

# Evaluation of Wide-Complex Tachycardia

20 May 2024

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**HARVARD MEDICAL SCHOOL**  
**TEACHING HOSPITAL**



**MASSACHUSETTS**  
**GENERAL HOSPITAL**

**CORRIGAN MINEHAN**  
**HEART CENTER**

**Utilize clues on 12-lead ECGs to distinguish different causes of wide-complex tachycardia**

# Case Presentation

## **HPI:**

68 year old man with paroxysmal AF and known ischemic cardiomyopathy who presents with lightheadedness.

## **PMH:**

CAD, ischemic cardiomyopathy

HTN

DM2

Obesity

# Case Presentation

## **Vital signs:**

T=98F BP 96/60 HR 140 RR 12

## **Physical exam:**

Gen: appears unwell, diaphoretic

JVP: 7cm

Lungs: good air movement, scattered crackles

Heard: reg S1S2, no S3S4, no rubs or murmurs

Abd: benign

Extr: trace ankle edema

## Cardiac Studies:

TTE:

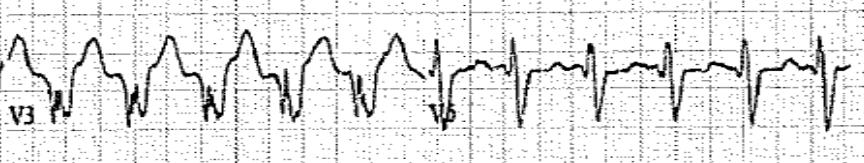
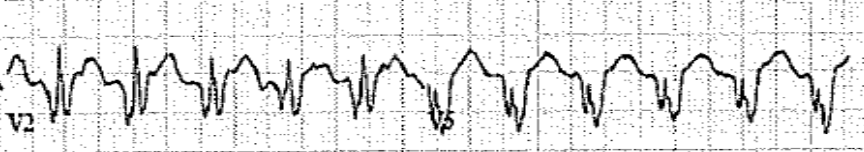
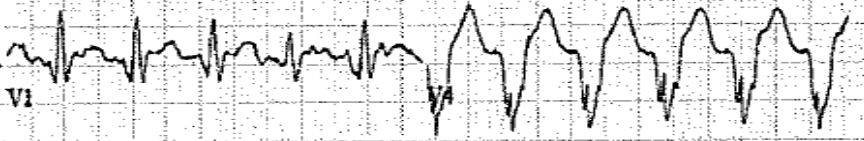
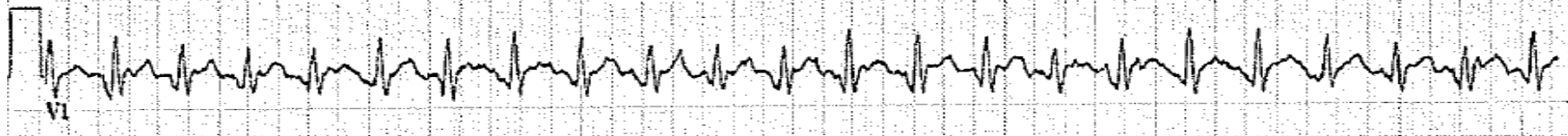
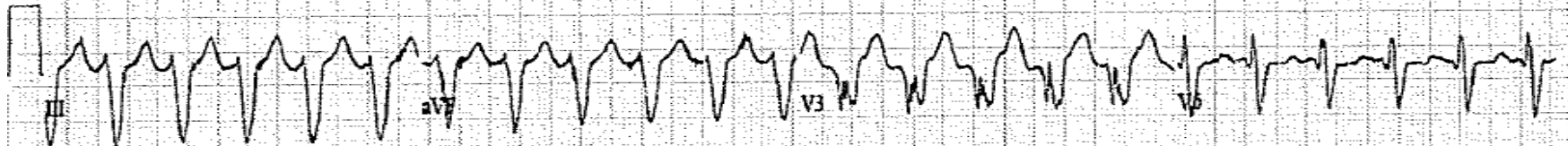
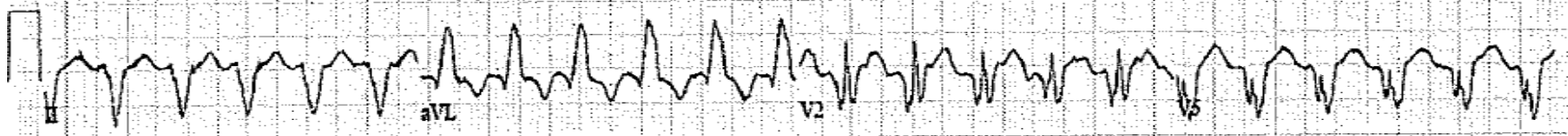
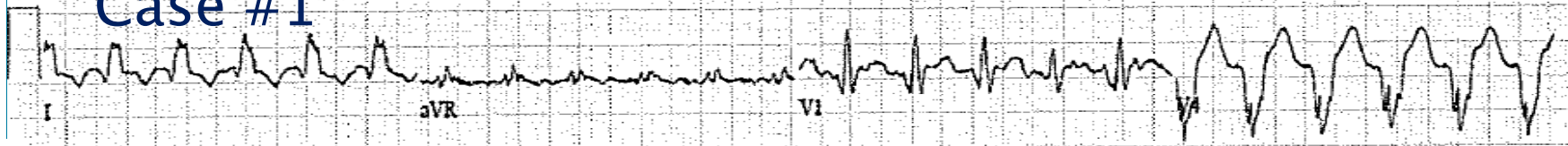
LVEF 45%, no LVH or WMA

No hemodynamically significant valvular disease

Stress test:

LVEF 40%, small inferior infarct with no ischemia

# Case #1



# Question 1

Which of the following are potential explanations for this rhythm?

1. Supraventricular tachycardia with aberrancy
2. Ventricular tachycardia
3. Supraventricular tachycardia with ventricular pacing
4. Any of the above

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# Question 2

Which of the following are included in the Brugada criteria for identification of ventricular tachycardia?

1. Absence of RS complex in precordial leads
2. R to S interval  $> 100$  ms in one precordial lead
3. AV dissociation
4. Morphology criteria RBBB (+ in V1) or LBBB (- in V1)
5. All of the above

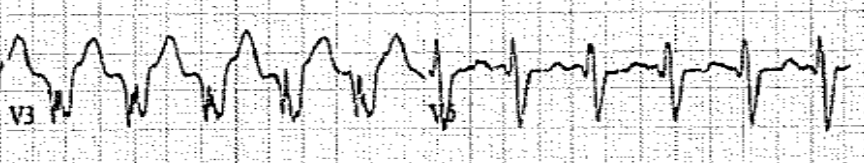
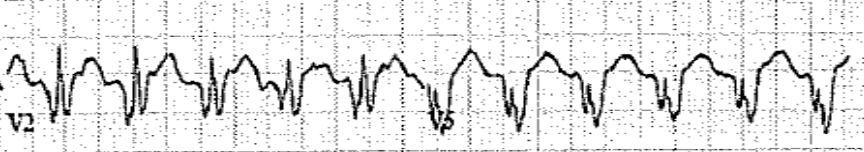
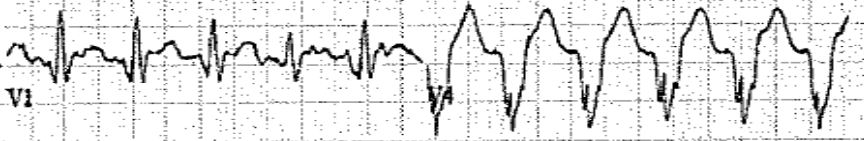
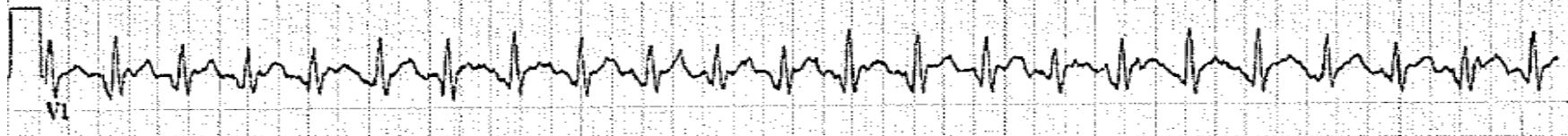
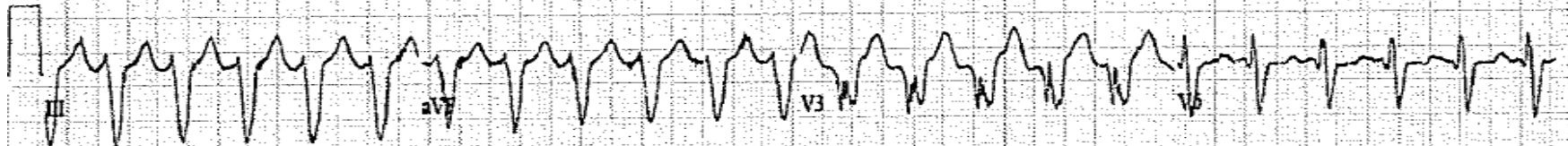
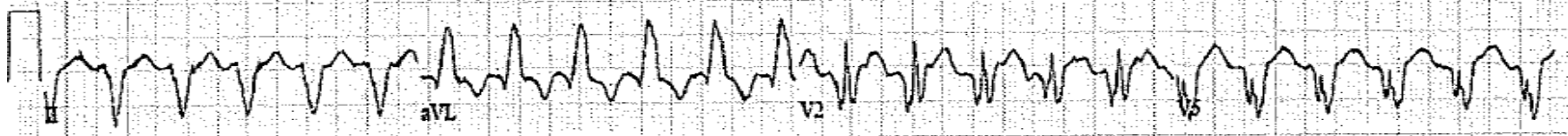
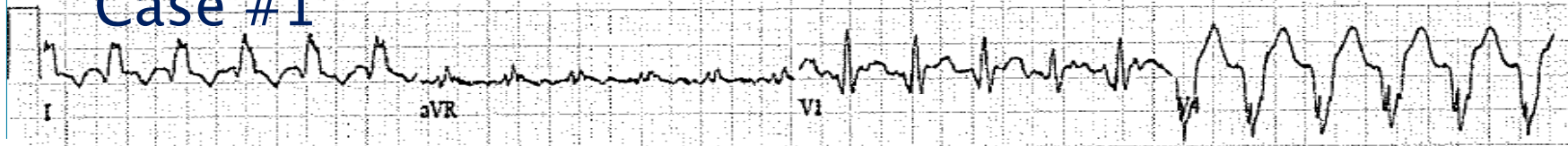
# Question 2

