Sedoanalgesia in Hypotensive Patients

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Pathophysiological issues in hypotensive patients

- Hypotensive patients needs:
  - More metabolic demands
  - More respiratory work
  - Optimal blood oxygenation

- Hypotensive patients are at risk of:
  - Loss of airway control
  - Renal failure
  - Hypoxia (V/Q mismatch)

The ideal agent characters?

- Rapid onset
- Rapid recovery
- Lack of drug accumulation
- No side effects or toxicity

- **Unfortunately no single agent has all characteristics**

Route of administration of sedoanalgesic drugs in hypotensive patients

- Preferred route of administration in critically ill patients who may have erratic GI absorption
- Hypo-perfusion in hypotensive patients causes IM or SC injections unreliable
- Whenever possible local nerve blocks should be considered

Strategies to prevent hypotensive effects of sedoanalgesic drugs

- Choose the most cardio-vascular stable agents
- Give the lowest acceptable doses
- Administer short acting agents in small frequent doses
- Avoid poly-pharmacy if possible
- Correct hypovolemia

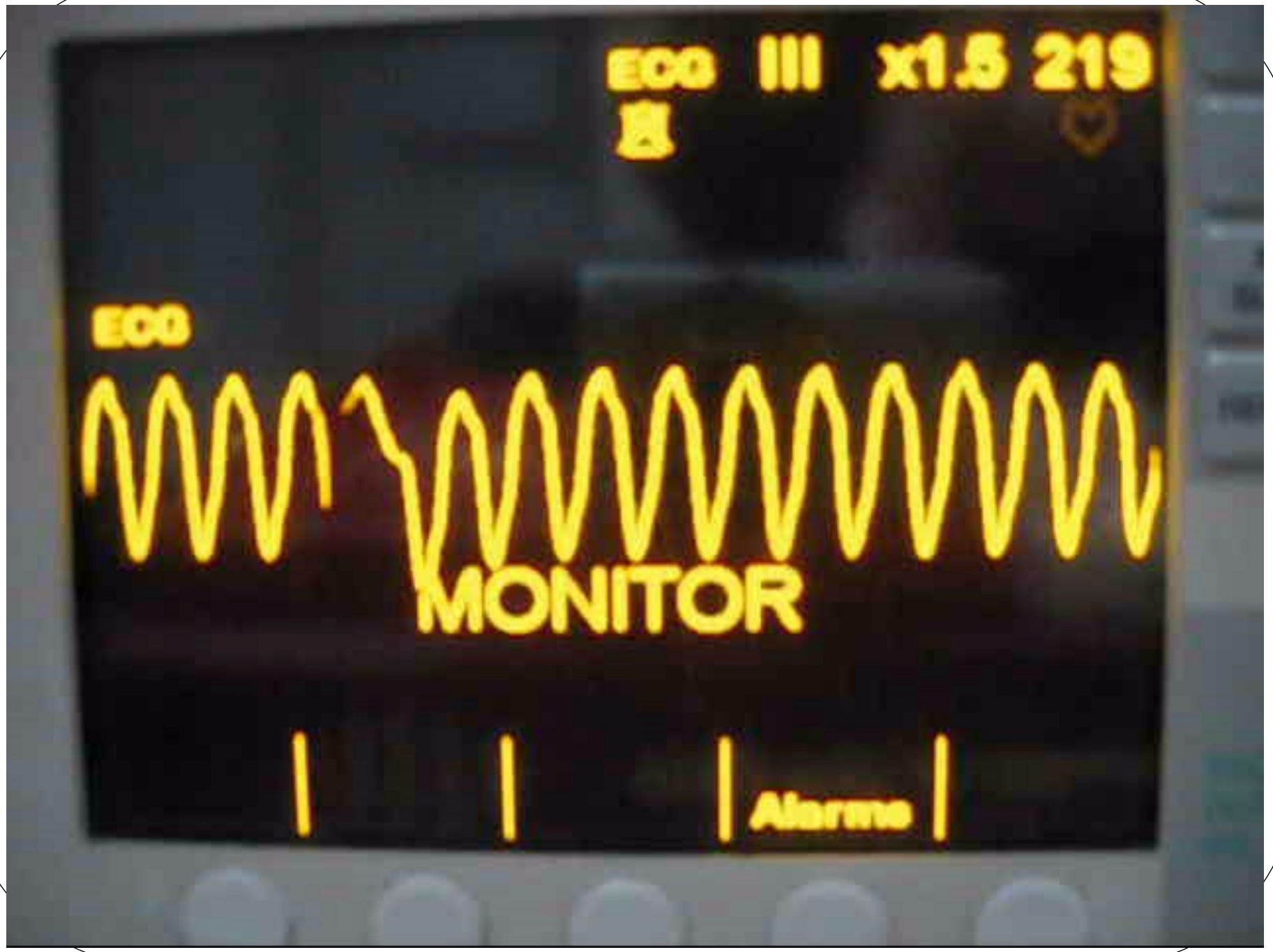
Case 1

- A 55-yr old man with a hx of myocardial infarction was presented to ED with palpitation, chest pain and agitation

- On initial assessment:
  - BP: 70/pulse
  - PR: 220
  - RR: 28
  - O2 Sat: 94% (at room air)

Case 1 (cont'd)

- Two large bore IV line was established
- Cardiac monitoring was started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Case 1 (cont'd)

- Unstable wide QRS tachycardia was diagnosed
- Cardioversion was planned

What is your choice for premedication?

- Midazolam
- Midazolam and Fentanyl
- Etomidate & Fentanyl
- Ketamine
- Propofol

Procedural sedation for cardioversion: Defining the situation

- **Fact:** stimulus intensity of external cardioversion is similar to that of a surgical incision
- **Level of sedation recommended:** either "deep sedation" or general anesthesia
- **Goals of sedation:** prevent recall of the experience and to attenuate the stress response

