LOVE
CONNECTION
Host:
David A. Sandler, MD
Owen Obel
1962 - 2015
Sherry Burma
1964 - 2019
LOVE CONNECTION

Host:
David A. Sandler, MD
Round I

Meet the Bachelors and Bachelorettes
What’s the Rhythm?

ECG 1
What’s the Rhythm?

1. Sinus rhythm
2. Atrial rhythm
3. Atrial flutter
4. Sinus rhythm with lead reversal
Normal Sinus Rhythm

- Starts at the Sinus Node
- Normal rate 60-100 BPM
- Propagates across both RA and LA simultaneously
Normal Sinus Rhythm
What’s the Rhythm?
What’s the Rhythm?

1. Sinus rhythm
2. Atrial rhythm
3. Atrial flutter
4. Sinus rhythm with lead reversal
What’s the Rhythm?
What’s the Rhythm?

1. Sinus rhythm
2. Atrial rhythm
3. Atrial flutter
4. Sinus rhythm with lead reversal
Carotid Sinus Massage
Post-Ablation
Loves to Skip
Why is She Skipping?

1. Mobitz I AV Block
2. Mobitz II AV Block
3. Sinus Pauses
4. PACs
5. She’s in love
Another example
What Happened to the P Waves?
What’s the Rhythm?

1. Complete heart block
2. Accelerated junctional rhythm
3. Atrial flutter
4. Marked sinus bradycardia
Name That Rhythm
What’s the Rhythm?

1. Complete heart block
2. Accelerated junctional rhythm
3. Idioventricular rhythm
4. Intermittent ventricular pacing
Round II

Happy Couples
Unhappy Couples

It was VT

It was SVT with aberrancy
Coup[le 1

Name That Couple
Name That Couple

1. Atrial flutter and RBBB
2. Atrial flutter and acute MI
3. Sinus tachycardia and acute MI
4. SVT and acute MI
Post-conversion
Palpitation on monitor

**Symptoms:** Auto Trigger

**Activities:** None Indicated

**Findings:** Urgent - Sinus Tachycardia with PAC and Ventricular Tachycardia 10 beats, Rate 200 BPM, post only notified on 11/09/2019 at 20:02 EST

**Date:** 11/09/2019 | 13:20:26 CST

**Findings:** PSVT 7 beats, Rate [149] BPM

**Symptom:** Automatic Trigger

**Activities:** None Indicated

**HR:** 149
These strips represent:

1. SVT and VT
2. SVT and WPW
3. Atrial fibrillation and VT
4. Atrial tachycardia and aberrancy
Palpitation and Indigestion
Palpitation and Indigestion

1. Atrial fibrillation and GERD
2. Atrial fibrillation and LBBB
3. Inferior MI and Wenckebach
4. Inferior MI and atrial fibrillation
Exertional syncope in a guy who LOVES to workout
Loves to Workout

1. Sinus rhythm with LBBB
2. RBBB and LAFB
3. RBBB and LPFB
4. Sinus rhythm 2:1 AV Block
Left Anterior Fascicular Block (LAFB)

- Anterior Fascicle
- Posterior Fascicle

Left Posterior Fascicular Block (LPFB)

- Anterior Fascicle
- Posterior Fascicle

Lead I Lead I

90° 90°

60° 60°

120° 120°

Lead III Lead III

Lead aVF Lead aVF

Lead II Lead II

Lead aVL Lead aVL
<table>
<thead>
<tr>
<th></th>
<th>LAFB</th>
<th>LPFB</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td><img src="image1" alt="Graph" /></td>
<td><img src="image2" alt="Graph" /></td>
</tr>
<tr>
<td>III</td>
<td><img src="image3" alt="Graph" /></td>
<td><img src="image4" alt="Graph" /></td>
</tr>
<tr>
<td>aVF</td>
<td><img src="image5" alt="Graph" /></td>
<td><img src="image6" alt="Graph" /></td>
</tr>
<tr>
<td>I</td>
<td><img src="image7" alt="Graph" /></td>
<td><img src="image8" alt="Graph" /></td>
</tr>
<tr>
<td>aVL</td>
<td><img src="image9" alt="Graph" /></td>
<td><img src="image10" alt="Graph" /></td>
</tr>
<tr>
<td>Axis</td>
<td>−45° to −90°</td>
<td>≥100°</td>
</tr>
</tbody>
</table>
So he goes to the gym...
And this happens....
What is going on?

