CHALLENGES IN PREHOSPITAL CARE

EMS CASE STUDIES
JOE BEIRNE, DO, FACOEP, FACEP

EMERGENCY DEPARTMENT PHYSICIAN-EMS MEDICAL DIRECTOR
MISSOURI BAPTIST MEDICAL CENTER
MEDICAL DIRECTOR

EMS PROGRAMS

ST. LOUIS COMMUNITY COLLEGE

RESPOND RIGHT EMS ACADEMY
EMS CASE STUDIES

• Critical thinking and clinical diagnostic skills are a vital component to patient care
• Traditional medical training is disease-based and focuses on textbook learning
• Changing to patient-centered teaching, where we use our powers of reasoning, clinical examination skills and critical thinking, to allow the patient’s to teach us, truly provides the most comprehensive approach to medical education
EMS CASE STUDIES

• Each case will be presented with a chief complaint
• Proceed with each case as a new patient
• Use your clinical skills and critical thinking to help guide your decision-making
• Interact with each other as part of the medical team caring for each patient
• Formulate a working diagnosis
• Each case will be reviewed with diagnosis/disposition
EMS CASE STUDIES

- 47 year-old man with rapid heart rate
- 3-4 hours of palpitations and rapid heart rate
- Admits to dyspnea, mild chest pain; denies dizziness
- No prior episodes
- History: DM, Hypertension, COPD
- Meds: Metformin, Hyzaar, Norvasc, Combivent MDI
- VS: 98, 150/90, 198, 22, 100% room air
EMS CASE STUDIES

- Exam: HEENT/neck benign, no bruits/JVD
- CV: tachycardic, rhythm appears regular; cannot assess for murmurs secondary to heart rate
- Pulmonary: clear bilaterally
- Abdomen/Extremities: benign
- Neuro: benign
- IV started, labs sent, Oxygen started, 12-lead ECG obtained:
EMS CASE STUDIES
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- Second troponin drawn 8 hours after symptom onset also normal
- Patient remained in sinus rhythm, discharged home after several hours of observation
- Incidence of SVT 35/100,000 population; often recurrent and occasionally persistent
- Usually not associated with heart disease
- Narrow complex (orthodromic) tachycardias occur in 90% of cases
EMS CASE STUDIES

• Orthodromic SVT are treated with vagal maneuvers first; if unsuccessful, proceed with pharmacologic therapy

• “ABCD” Drugs- Adenocard, Beta blockers, Calcium channel blockers, Digoxin

• Other choices include Procainamide, Propafenone, Ibutilide, Flecainide (cardiologist should be consulted before using these)

• Check electrolytes/TSH; 2D echo as outpatient +/-, as structural heart disease is uncommon
EMS CASE STUDIES

• Teaching Points: SVT frequently occurs in young patients, usually not associated with structural heart disease.

• Common symptoms include palpitations, anxiety, lightheadedness, chest pain, pounding sensation in neck/chest and dyspnea; syncope is uncommon.

• Hemodynamically stable patients can be treated medically; unstable patients require cardioversion.

• SVT can present as WCT (antidromic); these should be treated as VT until proven otherwise.
EMS CASE STUDIES

- 75 year old woman presents via EMS after fall
- EMS reports she was walking her dog, tripped over him and did a “face plant” (I am lobbying to make this an accepted medical term!)
- Struck forehead, denied LOC, numbness, paresthesias, focal weakness
- Complained of neck pain, but no different from her chronic neck pain
- No cervical immobilization in field
EMS CASE STUDIES

• ED Evaluation: elderly female seated on ED stretcher, appears stable
• VS: 98.6°, 140/90, 88, 22, 99% ra
• HEENT: 2 cm superficial laceration to central forehead, edges fairly well approximated; PERLA/EOMI, Battle’s sign negative; airway clear, no teeth/blood/secretions noted, no hemotympanum
• Neck: mildly tender to palpation midline upper cervical spine
EMS CASE STUDIES

