ECG pearls and pitfalls

Maria Rif, MD
Dr. Rif has no affiliation with the manufacturer of any commercial product or provider of any commercial service discussed in this CME activity.
Where I work:
Objectives

1. Identify high-risk ECG features in NSTEMI patients.
2. Recognize potentially deadly ECG findings in patients with chest pain and negative trops.
3. Discuss causes of sudden cardiac syncope in young adults.
4. Differentiate second degree AV blocks from PAC’s.
Case 1 – 50 yoM with C/P

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 1 – 50 yoM with C/P-LMCA occlusion

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 1 - LMCA occlusion

An Early and Simple Predictor of Severe Left Main and/or Three-Vessel Disease in Patients With Non–ST-Segment Elevation Acute Coronary Syndrome

Masami Kosuge, MD*, Toshiaki Ebina, MD, Kiyoshi Hibi, MD, Satoshi Morita, PhD, Mitsuaki Endo, MD, Nobuhiko Maejima, MD, Noriaki Iwahashi, MD, Kozo Okada, MD, Toshiyuki Ishikawa, MD, Satoshi Umemura, MD, and Kazuo Kimura, MD

A new electrocardiographic criteria for emergent reperfusion therapy

Jacob R. Hennings MDa, Francis M. Fesmire MDa,b,*

aDepartment of Emergency Medicine, University of Tennessee College of Medicine Chattanooga, Chattanooga TN 37403, USA
bChest Pain Center, Erlanger Medical Center

Short- and Long-Term Prognostic Significance of ST-Segment Elevation in Lead aVR in Patients With Non–ST-Segment Elevation Acute Coronary Syndrome

Nevio Taglieri, MD*, Antonio Marzocchi, MD, Francesco Saia, MD, PhD, Cinzia Marrozzini, MD, Tullio Palmerini, MD, Paolo Ortolani, MD, Laura Cinti, MD, Stefania Rosmini, MD, Fabio Vagnarelli, MD, Laura Alessi, MD, Caterina Villani, MD, Giuseppe Scaramuzzino, MD, Ilaria Gallelli, MD, Giovanni Melandri, MD, Angelo Branzi, MD, and Claudio Ravezzi, MD

Case I – LMCA/LAD occlusion/ 3VD

http://lifeinthefastlane.com/ecg-library/lmca/
Case 1 STE in AVR > V1 = LMCA occlusion

http://lifeinthefastlane.com/ecg-library/lmca/
Case 1 - Normal ECG for comparison

http://lifeinthefastlane.com/ecg-library
Case 1

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 1 - THE WIDOWMAKER- Take home points

• STE in AVR is the new “STEMI equivalent”
• Don’t ignore the AVR lead!
• AVR STE, AVR > V1, AVR and AVL STE
• Need ischemia in other leads to make the diagnosis
• Invasive management!
Case 2 – 45F with C/P 3 hours ago, now well...troponins negative

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 2 – 45F with C/P 3 hours ago, now well... troponins negative

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 2 – Wellens’ syndrome – 2 types - at risk for anterior MI within 2-3 weeks!

High specificity for critical LAD occlusion

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Case 2 – Wellens’ Syndrome

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 2 – Wellens’ Syndrome = invasive management!

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 2 – Wellens’ Syndrome

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http://lifeinthefastlane.com/ecg-library
Case 2 – Wellen’s Syndrome

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Case 2 - Wellens’ Syndrome – Take home points

- T wave abnormality V2-4
- 2 types
- Highly specific for critical stenosis of the proximal LAD
- At risk for a large anterior MI soon!
- Asymptomatic, trops negative
- Invasive management
Case 3 – 25M with sudden exertional syncope

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 3 – 25M with sudden exertional syncope

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 3 – HOCM – NON INFARCTION Q waves, tall R waves, large amplitude QRS complexes

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Case 3 - HOCM

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 3 – Take home points

- High left ventricular voltage (HLVV)
- Deep narrow Q waves in lateral leads (V5, V6, I, AVL)
- Deep and narrow Q’s (less than 40 ms in duration)
- Tall R waves in R precordial leads
- Get ‘em an echo!
- Beta blockers
Case 4 - These youngsters just keep passing out! 22M with syncope!

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Case 4 - These youngsters just keep passing out! 22M with syncope!

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Case 4 - Brugada

- Mutation in the Na channel gene
- Structurally normal heart
- "electrically" flawed
- At risk for VT and sudden death
- Type 1 most obvious
- Need an ICD

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Case 4 - Brugada: type I more sensitive and specific for the syndrome
Case 4 - Brugada

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Case 4- Brugada

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 4- Brugada – Take home points

- Cause of syncope and sudden death in young adults
- NEED other CLINICAL criteria – definitive diagnosis made in EPS lab
- 3 types
- Type 1 is most obvious and most clinically relevant
- ICD
Case 5 – More fainting spells and palpitations!

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Case 5 after treatment

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Case 5 - delta waves, short PR, wide QRS...familiar?

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Case 5

http://lifeinthefastlane.com/ecg-library
Case 5 – Afib with WPW: very fast, changing morphologies, irregular!

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 5 - afib with WPW vs VT

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Case 5 – afib with WPW vs VT

http://lifeinthefastlane.com/ecg-library
Case 5 – Afib with WPW-take home points

- Varying QRS morphology

- Sometimes very fast (300/min): loss of protection by the AV node

- Irregular

- LBBB morphology lacking

- Do not treat as VT ➔ Procainamide/Cardioversion
Case 7- To block or not to block? 82F, feeling unwell

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 7 – Non conducted PAC’s vs Mobitz I or II

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 7 – Blocked PAC’s not Mobitz I or II

Amal Mattu et al., ECGs for the Emergency Physician 2, Blackwell Publishing 2008
Case 7 – Block or PAC’s?

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Case 7: 2\textsuperscript{nd} degree block or PAC’s?

GROUPED BEATS: REGULARLY IRREGULAR

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Case 7 – 2\textsuperscript{nd} degree blocks vs ectopic beats

- Regularly irregular = Second degree block or ectopic beats in bigeminy, trigeminy etc.

- Check the P-P interval

- Constant P-P interval in a block, not so in PAC’s
Summary

• STE in AVR in context of ischemia – LMCA occlusion

• Wellens’ (2 types) predictive of LAD occlusion

• HOCM, Brugada, afib with WPW and their diagnostic criteria

• Regularly irregular (grouped beats) could be a 2nd degree AV block or non conducted PAC’s
References

- Wagner, GS. Marriott’s Practical Electrocardiography (11th edition), Lippincott Williams & Wilkins 2007
- Pictorial references provided in the slides.