Heart Block (Mobitz Type II)

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Keywords: bradycardia, arrhythmia, AV block
Procedures: transcutaneous pacing, transvenous pacing

LEARNING OBJECTIVES

1. Manage a patient with symptomatic bradycardia
2. Create a broad differential for a patient with bradycardia
3. Order appropriate studies to elucidate the cause of patient's clinical deterioration
4. Recognize need for early consultation
5. Perform transcutaneous pacing

CRITICAL ACTIONS

✓ Obtain IV access with two large bore peripheral IVs
✓ Early fingerstick glucose
✓ Place patient on cardiac monitor with continuous oxygen saturation monitoring
✓ Ask for a full set of vital signs including HR, BP, oxygen saturation, and temperature
✓ Ask for and interpret appropriate labs (CBC, Coagulation Profile, Cardiac Biomarkers, Chemistry)
✓ Administer atropine
✓ Perform transcutaneous pacing
✓ Counsel patient
✓ Provide analgesia
✓ Check for mechanical capture
✓ Obtain EKG, CXR
✓ Reassess patient and vital signs
✓ Call appropriate consultations (Cardiology, ICU)
✓ Use closed-loop communication
✓ Summarize case to team or consultant
✓ Bonus: Prepare for transvenous pacing

CASE ONE-LINER

64-year-old male presents with weakness and diaphoresis

PRESENTATION

SETTING	Hospital ED
ADDITIONAL ROLES	Sim operator, sim RN, debrief manager **CONSULTANTS:** Cardiology, CCU
PATIENT	64yo male
CHIEF COMPLAINT	"I feel weak and sweaty!"
Hx of PRESENTING ILLNESS	A 64-year-old male presents to the ED after growing diaphoretic and feeling weak while at his PCP's office 10 minutes prior to arrival. Also notes retrosternal pressure that has resolved now. Denies associated dyspnea, abdominal or back pain, or extremity edema. He does endorse some dizziness but denies LOC. Patient has had this happen before 1 week ago in line at a Taylor Swift concert. Has come close to falling a few times. Did not take his home medications this morning (only report if directly asked).
ROS	(+) Dizziness, diaphoresis, weakness, chest pressure (-) Loss of consciousness, headache, dyspnea, abdominal pain, back pain, extremity edema
PMH/PSH	Hypertension, Diabetes Mellitus, HIV +/ Lap Cholecystectomy
MEDICATIONS	Metoprolol, Vitamin C supplements, metformin
ALLERGIES	None
SOCIAL Hx	Occasional EtOH Never smoker Never tried recreational drugs

INITIAL VITAL SIGNS

HR	BP	RR	PULSE OXIMETRY	TEMP	WEIGHT
45	100/75	15	99% on room air	97.9F	80 kg

PHYSICAL EXAM

Items in red need to be verbalized

PRIMARY SURVEY

- **Airway:** Patent, speaking full sentences
- **Breathing:** Equal chest rise, no cyanosis
- **Circulation:** Thready pulses, mottled color of skin