Which of the following are included in the Brugada criteria for identification of ventricular tachycardia?

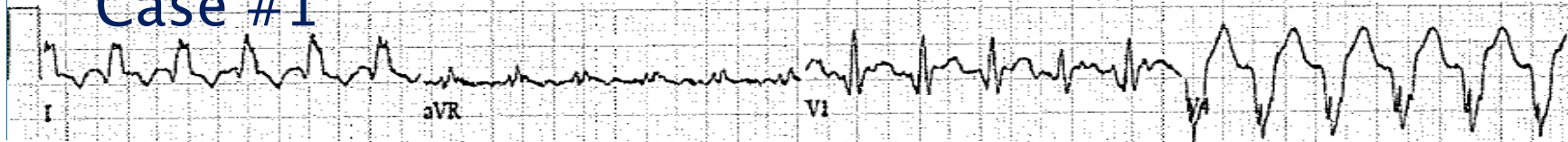
1. Absence of RS complex in precordial leads
2. R to S interval  $> 100$  ms in one precordial lead
3. AV dissociation
4. Morphology criteria RBBB (+ in V1) or LBBB (- in V1)
5. **All of the above**

1. Blood pressure, overall clinical status
  - Unstable? Follow ACLS criteria, consider DCCV
2. Determine the mechanism (SVT with aberrancy vs VT)
  - Look for fusion beats
  - If no fusion beats use tools to assess QRS complex (e.g., Brugada criteria)
    - Absence of RS complex in precordial leads
    - R to S interval > 100 ms in one precordial lead
    - AV dissociation
    - Morphology criteria RBBB (+ in V1) or LBBB (- in V1)

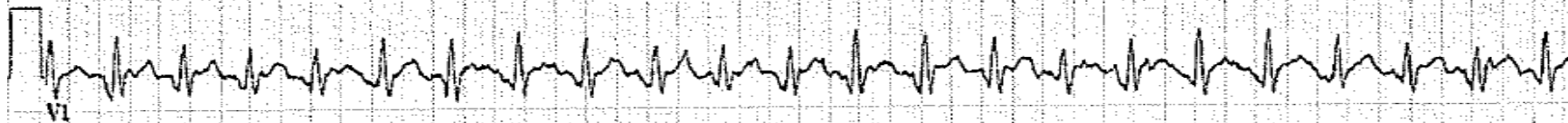
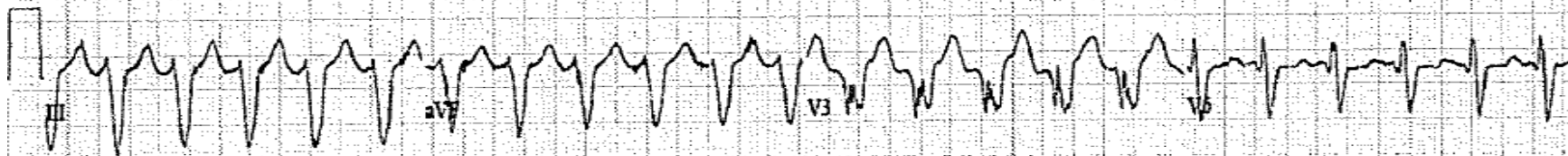
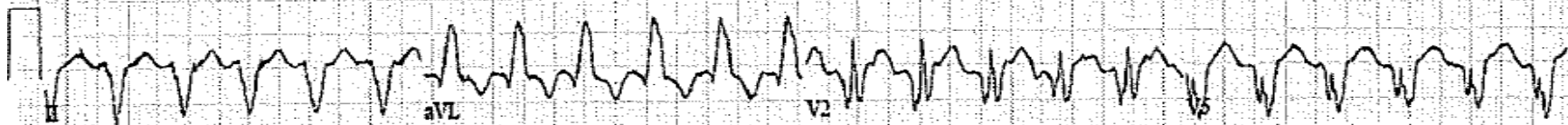
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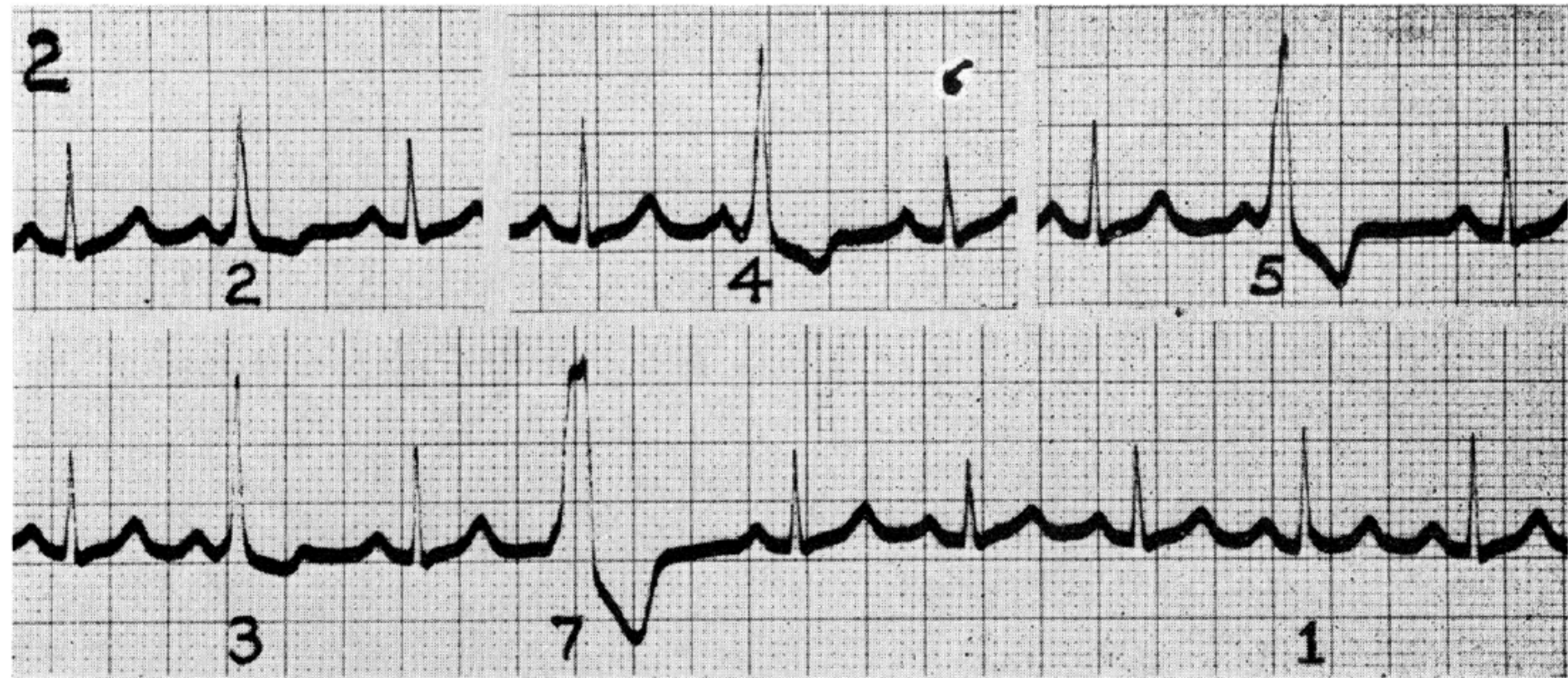
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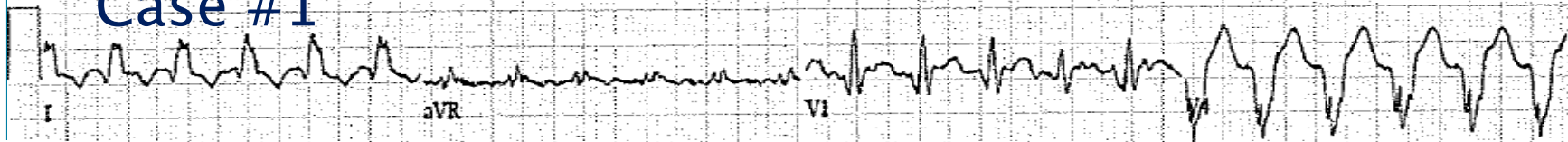
Fusion beats present?



