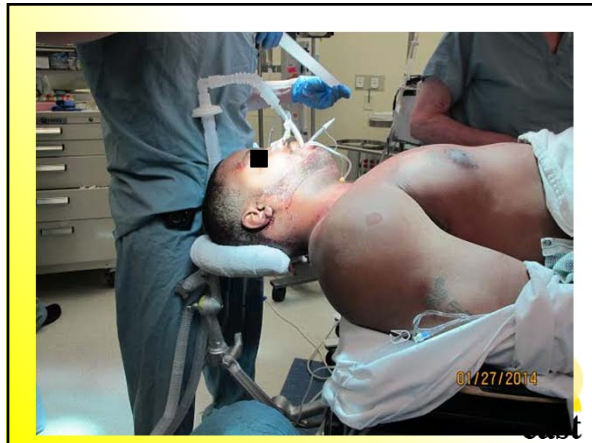


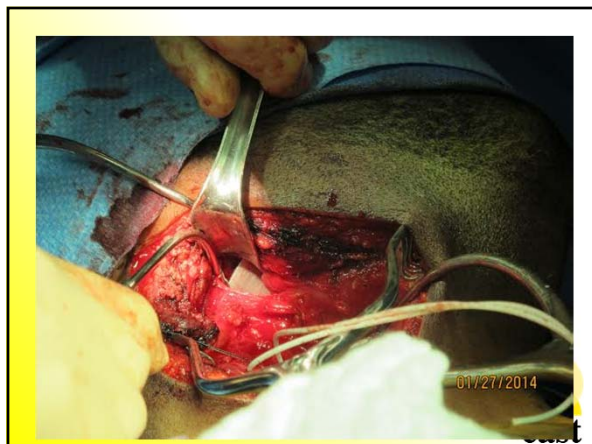


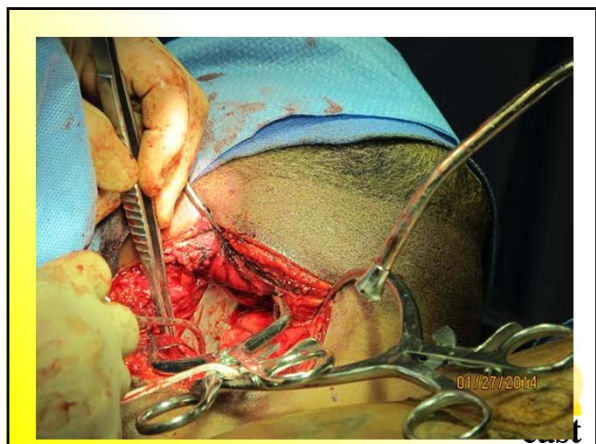
Cook County Trauma Unit

- Critical decision #2
 - What operative approach should be undertaken, and how should the patient be positioned?






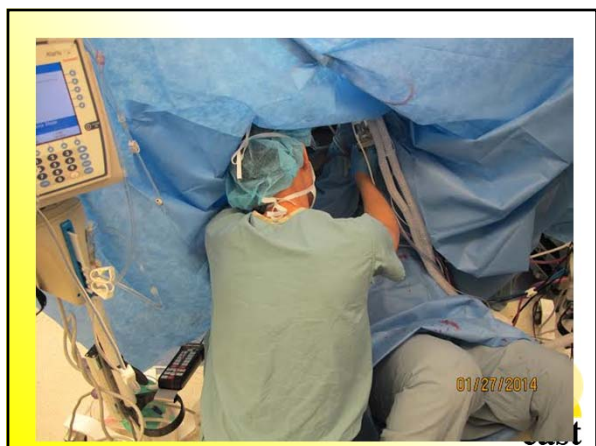


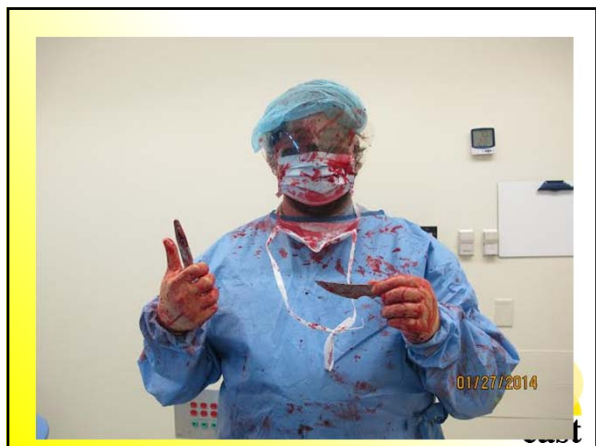


Cook County Trauma Unit

- Critical decision #3
 - How to remove the knife buried firmly into mandible?









Cook County Trauma Unit

- Extubated on POD#1, no neurologic deficit
- Discharged home on POD#4