GENERAL: AAOx3, diaphoretic

HEENT: Normocephalic, atraumatic. PERRL, TM physiologic, tongue midline

NECK: No JVD, no crepitus

CV: Bradycardic, physiologic heart sounds

PULM: CTAB in all fields, no tachypnea

ABD: Non-tender, non-distended abdomen, +bowel sounds, no rebound or guarding

EXT: 2+ pulses throughout - though thready, no edema

NEURO: Normal

PHASE 1: INITIAL PRESENTATION				
TIME	**CLINICAL PROMPT**	**EXPECTED MANAGEMENT**	**CONSEQUENCES**	**CRITICAL ACTIONS**
00:00-03:00	64yo male presents wtih weakness and diaphoresis **Repeat Vital Signs (after atropine)** BP: 100/73 HR: 40 RR: 18 O2 sat: 99% on RA	• Order full set of vital signs, cardiac monitor, continuous oxygen saturation monitoring • Order 2 large bore IVs • Obtain 12-lead ECG • Order troponin • Order point-of-care glucose (POC glucose – 94) • Place pads on patient • Introduce self to the patient • Administer atropine (may attempt up to 3 times but will not alter vitals)	• RN prompts, "Do you want vitals/patient on the monitor/ IV access?" if not requested • RN prompts, "Doc, do you want a fingerstick?" if not requested • RN prompts, "Do you want me to put the pads on the patient?" if not conducted. • Patient to ask, "Who are you?" if no introduction provided	**Obtained a complete set of vital signs?** I P N **Recognized abnormal VS?** I P N **Performed focused physical exam?** I P N **Ordered 2-large bore IVs?** I P N **Obtained and interpreted ECG?** I P N **Ordered a fingerstick glucose?** I P N **Introduced self to patient?** I P N **Atropine attempted?** I P N **Pads placed?** I P N

PHASE 2: REASSESSMENT AND SECONDARY INTERVENTION				
TIME	**CLINICAL PROMPT**	**EXPECTED MANAGEMENT**	**CONSEQUENCES**	**CRITICAL ACTIONS**
3:01-6:00	Patient develops chest pain and feels near syncopal **Repeat Vital Signs** BP: 80/57 HR: 47 RR: 15 O2 sat: 98% on RA **Repeat Vital Signs (after pacing)** BP: 104/75 HR: 70 RR: 16 O2 sat: 98% on RA **Repeat Vital Signs** (if no pacing) Cardiac arrest	• Order STAT labs • Order STAT CXR • Provide analgesia and perform transcutaneous pacing (must assess for mechanical capture) • Re-assess vitals and patient after transcutaneous pacing performed (will not be successful until 70 mA) • Broad DDx for etiology of bradycardia • Glucagon is an optional treatment and will not impact the vitals • If insulin is given, hypoglycemia will develop and patient will decompensate	• RN prompts, "Do you want any imaging/ labs?" if not requested • RN prompts, "Do we place pacing pads on the patient?" if not done by 5:00 • RN prompts, "Is the pacing working?" if no evaluation for mechanical capture • RN prompts, "What's causing HR to be so low?" if no DDx verbalized • Patient to groan in pain if pacing initiated without analgesia	**Ordered appropriate labs?** I P N **Ordered STAT CXR?** I P N **Interpreted ECG correctly?** I P N **Formed broad DDx?** I P N **Administered analgesia prior to pacing?** I P N **Performed transcutaneous pacing w/ assessment for mechanical capture?** I P N **Reassessed VS after interventions?** I P N

PHASE 3: REASSESSMENT, TERTIARY INTERVENTION, RESULTS, RESOLUTION				
TIME	**CLINICAL PROMPT**	**EXPECTED MANAGEMENT**	**CONSEQUENCES**	**CRITICAL ACTIONS**
6:01-10:00	Patient improves after pacing **Repeat Vital Signs (after pacing)** BP: 104/75 HR: 70 RR: 16 O2 sat: 98% on RA	• Suggest or conduct transvenous pacing • Reassess vital signs • Relay findings and plan of care to patient • Present case to Cardiology/CCU	• Lab results at 6:30 • RN prompts, "What did the imaging/labs show?" if no interpretation • RN prompts, "Who's admitting this patient?" if no consult called • RN prompts, "The patient wants to know what's going on" if no update provided to patient	**Called consultant?** I P N **Succinct and direct hand-off to specialist?** I P N **Interpreted test results accurately?** I P N **Updated patient at any point?** I P N **Reassessed VS?** I P N

PHASE 4: CONCLUSION & DEBRIEFING	
TIME	**ACTIONS**
10:00-20:00	Debrief Q&A Session/Teaching Evaluations