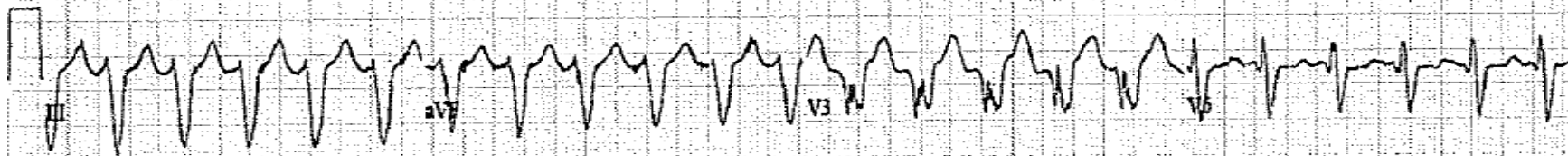
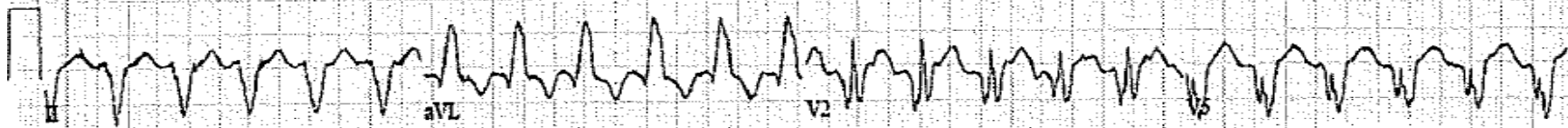
# Fusion Beats



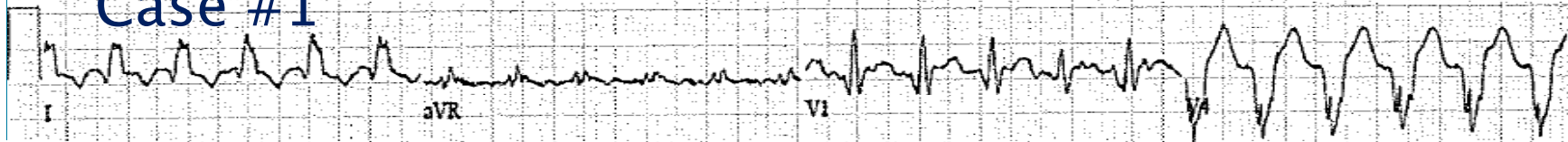
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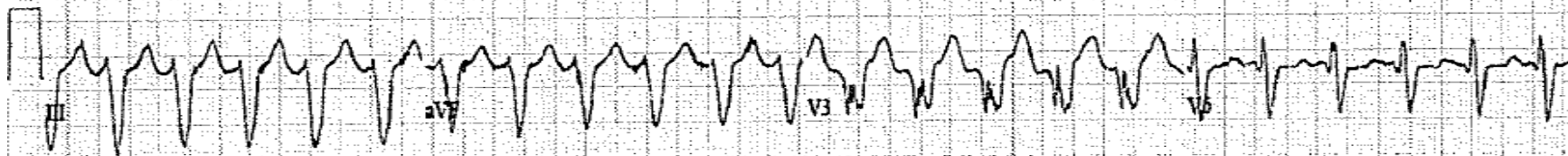
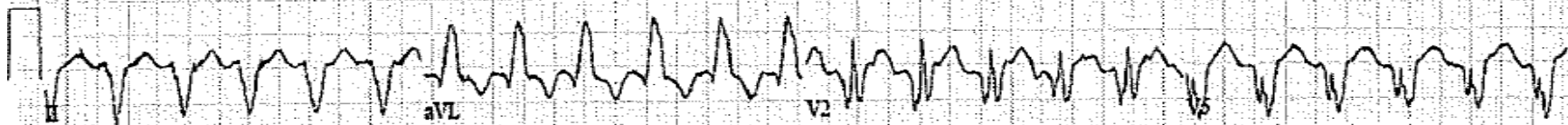
Fusion beats present?



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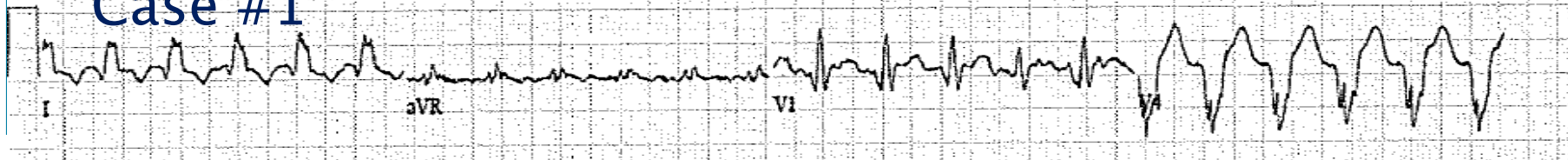


Fusion beats present? **No**

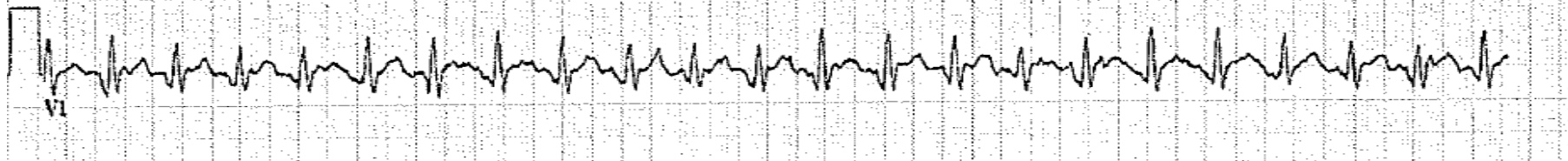
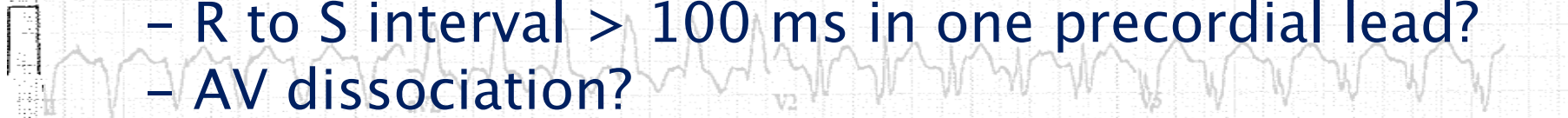




