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EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER DEPARTMENT OF EMERGENCY MEDICINE

AUTHOR: GABRIELLY COATTI, MS IV
EDITOR: ANDREA SARCHI, DO

Transient Mobitz Type 2 AV Block

A 72-year-old Caucasian male with a PMH of DM2, HTN, dyslipidemia, BPH, CKD, and TIA presents to the ED via ambulance after a syncopal episode. Patient was unable to provide a clear history upon presentation to the ED as he lost consciousness when he had the syncopal episode. Patient said he had been feeling lightheaded and weak all day prior to syncopal episode. His vitals upon arrival were Temp 98F, RR 20, HR 39 bpm, BP 105/49, and O2 97% RA. EKG was done and showed the following:

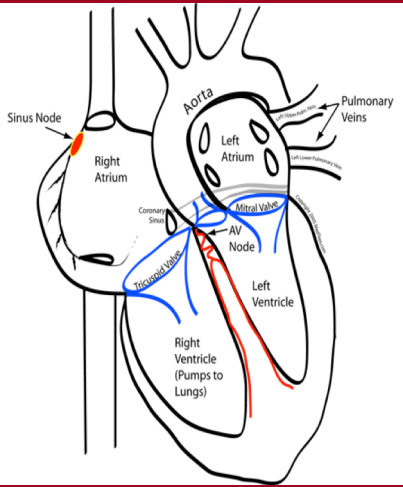
What is the next step in management?

A. Stat insertion of a trans-venous pacing wire in the ED

B. Consult Cardiology for stat pacemaker placement

C. Place transcutaneous pacemaker and rule out reversible causes of Mobitz type 2, second-degree AV block

D. Administer Atropine, as patient is bradycardic

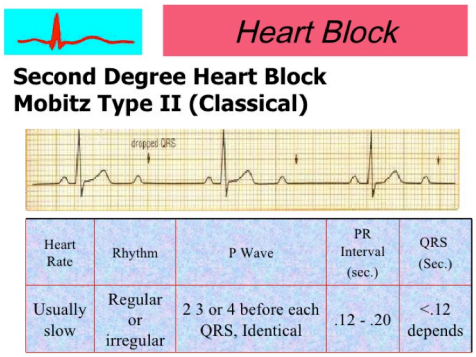


It is important to know the facts about 2° Mobitz II AV Block, as not all patients will require a pacemaker. It is essential to revise patients' home medications and order serum electrolytes among other studies to rule out reversible causes of AV block.

EM CASE OF THE WEEK

EM Case of the Week is a weekly "pop quiz" for ED staff. The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

Broward Health Medical Center
Department of Emergency Medicine
1625 SE 3rd Ave
Fort Lauderdale, FL 33316



Heart Rate	Rhythm	P Wave	PR Interval (sec.)	QRS (Sec.)
Usually slow	Regular or irregular	2 3 or 4 before each QRS, Identical	.12 - .20	<.12 depends

Take Home Points

- 2° Mobitz II may present as occasional or repetitively blocked impulses with consistent PR and RR intervals.
- 2° Mobitz II may be due to degeneration of the heart's conduction system vs. reversible extrinsic factors
- Most patients with 2° Mobitz II are asymptomatic. If the patient is symptomatic, however, signs and symptoms include chest pain, lightheadedness, or syncope.

The correct answer is C. Second-degree, Mobitz II AV Block is a disorder characterized by a disturbance of atrial impulse to the ventricles via the AV node. Electrocardiographically, HR is usually slow, rhythm may be regular or irregular, and a conducted QRS complex follows non-conducted beats with identical PR and RR intervals. Of note, there may be as many as 2, 3, or 4 P waves before each QRS complex as in the example shown above (3:1 block).

Discussion. Second-degree Mobitz II AV blocks can be permanent or transient, depending on the anatomic or functional impairment in the conduction system. Cardioactive drugs such as digoxin, beta-blockers, calcium channel blockers and certain anti-arrhythmic drugs have been implicated in second-degree AV block. If discontinuation of such drugs does not reverse the patient's second-degree AV block, an underlying conduction disturbance may be present.

