- Vital sign observations
  - Relative bradycardia was thought to be due to the patient being on a beta blocker (discovered later) but may also be due to vagal stimulation by intraperitoneal blood (this is also well described in ruptured ectopic pregnancies).
- Take-home points
  - Consider ruptured AAA in patients (especially those >50 years of age) with unexplained hypotension and back or abdominal pain.
  - The absence of tachycardia does not mean the patient isn't bleeding. Beta blockers can suppress tachycardia, and blood in the belly can lead to a vagal response and relative bradycardia.
  - Point-of-care ultrasound (POCUS) is critical in evaluating patients with undifferentiated shock. The RUSH exam is great but most important is to have a focused, organized approach so you make sure you don't miss anything.

Links:

EMRAP HD: RUSH Exam (Rapid Ultrasound in Shock and Hypotension)

CorePendium: Abdominal Aortic Aneurysm

Critical Care Mailbag: Shock Index + Diastolic Shock Index

Scott Weingart and Anand Swaminathan

- Some basics:
  - Systolic BP is a general reflection of the patient's cardiac output.
  - Diastolic BP is a reflection of the vascular tone.
- Shock index (SI)
  - SI = heart rate/systolic BP
  - Normal range is 0.5-0.7
  - An SI >0.7 signals that the patient may be sicker than they appear.
    - It is useful in the patient with a "soft" BP (90-100) without frank hypotension.
- Clinical application of an elevated SI:
  - It does not tell the clinician what to do (ie, pneumonia + SI = 0.9 does not equal "give norepinephrine").

  - It should alert the clinician that a patient may have compensated shock and is at risk for rapid deterioration.
  - It should prompt the clinician that the patient requires frequent reassessments for signs of hypoperfusion.
- Diastolic shock index (DSI)
  - DSI = heart rate/diastolic BP
  - Abnormal: >2.5.
  - Similarly to SI, a DSI >2.5 tells you that the patient is sick but it does not tell you what resuscitative maneuver should be initiated.
- Important reminder: Episodic hypotension is a marker of impending decompensation.
  - When a patient has an episode of hypotension that resolves, improvement is likely due to endogenous catecholamine surge.
  - The catecholamines increase heart rate, cardiac output, and vascular tone.
  - A patient like this should not be admitted to the floor but instead to a higher level of care.
  - SI + DSI can be helpful here if you missed the signal of the episode of hypotension but recognize the elevated SI/DSI.
- Devil's advocate: FAST Exam Pro/Con
  - Specificity and sensitivity of the FAST (focused assessment with sonography in trauma) exam is often centered around diagnosing abdominal injury.
  - Weingart encourages us to shift our endpoint to a "bunch of blood in the belly" (BBB).
  - FAST becomes an excellent test to answer the question, "Is there a bunch of blood in the belly?"
    - Positive FAST = bunch of blood in the belly.
    - Negative FAST = there isn't a bunch of blood in the belly (but it does not mean there's no blood or that there's no intra-abdominal injury).

References:

EM:RAP 2022 April Pulse Pressure in Trauma

EM:RAP 2022 March FAST Exam: Pros and Cons

Ultrasound for the detection of intraperitoneal fluid: the role of Trendelenburg positioning
Abrams BJ, Sukumvanich P, Seibel R, et al. Am J Emerg Med. 1999;17(2):117-120. doi:10.1016/s0735-6757(99)90040-2. PMID: 10102306