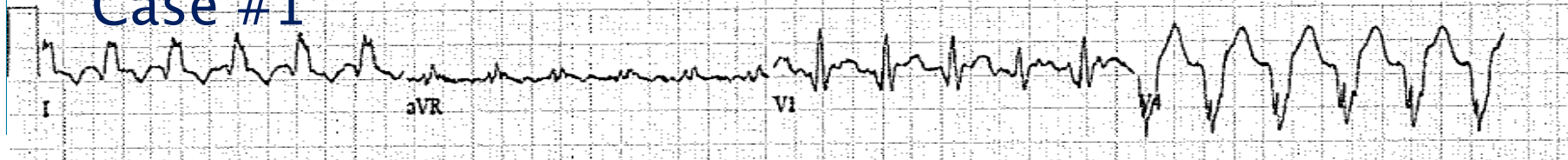
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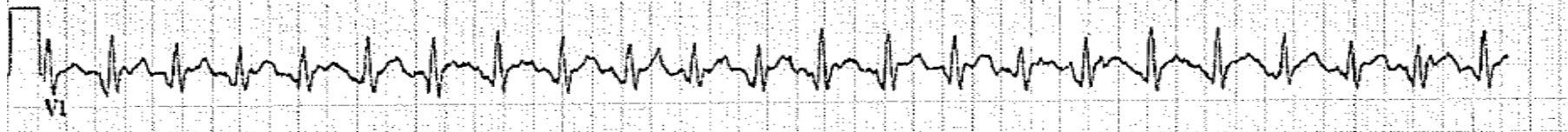
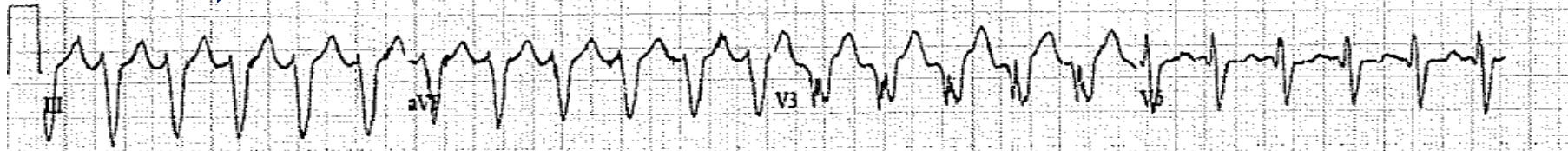
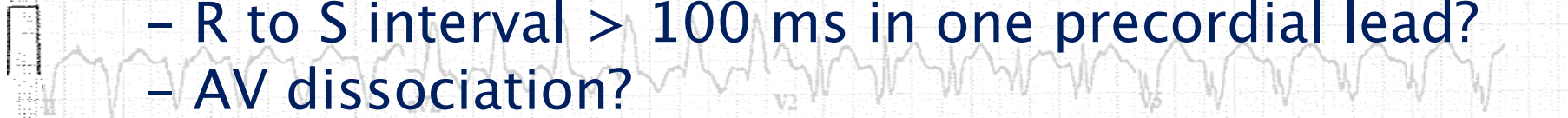
- Absence of RS complex in precordial leads?
- R to S interval  $> 100$  ms in one precordial lead?
- AV dissociation?
- Morphology criteria RBBB (+ in V1) or LBBB (- in V1)?



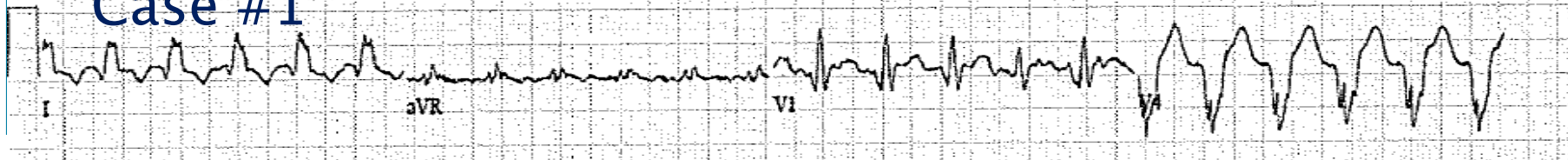
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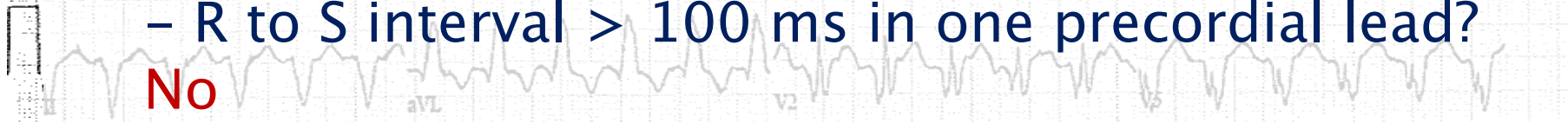
- Absence of RS complex in precordial leads? **No**
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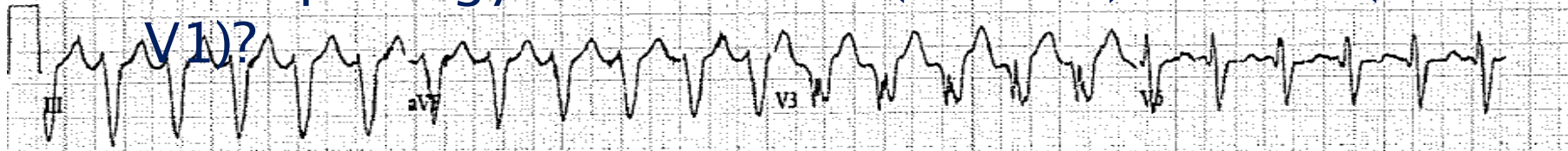


- Absence of RS complex in precordial leads? **No**
- R to S interval > 100 ms in one precordial lead?

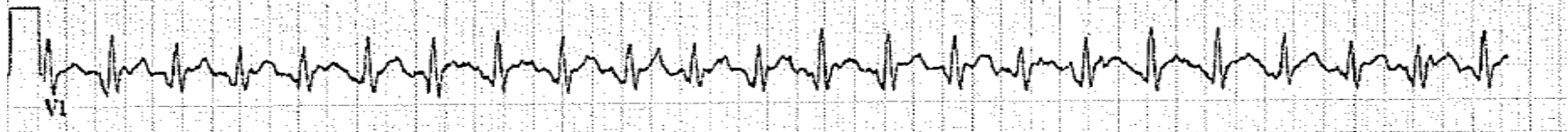


**No**

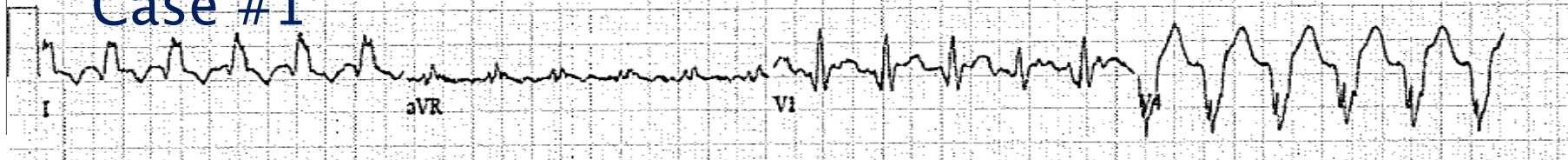
- AV dissociation?
- Morphology criteria RBBB (+ in V1) or LBBB (- in



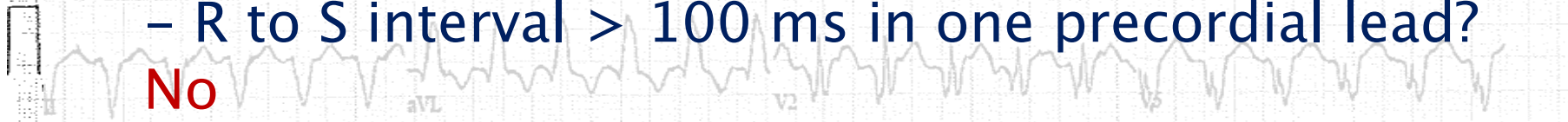
**V1)?**



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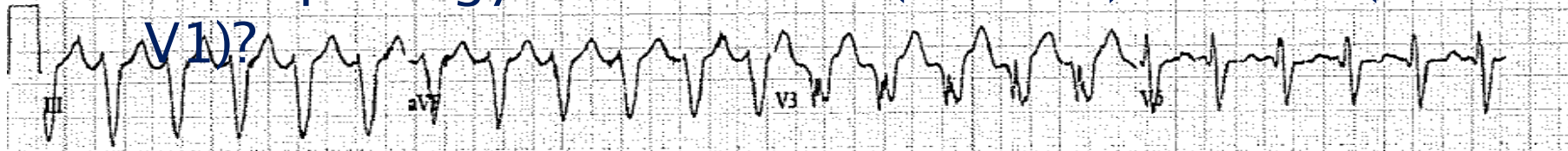


- Absence of RS complex in precordial leads? **No**
- R to S interval > 100 ms in one precordial lead?