DEBRIEFING POINTS

GENERAL POINTS	SCENARIO-SPECIFIC POINTS
• What went well? • What are some opportunities for improvement? • Did you identify any gaps in knowledge? • Was there any delay in treatment? • How was communication between team members?	• Management of high-grade AV blocks • Bradycardia differential diagnosis including beta-blocker toxicity, calcium channel block toxicity, digoxin toxicity, hyperkalemia, etc. • Transcutaneous and transvenous pacing methods

ORAL BOARDS PEARLS

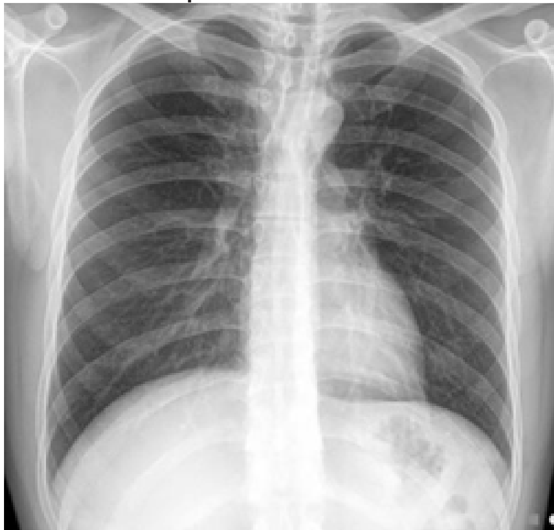
- Have a format for how you would like to approach each case
- Remember to consider POC glucose as part of the initial vitals or assessment, re-assess the vital signs, re-assess after each intervention, and follow up on any studies
- Remember to explain to the patient/family the same way you would in real life
- If the examiner attempts to cue you or ask "anything else", take a moment to synthesize what has been done to help organize your thoughts (this may be your final chance to correct something you forgot!) and ensure the examiner recorded all of your intended actions
- Make sure you include toxidrome or other causes of bradycardia in your work-up

SCENARIO STIMULI

Complete Blood Count		Coagulation Profile	
WBC	11.5 (Normal 5.0 - 14.5 x 10^3/mL)	PT	12 (Normal 11-13.5 seconds)
Hemoglobin	12.0 (Normal 11.5-15.5 gm/dL)	PTT	28 (Normal 25-35 seconds)
HCT	34.5 (Normal 35%-45%)	INR	1.1 (Normal 0.8-1.1)
Platelets	300 (Normal 150-450 x 10^3/mL)		
MCV	84 (Normal 76-90 fL/red)		
Basic Metabolic Panel		**Additional Tests**	
Sodium	136 (Normal 136-145 mEQ/L)	Troponin I	< 0.02 (Normal < 0.08 ng/mL)
Potassium	5.1 (Normal 3.5-5.5 mEQ/L)	Type/Cross	Type A Negative
Chloride	105 (Normal 95-105 mEQ/L)		
CO_2	22 (Normal 17-29 mEQ/L)		
BUN	18 (Normal 5-20 mg/dL)		
Creatinine	1.1 (Normal 0.5-1.1 mg/dL)		
Glucose	140 (Normal 70-110 mg/dL)		

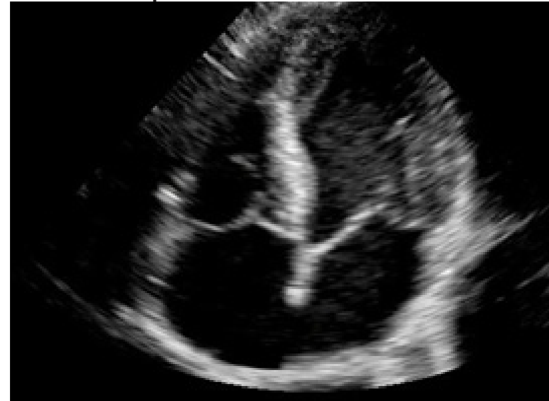
IMAGING

Representative CXR



(IMAGE FROM RADIOPAEDIA.ORG)

Representative Ultrasound



(IMAGE FROM EMERGENCYULTRASOUNDTEACHING.COM)

Representative ECG