- CVP: RRR, no murmurs, lungs clear
- Abdomen/Ext: benign
- Neuro: alert, oriented; upper and lower extremity strength 5/5 proximal and distal bilaterally; sensation intact
- IV started, labs drawn
- Noncontrast CT head and cervical spine ordered, with patient in hard collar; Head CT normal
- Reformatted CT cervical spine:
EMS CASE STUDIES
Figure 60.2. Reformatted sagittal (panel A) and coronal (panel B) images from the cervical spine CT of a 73-year-old female with type II odontoid fracture (arrows).
EMS CASE STUDIES

- Diagnosis-Type II Odontoid Fracture (considered unstable) with 12 mm dorsal displacement of C1 ring and odontoid process with respect to C2, posterior displacement of lateral masses C1

- Patient remained in hard collar and immobilization, transferred to trauma center and had C1-C2 posterior fusion/facet joint fusion with lateral mass screws and pedicle screws at C1-C2

- Repeat CT at 6 months showed healing of odontoid fracture with no evidence of displacement
EMS CASE STUDIES

• Have low threshold for cervical immobilization and imaging in elderly patients with neck pain, especially following low impact trauma (fall from standing, face plant, etc)

• CT cervical spine is far superior to plain radiography in diagnosing C-spine fractures, particularly those at the craniocervical junction, and in elderly patients with osteopenia and DJD

• Elderly patients may have significant C-spine trauma in absence of neurologic symptoms
EMS CASE STUDIES

- 74 year old woman brought by EMS for near syncope and chest pain
- Onset occurred while brushing her teeth; felt lightheaded and had chest pressure; husband checked her BP and noted 74/50, pulse of 110; 911 contacted
- On EMS arrival, awake, wide complex tachycardia, 200/min, monomorphic, uniform and regular QRS morphology
EMS CASE STUDIES
EMS CASE STUDIES

- EMS administers Lidocaine, with rhythm change to following:
EMS CASE STUDIES

• History: hyperlipidemia, HTN, dyspnea of unclear etiology

• Stress thallium test 6 months earlier markedly abnormal; underwent cardiac catheterization with area of basilar inferior hypokinesis, but no obstructive lesions

• Prior ECG showed first degree AVB with RBBB and LPFB

• 1 week prior to ED presentation, had complained of lightheadedness; Metoprolol dose reduced to 12.5 mg daily
EMS CASE STUDIES

- BP improves to 100 systolic, with persistent lightheadedness, but no chest pain or dyspnea
- ED Evaluation: awake, alert, appears nontoxic
- VS: 98.6°, 100/60, 55, 22, 99% ra
- Exam: bradycardic, otherwise entire exam unremarkable
- 12-lead ECG unchanged from prior in field
- Labs normal
EMS CASE STUDIES

- Diagnosis: Complete heart block following conversion from Ventricular Tachycardia with Lidocaine
- On ED arrival, remained in complete heart block, junctional escape rhythm 55; temporary pacer wire placed via IJ line
- Despite multiple readjustments, pacer spikes continued falling on T waves; pacer turned off while wire repositioned
- Patient became unresponsive, pulseless with following ECG:
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EMS CASE STUDIES

• Rhythm interpretation?

• Torsades

• Defibrillated at 200 J (biphasic monitor), rhythm converted to complete heart block; regained consciousness with immediate resumption of pacemaker at 90 to override intrinsic rhythm

• Remained hemodynamically stable

• Received AICD/pacemaker and discharged in good condition
EMS CASE STUDIES

Teaching points:

Patients with multifascicular block have advanced conduction system disease that can progress to CHB at any time.

Any patient with CHB needs a permanent pacemaker, even if they are asymptomatic!