Sedation protocols for cardioversion

- Etomidate and Fentanyl combination
  - Etomidate 0.15 to 0.2 mg/kg and
  - Fentanyl: 1 mcg/kg/dose up to 50 mcg/dose every 3 minutes, titrating to effect
- Midazolam and Fentanyl combination
  - Midazolam 1 mg IV every 3-5 minutes up to adequate Sedation or to maximum 5 mg cummulative dose and
  - Fentanyl 50 mcg increments
- Propofol

Coll-Vinent (2003) Ann Emerg Med 42:767-72
Basset (2003) Ann Emerg Med 42:773-82

Characters of appropriate agent for cardioversion?

- Short induction
- Rapid awakening
- Minimal adverse effects

Problems with classic protocols

- Deep sedation has a narrow margin of safety
- Usually needs the presence of anesthesiologist or respiratory therapist
- It is time consuming

Challenges

- Of 135 papers (7 RCTs) comparing agents for sedation for cardioversion:
  - Majority have done on stable patients
  - Majority have focused on supraventricular arrhythmias
  - Majority have done using pre-scheduled setting with cardioversion team available
  - No studies focused on unstable patients with ventricular tachyarrhythmia in the ED

Changing trends

- Physician led cardioversion instead of team led cardioversion
- Awake sedation versus deep sedation
- Amnestic agents instead of anesthetic agents
- Supporting evidence: A handful studies since 2003 showing low rate complication and almost zero recall for those taking benzodiazepines alone before cardioversion

Diazepam or midazolam for external cardioversion (The DORM Study)

- 141 stable cases of atrial arrhythmias were randomly given either titrated IV midazolam or diazepam before elective cardioversion
- Sedation time was 5.0±3.4 min for midazolam and 6.5±3.4 min for diazepam (P=0.0016)
- Patients awoke 77±46 min post-sedation with midazolam and 39±24 min with diazepam (P<0.0001)
- 16 minor adverse events in midazolam and 9 with diazepam groups (P=0.14)
- No major adverse events in either group
- No recall in either group at 48 hr post-cardioversion