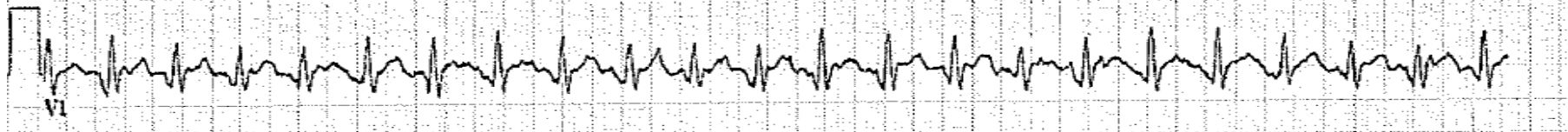


**No**

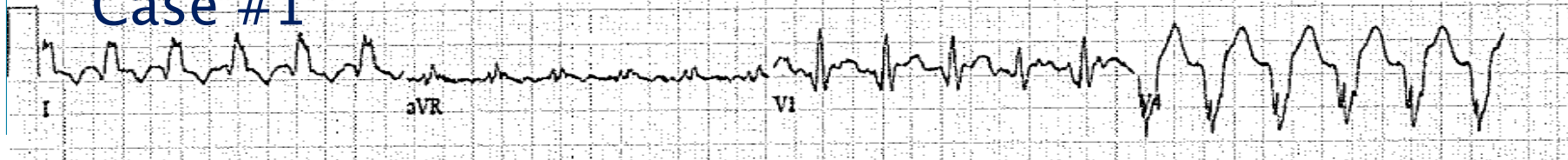
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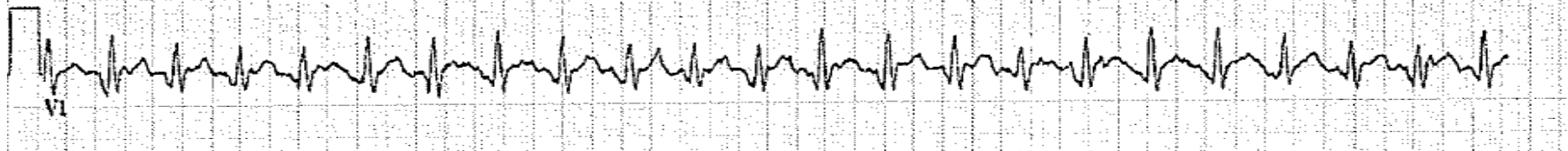
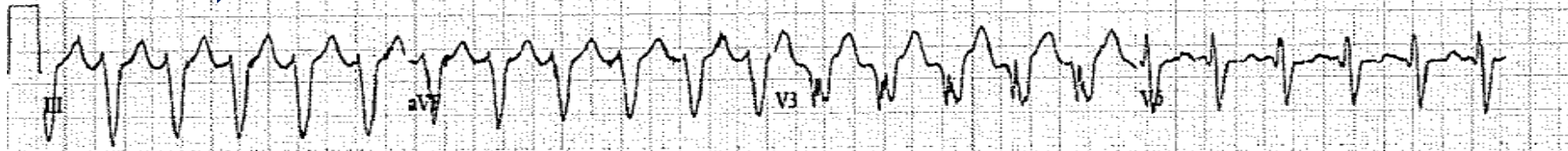
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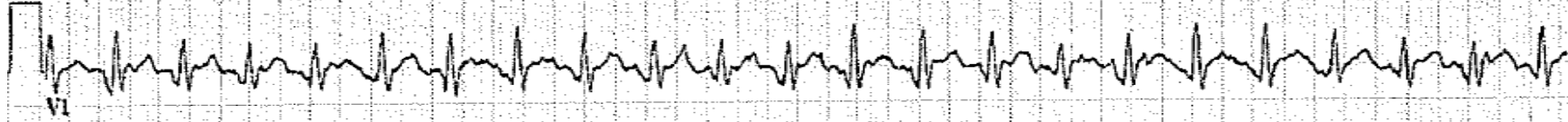
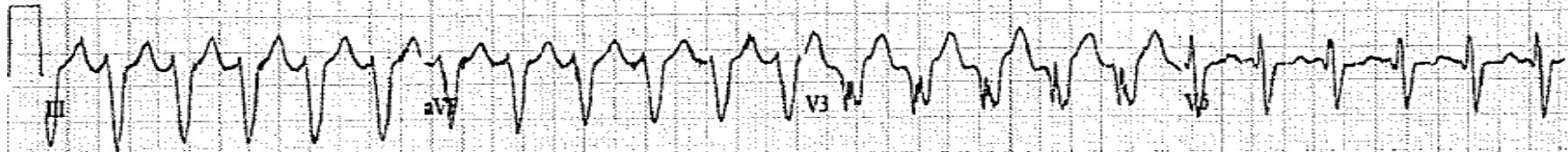
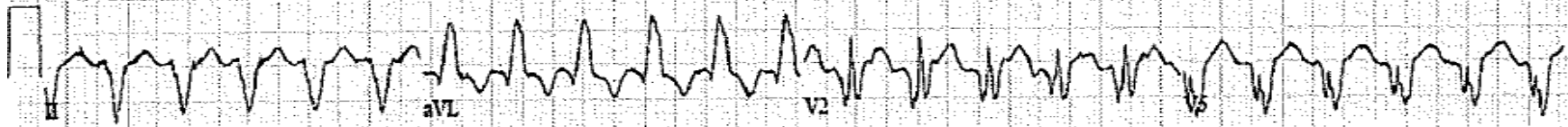
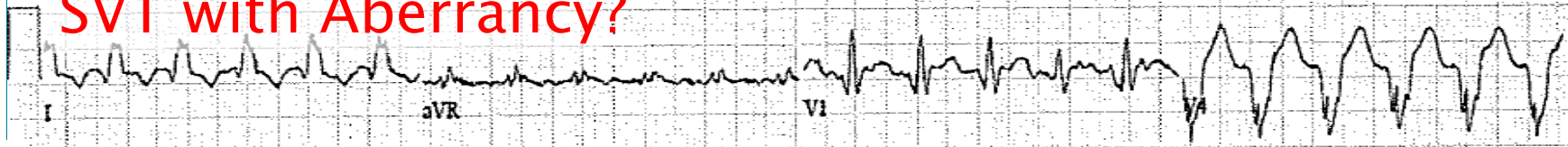
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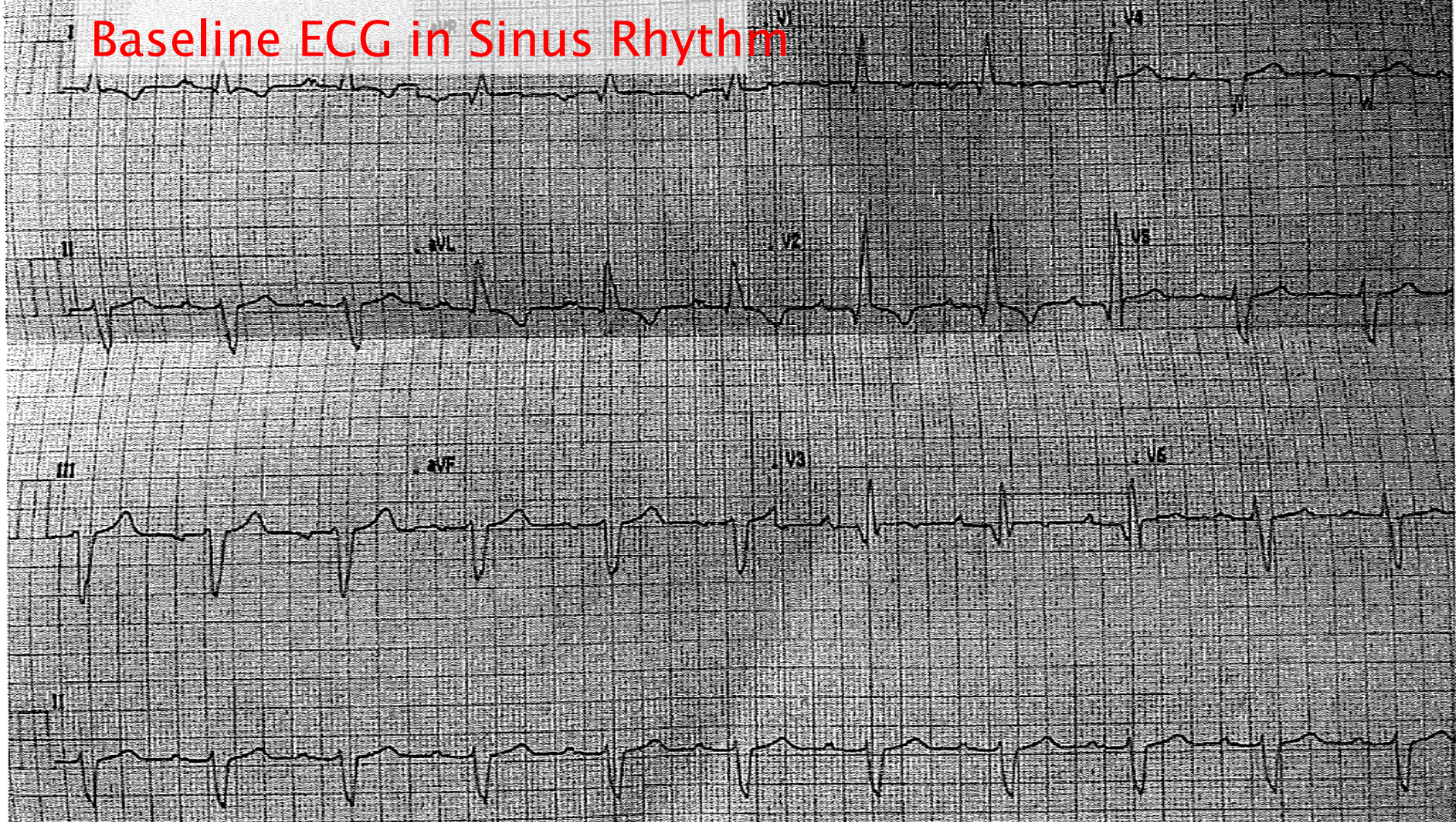
- Absence of RS complex in precordial leads? **No**
- R to S interval  $> 100$  ms in one precordial lead? **No**
- AV dissociation? **No**
- Morphology criteria RBBB (+ in V1) or LBBB (- in V1)? **No**