Patients with pre-existing sinus node dysfunction, abnormal His-Purkinje conduction or ventricular escape rhythms may degenerate to CHB following administration of IV Lidocaine.
EMS CASE STUDIES

• 54 year-old woman calls 911 for complaint of nausea and vomiting for one month

• Call is dispatched as a “sick case”

• Report by EMS is patient reported above symptoms as well as weakness

• Local EMS administered Zofran for nausea

• Patient requested transport to Missouri Baptist, but due to her location in St. Louis City, private ambulance was contacted for transport
EMS CASE STUDIES

• Private ambulance company transports patient non-urgent to Missouri Baptist
• On arrival to ED, patient is somewhat lethargic, pulse drops from 90 to 45 over a period of 10 minutes
• No 12-lead EKG done in field
• 12-lead EKG done in ED:
EMS CASE STUDIES

• Patient is taken immediately to cardiac cath lab for emergency catheterization
• Findings: 100% Left main coronary artery occlusion
• PTCA with stent placement and IABP
• Outcome: discharged about 1 week later, with complete reperfusion of occluded vessel
• Returned about 2 weeks later with pericarditis, CHF and continued sensation of weakness
EMS CASE STUDIES

• What else did we need to know?
• Patient had history of uncontrolled Diabetes
• History of Hepatitis C with cirrhosis and Hepatocellular carcinoma, s/p liver transplant
• Most recent follow up with transplant service March 2011 revealed evidence of immune hepatitis and recurrent Hepatitis C without evidence of rejection
• History of hypertension and hyperlipidemia
EMS CASE STUDIES

• Reperfusion arrhythmia (ventricular tachycardia) occurred after placement of left main coronary artery stent
• What did we learn from this case?
• Patient was transported nonemergently from scene, 14 miles to this hospital, by passing HOW MANY other facilities with identical capabilities?
• 35 minute transport time!
• No 12-lead EKG done in field; if it was, patient could have been in cath lab an hour earlier!
EMS CASE STUDIES

• Patients with CAD, particularly women, do not have traditional signs/symptoms; *expect the unexpected!*

• Patients with weakness should never be considered “just a sick case”; weakness is a nonspecific symptom and should make you look for the cause

• 12-lead EKG is a cheap screening test; in this case, it would have saved the patient at least an hour of time and myocardium

• If something feels unnatural about the history, it probably is!
EMS CASE STUDIES

- aVR is often termed the “Forgotten Lead”
- Initially developed with intent of obtaining information of right upper side of heart near RV outflow tract
- In practice, aVR is often ignored because it is felt to provide reciprocal information of left lateral leads (I, aVL, V5, V6)
- In anterior STEMI, aVR elevation is associated with left main occlusion, as well as MI in presence of multivessel CAD
EMS CASE STUDIES

• In anterior STEMI, ST-segment elevation in aVR greater than V1 is associated with occlusion of the left main artery.

• ST-segment elevation in aVR less than that in V1 is associated with proximal LAD occlusion.

• ST-segment elevation in these STEMI patients is thought to be caused by occlusion of first septal perforator, resulting in ECG injury current in basal portion of interventricular septum.
EMS CASE STUDIES

- ST elevation in aVR with multi-lead ST depression has been previously described for patients with occlusion of left main, proximal LAD and MI in presence of multivessel CAD
- Mechanism of multilead ST depression associated with occlusion of left main and proximal LAD is not known
- Presumably, mechanism is global ischemia from generalized decrease in myocardial blood flow
EMS CASE STUDIES

- Teaching Points:
  - Incidence of aVR ST elevation in patients with MI is unknown
  - Most of these patients with MI associated with multilead ST depression are treated as non-STEMI and typically do not undergo emergent angiography
  - These patients are a subgroup of ACS at high risk for adverse outcomes
  - These patients need emergent catheterization and may require emergency CABG
EMS CASE STUDIES

• While working as an EMS provider for a transporting ambulance service you respond to a patient in full cardiac arrest. Upon arrival the attending family member states that the patient has an OOH DNR order and an OOH DNR identifier.