Case 1 outcome

- Midazolam was injected 3 mg IV initially and 2 mg 1 min later
- Biphasic cardioversion with 100 J was successfully delivered
- Patient admitted to CCU for further monitoring
- One day later he was in stable condition and did not recall cardioversion

Case 2

- A 19-yr-old male was presented with severe dyspnea, agitation and fever
- He was a known case of ALL under active chemotherapy
- On presentation he was in severe respiratory distress and confused
- Vital signs:
  - BP: 80/40mmHg
  - PR: 125/min
  - RR: 45/min
  - O2 Sat: 74% (on 10 L/min oxygen by face mask)

Case 2 (cont'd)

- On P/E diffuse crackles was heard all over the chest
- A portable X-ray showed diffuse pulmonary infiltration consistent with ARDS or massive pneumonia
- RSI with succinylcholine for tracheal intubation was planned

What is the preferred premed sedative choices for RSI?

- Fentanyl
- Midazolam
- Propofol
- Etomidate
- Ketamine
- Thiopental

A meta-analysis of etomidate in sepsis

- Included 10 studies (recruiting 1623 cases of sepsis and septic shock)
- A significant attenuation in response of adrenal to ACTH even after a single injection of etomidate
- Higher risk of death in individuals exposed to etomidate (pooled RR 1.28; 95% CI 1.06–1.54)

Case 2 outcome

- RSI was performed after giving 100 mg Lidocaine, 100 mcg Fenatanyl, 50 mg Ketamine and then 100 mg Succynilcholine without complication
- Assisted ventilation and antibiotics started and patient admitted to ICU

Case 3

- An unrestrained 46-yr-old car driver involved in a roll over accident transferred to ED with multiple trauma.
- On arrival he was alert and vital signs were stable:
  - PR: 90/min
  - RR: 20/min
  - BP: 110/90mmHg
  - O2 Sat: 96% (Room air)

Case 3 (cont'd)

- Trauma survey was notable for unstable pelvic fracture and several skin bruises

Case 3 (cont'd)

- Pelvic was splinted by a pelvic binder
- Other trauma x-ray series were normal
- FAST exam was normal
- Brain and Abdomino-pelvic CT were planned but because of agitation and severe pelvic pain, morphine 5 mg IV was given
- BP dropped to 80/50
- No response after 2 liters saline injection
- Pack cell transfusion started and repeat FAST exam and DPL did not reveal hemoperitoneum

Case 3 (cont'd)

- Expanding retroperitoneal hematoma was suspected
- Pending transfer to cath lab for angiographic embolization, patient was extremely restless and screaming of severe pelvic pain
- 200 mcg IV fentanyl provided no pain relief and followed by further drop of BP to 70/pulse

What is the preferred medication at this time?