1. STEMI and Atrial Flutter
2. STEMI and 1st Degree AV Block
3. STEMI and Mobitz II AV Block
4. STEMI and AV Nodal Block
AV Block

**First Degree**  
Long PR no dropped beats

**Second Degree**  
Mobitz I (AKA Wenckebach)  
PR interval lengthens  
Mobitz II  
Fixed PR, dropped QRS  
2:1 Block

**Third Degree**  
Complete AV Block
AV Block

**First Degree**
Long PR no dropped beats

**Second Degree**
- Mobitz I (AKA Wenckebach)
  - PR interval lengthens
- Mobitz II
  - Fixed PR, dropped QRS
  - 2:1 Block

**Third Degree**
Complete AV Block
AV Block with AWMI
Infra-Nodal
Rarely recovers

AV Block with IWMI
AV Nodal
Usually recovers
77-Year-Old with Extensive Cardiac History
What Two Things are Represented?

1. Atrial fibrillation and pacemaker
2. Atrial fibrillation and WPW
3. Sinus rhythm and WPW
4. Sinus rhythm and pacemaker
Long-Term Outcomes with His Bundle Pacing

HBP was attempted in 332 consecutive patients at one hospital and 433 patients underwent RV Pacing at a second hospital.

92% Successful His Bundle Attempts

Selective His Bundle Pacing

Non-Selective His Bundle Pacing
18-year-old with palpitation
18-year-old with palpitation

1. Torsade de Pointes with ICD malfunction
2. AF with WPW
3. SVT with RBBB aberrancy
4. AF with STEMI
WPW Arrhythmia Mechanisms

Orthodromic

Antidromic

Atrial Fibrillation
Slow and Regular
Slow and regular

1. Atrial fibrillation and complete heart block
2. Sinus bradycardia and RBBB
3. Atrial fibrillation and LBBB
4. Typical atrial flutter and RBBB
What’s All the Noise About?
What are we looking at?

1. Non-cardiac stimulator and cardiac pacemaker
2. Atrial rhythm and brain stimulator
3. Sinus rhythm and artifact
4. Atrial fibrillation and non-cardiac stimulator
Past Surgical History:

- Appendectomy
- Cholecystectomy
- Hysterectomy
- **Pacemaker Insertion**
- Portacath Placement
- Rectal Surgery
- **Sacral Nerve Stimulator Placement**
And the Unhappy Couple is?

Couple 10
And the Unhappy Couple is?

1. Atrial flutter and RBBB
2. Atrial flutter and acute MI
3. Sinus tachycardia and acute MI
4. SVT and acute MI
With rate slowing (and 10 hours...)
Heart Throb
What’s going on?

1. Bigeminal PVCs and acute MI
2. Bigeminal PVCs and WPW
3. Atrial flutter with WPW
4. Atrial flutter with PVCs
First Degree
Long PR no dropped beats

Second Degree
Mobitz I (AKA Wenckebach)
PR interval lengthens
Mobitz II
Fixed PR, dropped QRS
2:1 Block

Third Degree
Complete AV Block
X-Rated Nightcap
This is a...

1. Pacemaker
2. ICD without any pacemaker function
3. ICD with pacemaker function
4. Biventricular pacemaker
This is a...

1. Pacemaker
2. ICD without pacemaker function
3. ICD with pacemaker function
4. Biventricular pacemaker
This is a...

1. Pacemaker
2. ICD without any pacemaker function
3. ICD with pacemaker function
4. Biventricular pacemaker
Subcutaneous ICD (S-ICD)

- Leads are extra-cardiac
- No pacemaker function
- No anti-tachycardia pacing
- Inhibits with magnet placement (like traditional ICDs)
This is a...

1. Pacemaker
2. Bullet
3. Loop recorder
4. Heart failure diagnostic tool
Leadless Pacemaker

- Implanted through the femoral vein
- Currently only in single chamber (VVI) version
- No response to magnet
TWO VIEWS, CHEST, PA AND LATERAL, 06/03/2017

INDICATION: POST PACEMAKER INSERTION.

REPORT:
SMALL RADIOPAQUE DEVICE OVERLYING THE MEDIAL LEFT MID LUNG IS NOTED, WHICH IS OF UNKNOWN CLINICAL OR PATHOLOGIC SIGNIFICANCE. NO PLEURAL EFFUSION OR PNEUMOTHORAX IS PRESENT.