• Neither the OOH DNR order or OOH DNR identifier can not be located. Would you begin resuscitation efforts for this patient?
EMS CASE STUDIES

- YES
- Begin resuscitation efforts
- If the OOH DNR orders or OOH DNR identifier is located prior to leaving the scene, you can stop resuscitation efforts
- May wish to contact on-line medical control for direction
- Post-incident – documentation as to compliance or noncompliance with the OOH DNR order
EMS CASE STUDIES

• You respond to the home of a terminally ill patient who has an OOH DNR identifier on their wrist
• The patient is non-responsive to verbal stimulus but does respond to painful stimulus. They are in obvious respiratory distress (respirations 40, shallow with oral secretions)
• The attending family member also shows you a valid OOH DNR order. Would you provide any care for this patient?
EMS CASE STUDIES

- YES
- Comfort care
  - Oxygen
  - Suctioning
  - Other medications as needed
- Contact on-line medical control
EMS CASE STUDIES

• You respond to a MVC with the local ambulance service
• Upon arrival you are assigned to an unconscious 67 year old male sitting in the passenger seat of one of the vehicles involved in the crash
• The patient has a large laceration to their forehead with active venous bleeding
• Upon assessment you find an OOH DNR identifier on the patient’s wrist. Would you continue care/treatment of this patient?
EMS CASE STUDIES

- YES
  - This condition is not the result of their underlying terminal condition
  - Contact on-line medical control if there are questions regarding the amount/type of treatment to be provided
EMS CASE STUDIES

- Your ambulance service arrives at the home of a 53 year old female with a terminal condition
- There is a valid OOH DNR order and identifier
- The OOH DNR order identifies the daughter (who is present at the scene) as the patient's legal representative
- The daughter states that she wants everything possible done for her mother. Would you begin resuscitative efforts if needed?
EMS CASE STUDIES

- YES
- An OOH DNR order is deemed revoked at anytime that a patient or legal representative is able to communicate in any manner the intent of the order be revoked.
- Documentation (post incident) is necessary to indicate that the order was revoked by the patient's legal representative.
EMS CASE STUDIES

• DILEMMAS
  • Patient who possesses valid DNR order who suffers a sudden, catastrophic event that could be terminal, yet easily reversible (airway obstruction from foreign body, anaphylaxis from insect envenomation are two common examples)
  • If properly treated, event resolves and no long-term disability occurs
  • Patient with valid DNR order who attempts suicide but is found before being successful
EMS CASE STUDIES

• Ethical intent of EMS providers to act for the good of the patient (concept of beneficence) is contrary to the patient’s autonomous wishes expressed in the DNR order
• Thus, a dilemma exists, as provider cannot satisfy both ethical principles
• In these two cases, one can argue that the patient who makes their DNR order typically has not thought of, nor considered, these types of examples or events within the scope of their expressed refusal of interventions
• In most cases, law would assume that a reasonable patient would not refuse a brief, simple, life-saving procedure
EMS CASE STUDIES

• Cases of attempted suicide are more complex and ethically challenging
• Suicide is “an affirmative act that requires a decision by the individual to undertake that act”
• However, treatment is necessary “because the individual must be returned to a level of functioning where it is possible to demonstrate that the decision to end life is truly an autonomous decision”
• Argument can be made that suicide attempt is not a rational decision and likely not considered by the patient when they formulated their DNR order
EMS CASE STUDIES

- If uncertainty exists regarding the validity or application of the OOH DNR order of identifier:
  - The EMS provider shall provide the necessary and appropriate resuscitation
    - Document compliance or noncompliance with the OOH DNR order and the reasons for not complying with the order
    - Include evidence that the order was revoked or uncertainty regarding the validity or applicability of the order
EMS CASE STUDIES

- An OOH DNR order is deemed revoked when:
- Any time that a patient, or an individual authorized to act on the patient’s behalf as designated on the OOH DNR order, is able to communicate in any manner the intent that the order be revoked, without regard to the mental or physical condition of the patient
EMS CASE STUDIES

• A revocation is only effective as to the health care provider upon communication to that provider by the patient, an individual authorized to act on the patient’s behalf as designated in the OOH DNR order, or by another person to whom the revocation is communicated by the patient.

• The personal wishes of family members or other individuals who are not authorized in the order to act on the patient’s behalf shall not supersede a valid OOH DNR order.