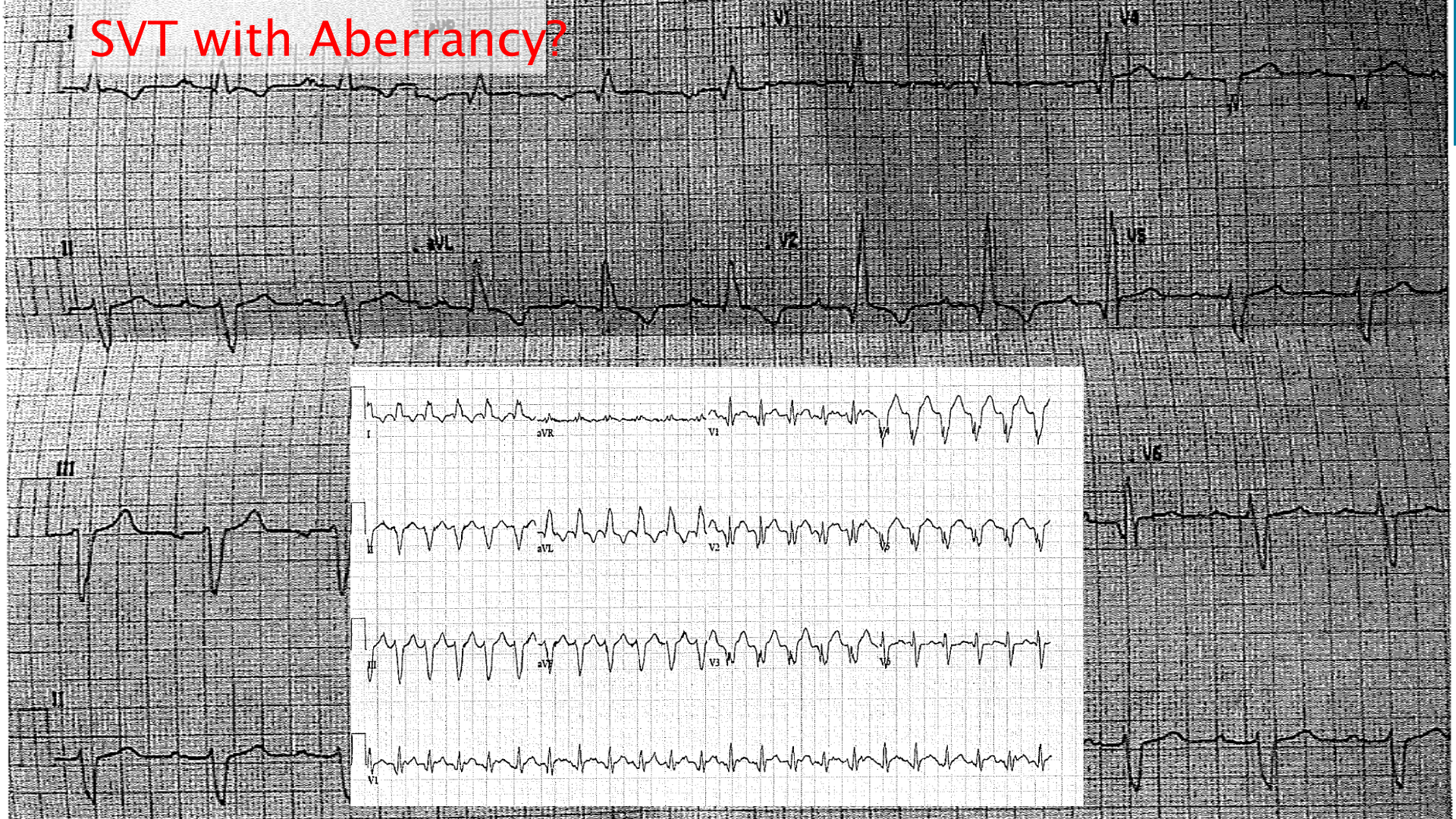
# SVT with Aberrancy?



# Baseline ECG in Sinus Rhythm

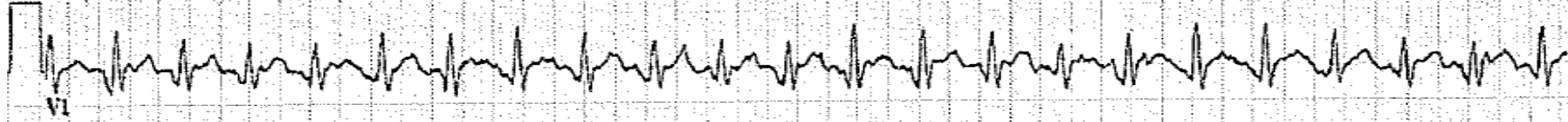
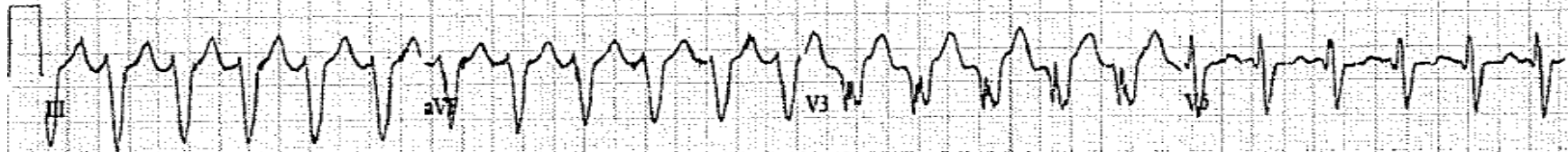


# SVT with Aberrancy?





# Ventricular Pacing?



# Question 3

Which of the following QRS characteristics are consistent with RV pacing?

1. Negative in II, III, and aVF; RBBB
2. Negative in II, III, and aVF; LBBB
3. Positive in II, III, and aVF; RBBB
4. Negative in II, III, and AVF; LBBB