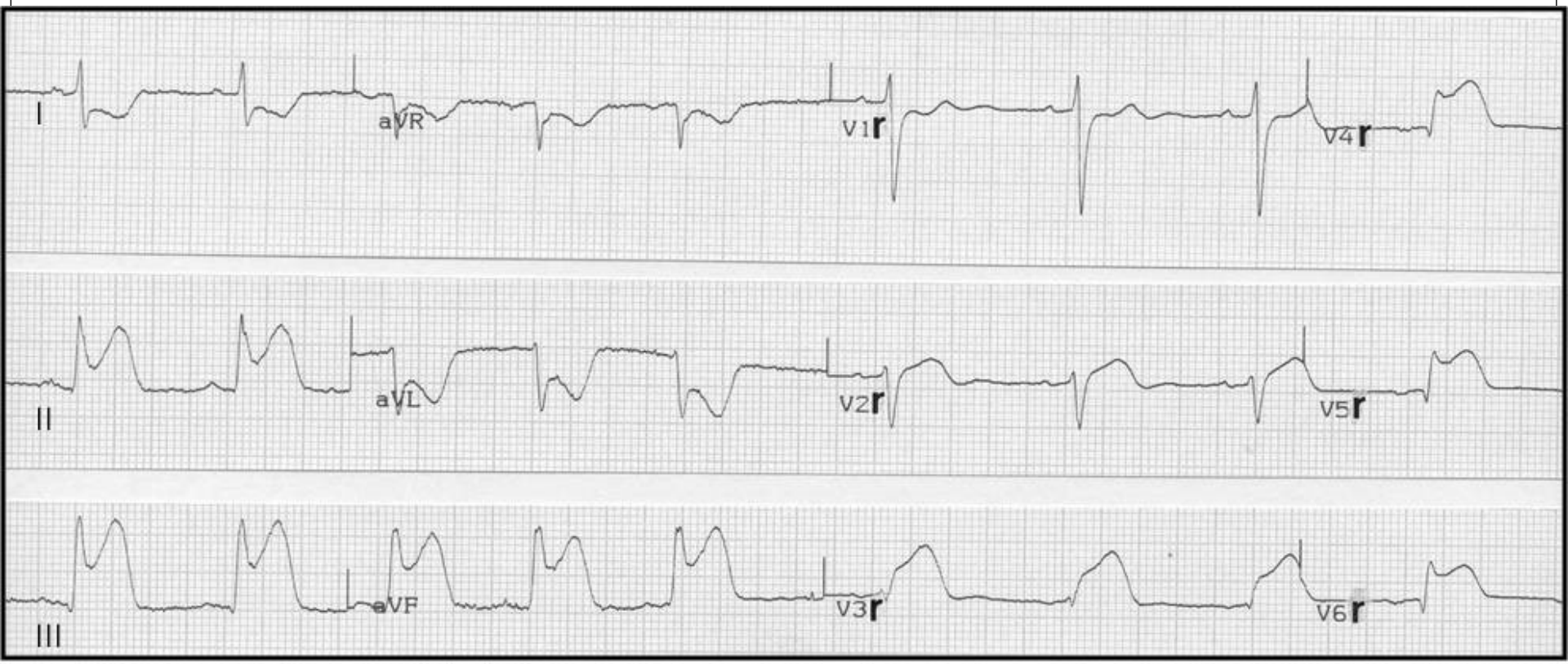
- Fentanyl
- Midazolam
- Propofol
- Etomidate
- Ketamine
- Thiopental
- Morphine

Case 3 (cont'd)

- Ketamine 30 mg was given IV
- Sedation was satisfactory
- Angiographic embolization was performed
- Hemodynamic status improved
- Pelvic external fixator was placed
- Patient hospitalized and scheduled for elective pelvic fracture surgery

Case 4

- A 55-yr-old hypertensive obese woman presented to ED with acute severe epigastric pain
- On exam she was restless and diaphoretic
  - BP: 80/45
  - PR: 74
  - O2 Sat: 94%
  - An ECG was obtained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aVR
V1r
V4r
II
aVL
V2r
V5r
III
aVF
V3r
V6r

Case 4 (cont'd)

- ST elevation MI was diagnosed
- Fentanyl 200 mcg IV was injected
- BP dropped to 50/pulse despite unchanged heart rhythm
- Epigastric pain increased and severe agitation noted

What is the preferred medication at this time?

- Fentanyl
- Midazolam
- Propofol
- Etomidate
- Ketamine
- Thiopental
- Morphine

Case 4 outcome

- A bolus of 500cc saline was infused
- BP increased to 110/80.
- Small doses of morphine was injected over 10 min with moderate pain relief
- Aspirin and clopidogrel was given by mouth
- And patient transferred to cath lab with successful revascularization of RCA

Summary

- Optimal Sedation or analgesia in unstable patients is challenging
- There is no single drug of choice
- Cardio-vascular stable drugs are preferred
- The short-acting drug is given IV in titrated doses
- Sound clinical judgment is extremely important
- Always consider underlying hypovolemia

Thank You