Various inflammatory, infiltrative, metabolic, endocrine and collagen vascular disorders have been associated with AV block, as follows:

Inflammatory diseases: endocarditis, myocarditis, Lyme disease, and rheumatic fever.

Infiltrative diseases and malignancies: amyloidosis, hemorchromatosis, sarcoidosis, multiple myeloma, and Hodgkin's Lymphoma.

Metabolic and Endocrine Disorders: hyperkalemia, hypokalemia, hypermagnesemia, hyperthyroidism, **and** Addison's disease. Electrolyte etiologies should always be considered in patients with an underlying renal disease.

Collagen Vascular Disorders: lupus, rheumatoid arthritis, and scleroderma.

Other: acute myocardial infarction, cardiac surgery, acute ethanol poisoning, and post chest trauma.

Presentation.

Patients with 2° Mobitz II are usually asymptomatic. If symptomatic, patients will likely have symptoms of hypo-perfusion secondary to bradycardia (i.e. lightheadedness, weakness, and syncope). Chest pain is an unlikely presentation, but if present, may hint at an inflammatory or ischemic etiology of heart block.

Workup.

Always consider transient causes of 2° Mobitz II. It may be helpful to check the following labs if clinically relevant:

- Serum electrolytes, calcium, magnesium
- Digoxin level if patient is on digoxin
- Cardiac enzymes if acute myocardial infarction is suspected
- Lyme titers, HIV serologies, enterovirus PCR, adenovirus PCR, and Chagas titers if myocarditis is suspected
- TSH if suspected thyrotoxicosis
- Echocardiogram if structural abnormality is suspected (i.e. history of valve surgery, suspected infiltrative disease, or history of collagen vascular disease)
- Follow-up ECGs and cardiac monitoring if appropriate

Treatment.

Transcutaneous (TC) pacing should be applied to all patients with 2° Mobitz II AV block, even if asymptomatic, because of the propensity of these patients to progress to complete heart block. It is important to test the TC pacemaker to ensure capture. If the TC pacemaker does not capture and the patient is unstable, cardiology should be consulted immediately. In scenarios where emergency cardiology consult is unavailable, a temporary trans-venous pacing wire should be placed in the ED.

Permanent pacemaker implantation is not indicated in patients with etiologies that are expected to resolve, such as:

- Hyperkalemia- albuterol and insulin will shift potassium into the cell, kayexalate and furosemide will decrease total body potassium, and calcium gluconate will stabilize the cell membrane.
- Hypokalemia: replace potassium
- Hypermagnesemia: furosemide will decrease total body magnesium, calcium gluconate will stabilize the cell membrane, and insulin will shift magnesium into the cell.
- Digoxin toxicity: activated charcoal in acute overdose, discontinuation of digoxin, and administration of digoxin immune Fab
- Acute myocardial infarction: PCI, CABG
- Myocarditis: treat underlying infection (i.e. if patient has positive Lyme titers, admit patient to telemetry and initiate doxycycline)
- Hyperthyroidism: PTU, anti-thyroid medications, ablation, or thyroidectomy

Permanent pacemaker implantation is indicated in cases where second degree AV block is expected to persist. Indications for permanent pacing in second degree AV blocks are explained in detail in the guidelines published by the ACC and AHA; however, a summary of the indications are as follows:

- Second-degree AV block associated with bradycardia, heart failure, and/or asystole greater than or equal to 3 seconds
- Mobitz II with wide QRS complexes
- Persistent and symptomatic second-degree AV block after a myocardial infarction
- Second-degree AV block with neuromuscular diseases, such as muscular dystrophy

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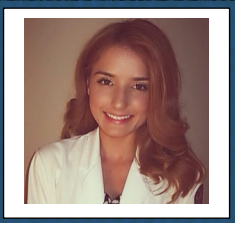
Sovari, Ali A. Second-Degree Atrioventricular Block. Medscape. 2014 Apr 28.



ABOUT THE AUTHOR:
This month's case was written by Gabrielly Coatti. Gabrielly is a 4th year medical student from NSU-COM. She did her emergency medicine rotation at BHMC in January 2016. Gabrielly plans on pursuing a career in Internal Medicine after graduation.