# Question 3

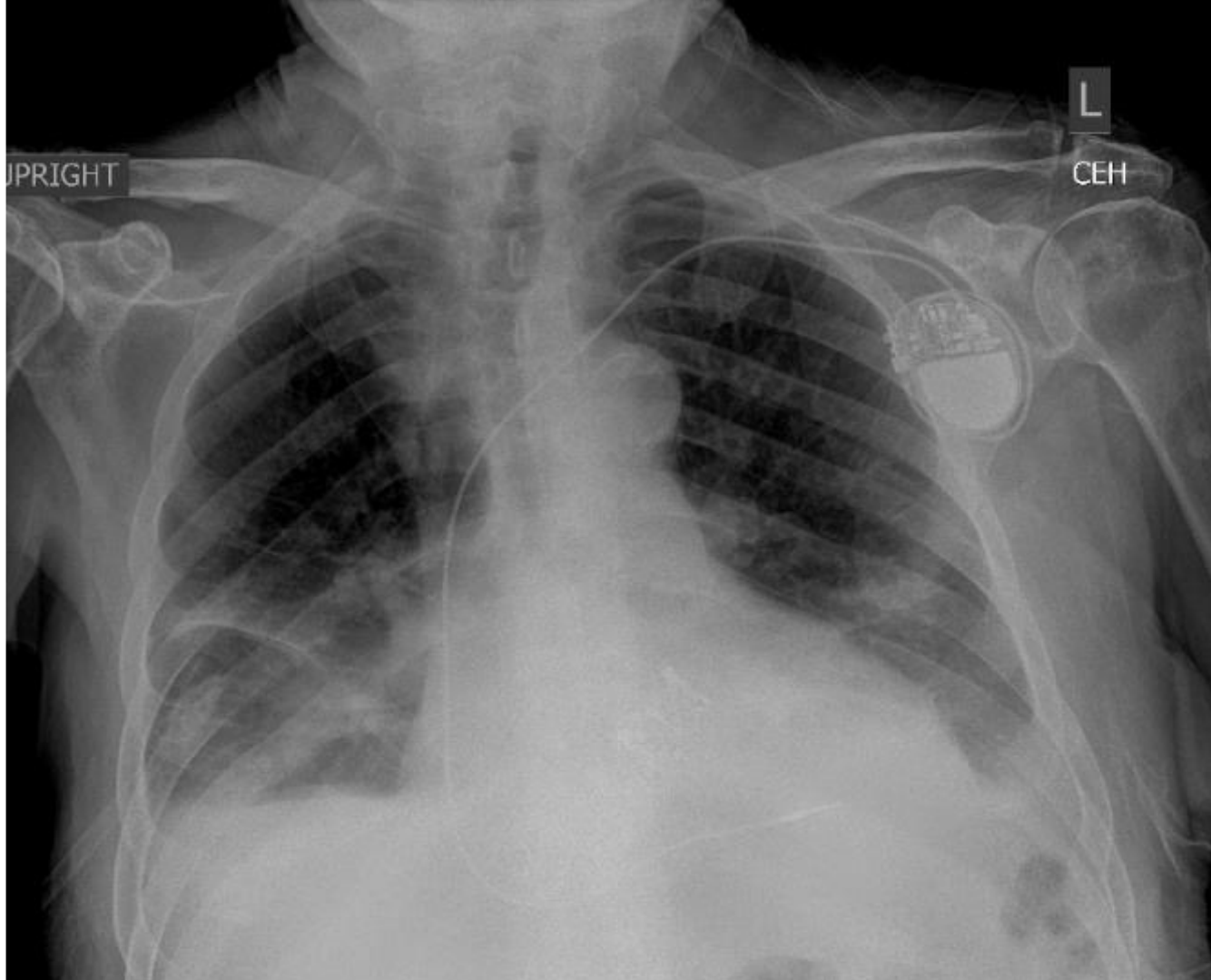
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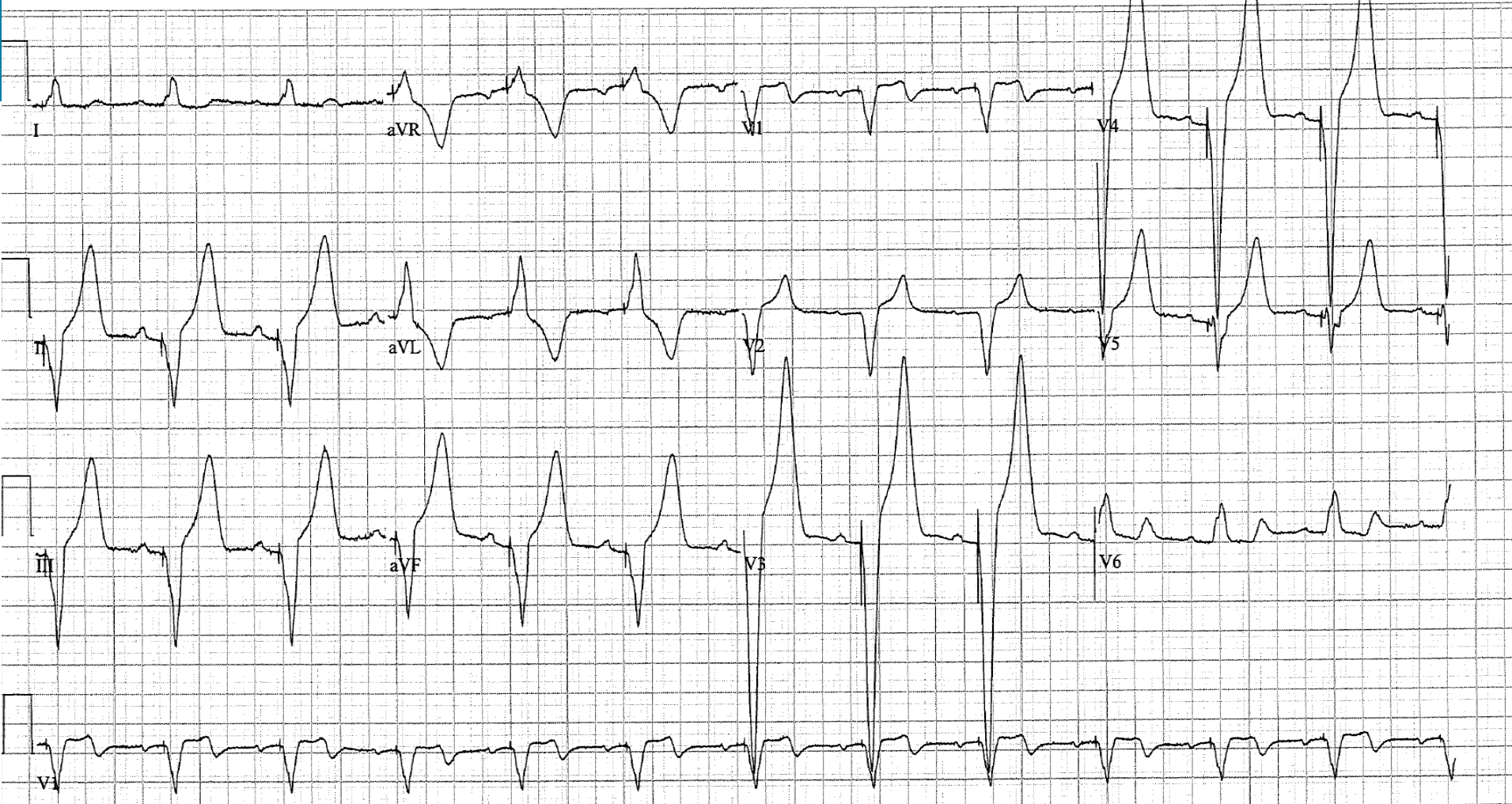
1. Negative in II, III, and aVF; RBBB
2. Negative in II, III, and aVF; LBBB
3. Positive in II, III, and aVF; RBBB
4. **Negative in II, III, and AVF; LBBB**