IMPRESSION:
1. INTERVAL PLACEMENT OF UNKNOWN SMALL RADIOPAQUE DEVICE POSSIBLY WITHIN THE LEFT PLEURAL SPACE OR EPICARDIAL SPACE ANTERIOR TO THE LEFT VENTRICLE ON THE CURRENT STUDY. CLINICAL CORRELATION IS SUGGESTED.
2. NO PNEUMOTHORAX.
This is a...

1. Pacemaker
2. Bullet
3. Loop recorder
4. Heart failure diagnostic tool
Shown here:

1. 2 pacemakers with dislodged leads
2. 1 pacemaker with dislodged leads
3. 1 abandoned pacemaker, one active pacemaker
4. 1 pacemaker with stable leads, 1 non-cardiac stimulator
This is a...

1. Single chamber ICD
2. Dual chamber ICD
3. Biventricular ICD
The the LV Lead is:

1. In perfect position
2. In suboptimal position
3. Not even close
Underlying ECG (QRS 168ms)
“BiV Pacing” (QRS 152ms)
Post Re-Positioned LV CRT-D (102ms)
LOVE CONNECTION

Host:
David A. Sandler, MD
What About Epicardial?
This is a...

1. Pacemaker
2. Bullet
3. Loop recorder
4. Heart failure diagnostic tool
This is a...

1. Pacemaker
2. Bullet
3. Loop recorder
4. Heart failure diagnostic tool
Extra stuff
• 92 year old admitted with falls and hip fracture
• EF 50-55% by echo
• Readmitted with CHF
• EF 20-25%
Case 2

• 65 year old with palpitation and “drop spells”
H.C.
M.O.
Baseline
Infra-nodal Block
Gap Phenomenon
Mobitz II block on isoproterenol
AV block
Case

• 72 year old with recurrent presyncope
• Symptoms consist of pain in the back of her neck into the back of her head
• No true syncopal episode
• Scheduled to see neurosurgery to discuss her neck issues
• Extensive workup including:
  • ECG
  • Carotid ultrasound
  • CT of the head
  • Echocardiogram
Date: 11/09/2018 03:31:02 CST
HR: 48

Findings: Urgent - Advanced Heart Block with Multiple Pauses noted, Longest Pause is 4.7 seconds Glenda (Holter Tech) notified on 11/09/2018 at 11:34 EDT

Activities: None Indicated
AV Block

**First Degree**
- Long PR no dropped beats

**Second Degree**
- Mobitz I (AKA Wenckebach)
  - PR interval lengthens
- Mobitz II
  - Fixed PR, dropped QRS
- 2:1 Block

**Third Degree**
- Complete AV Block
Vagal vs Paroxysmal AV Block
REASON FOR ADMISSION: Syncope with complete heart block.

HISTORY OF PRESENT ILLNESS: The patient is a very pleasant 48-year-old woman with hypertension who has had recurrent syncope for the past 3 weeks. The event occurred 3 weeks ago when she was getting ready for work. She reports that while brushing her hair she "all of a sudden" felt her ears ringing and began to black out. She then awoke looking up at the ceiling noticing that she had bit her tongue. She cleaned up the blood and proceeded to go to work. She reports that, that day she experienced a severe headache. The next day, she had episodes of near syncope every 30 minutes. She was brought to St. John's Emergency Room where an EKG was "normal." The patient continued to have occasional episodes of near syncope both sitting and while standing. She denies prior cardiac workup. She has not undergone echocardiography or stress testing. She denies exertional chest pain or dyspnea on exertion. A Holter monitor was placed, which was interpreted earlier today. There were 2 episodes of high-degree AV block with numerous non-conducted P waves with ventricular standstill of over 5 seconds.
Blood Supply of the Conduction System
Blood Supply of the Conduction System
Loves to Workout:

Office Visit 8/15/19

• The patient is a very pleasant 57-year-old avid exerciser who reports recurrent syncope for the last 15 months. His first episode occurred while performing pec exercises on a butterfly machine. He reports that he passed out 3 separate times that day. On one occasion his face hit the machine resulting in facial trauma. His most recent episode occurred 2 months ago while using a seated lat bar. He again passed out while seated and had his head hit the bar in front of him.

• He denies exertional chest pain. He is undergone echocardiography and nuclear stress testing (shown below) there is been no significant structural abnormalities.