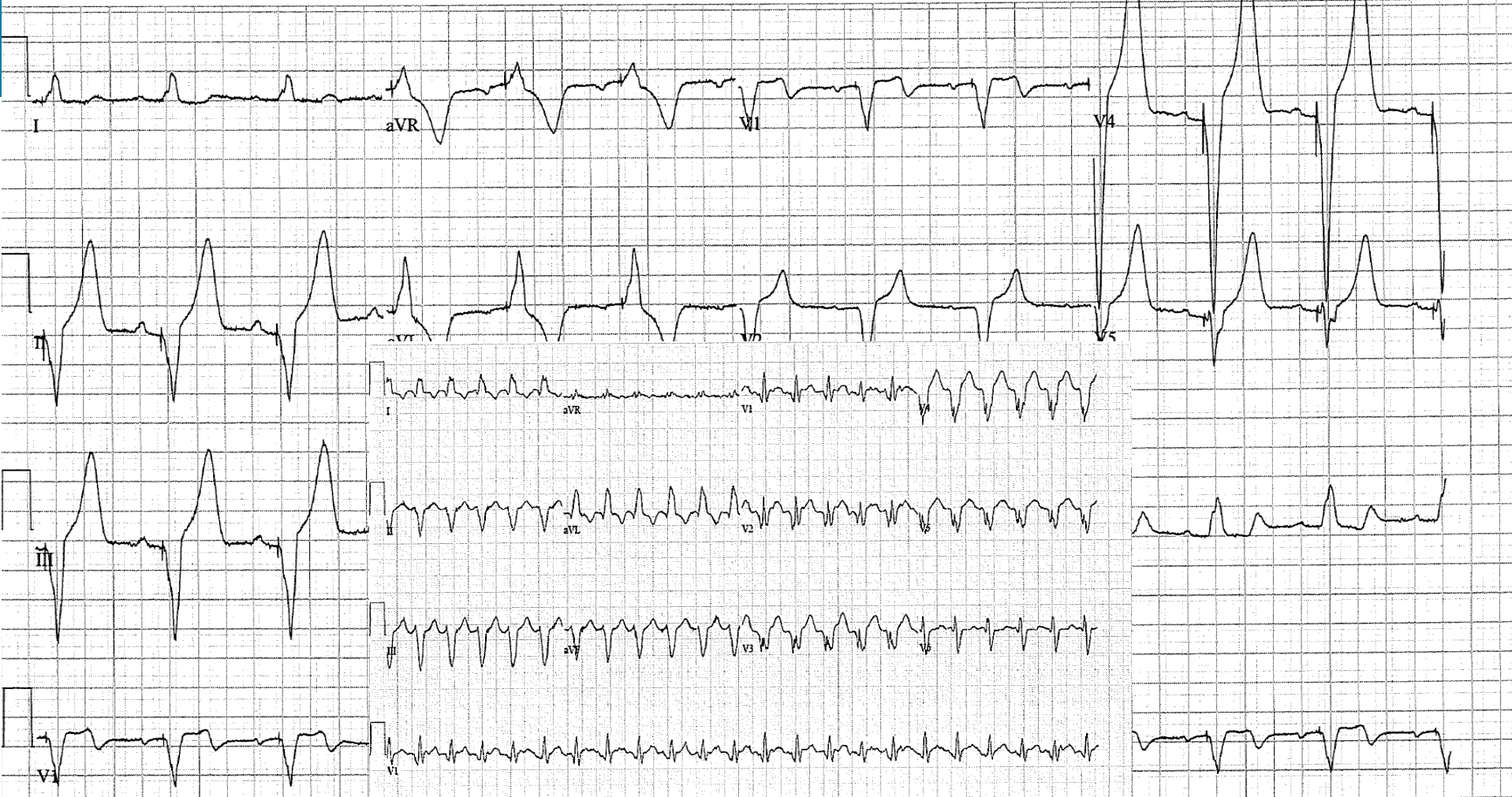
UPRIGHT

L

CEH







# Question 4

Which of the following is the most likely explanation for the wide complex tachycardia in this patient?

1. Supraventricular tachycardia with aberrancy
2. Ventricular tachycardia
3. Supraventricular tachycardia with ventricular pacing

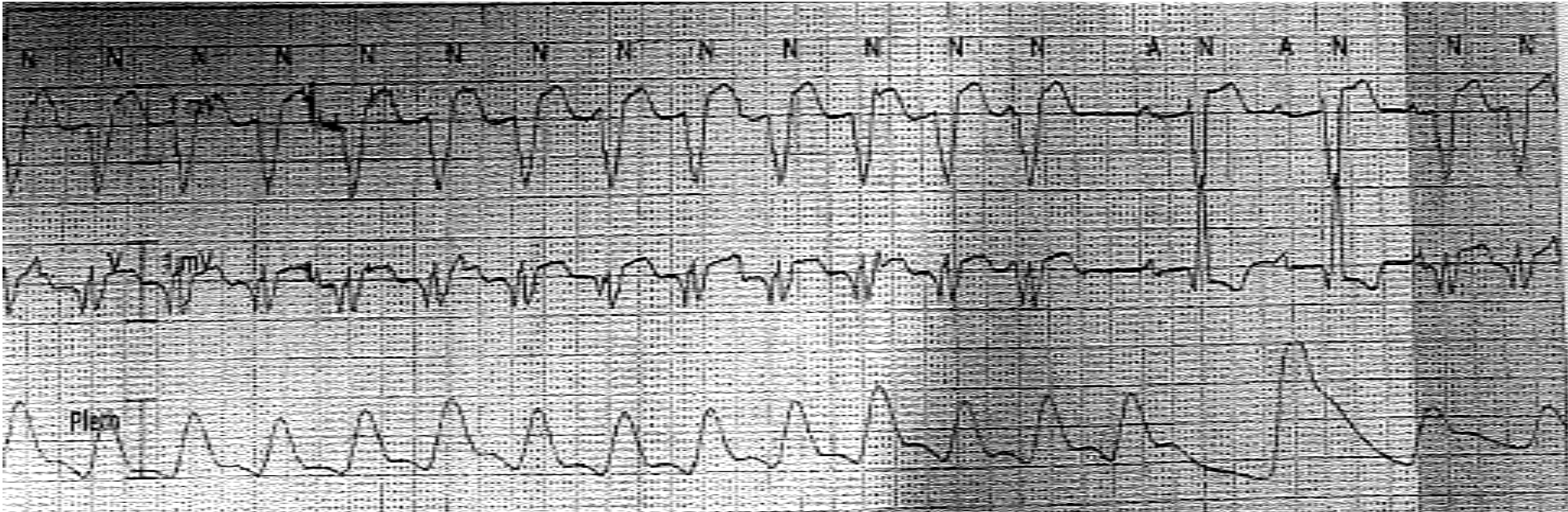
# Question 4

Which of the following is the most likely explanation for the wide complex tachycardia in this patient?

1. Supraventricular tachycardia with aberrancy
2. **Ventricular tachycardia**
3. Supraventricular tachycardia with ventricular pacing

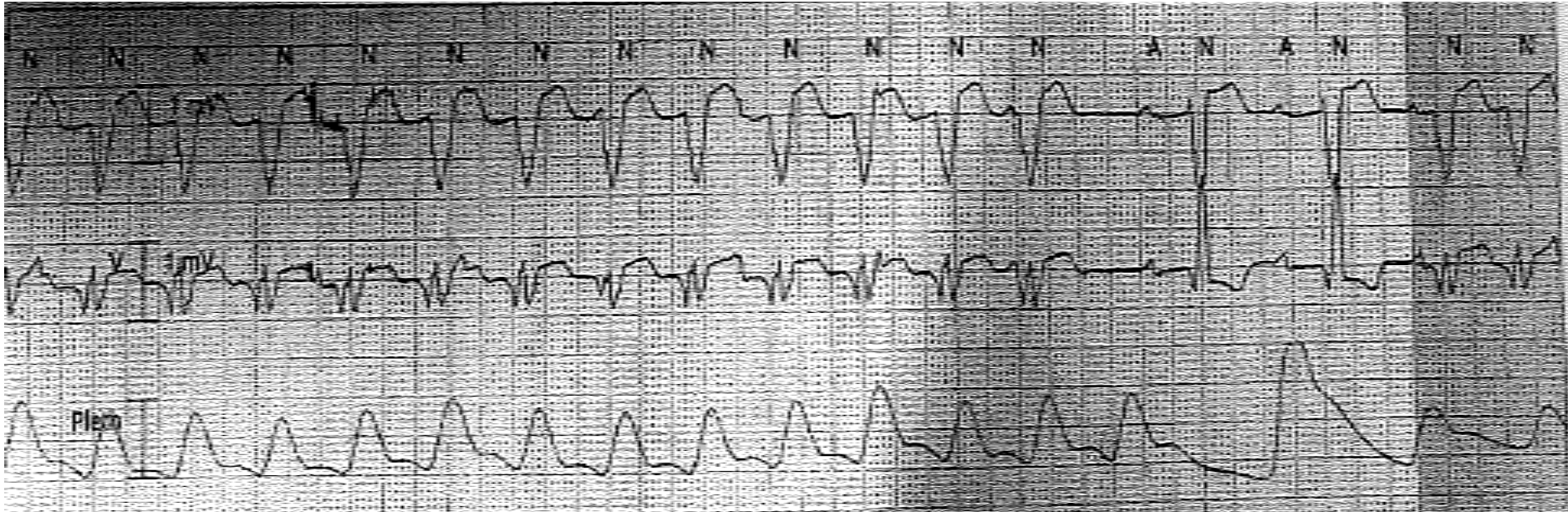


# Tachycardia Spontaneously Terminated



# Tachycardia Spontaneously Terminated

VT



## Utilize clues on 12-lead ECGs to distinguish different causes of wide-complex tachycardia

- Look for fusion beats
- If no fusion beats use tools to assess QRS complex (e.g., Brugada criteria)
  - Absence of RS complex in precordial leads
  - R to S interval  $> 100$  ms in one precordial lead
  - AV dissociation
  - Morphology criteria RBBB (+ in V1) or LBBB (- in V1)
- Look for other signs of ventricular origin: e.g., pacing, subtle change in QRS

A nighttime photograph of the Massachusetts General Hospital campus, featuring several large, modern buildings with illuminated windows. The scene is set against a dark blue twilight sky. In the foreground, there are trees with autumn foliage and a body of water. A semi-transparent blue horizontal band is overlaid across the middle of the image, containing the text "Thank you".

Thank you



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