

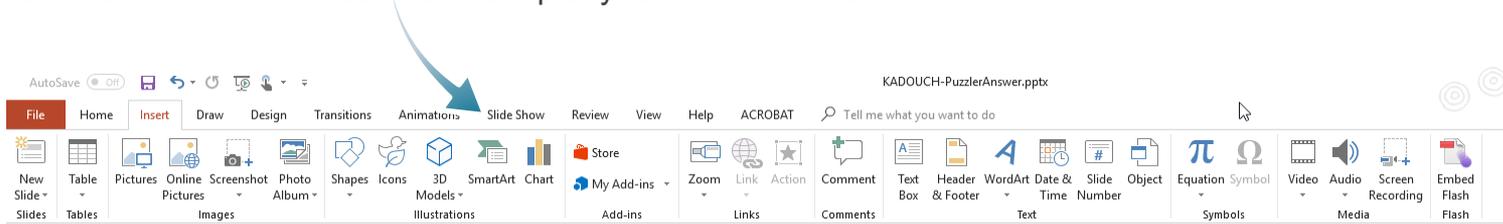
September 2019

# ECG Underwriting Puzzler

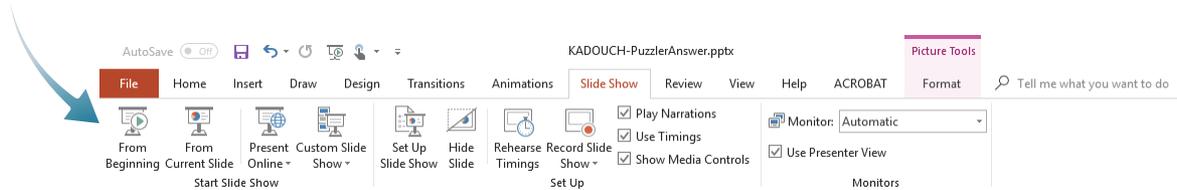
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## Clinical context

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**A 44-year-old male applies for life insurance.**



**He is asymptomatic and has no family or personal cardiac history.**



**He has no cardiovascular risk factors except a slightly elevated total cholesterol at 6 mmol/L with LDL at 3.11 mmol/L but HDL at 1.41 mmol/L and total/HDL ratio at 4.3**



**His physical, BMI and vitals are within normal limits.**



**A recent and maximal exercise stress test is within normal limits without chest pain, dysrhythmias or significant ST changes.**

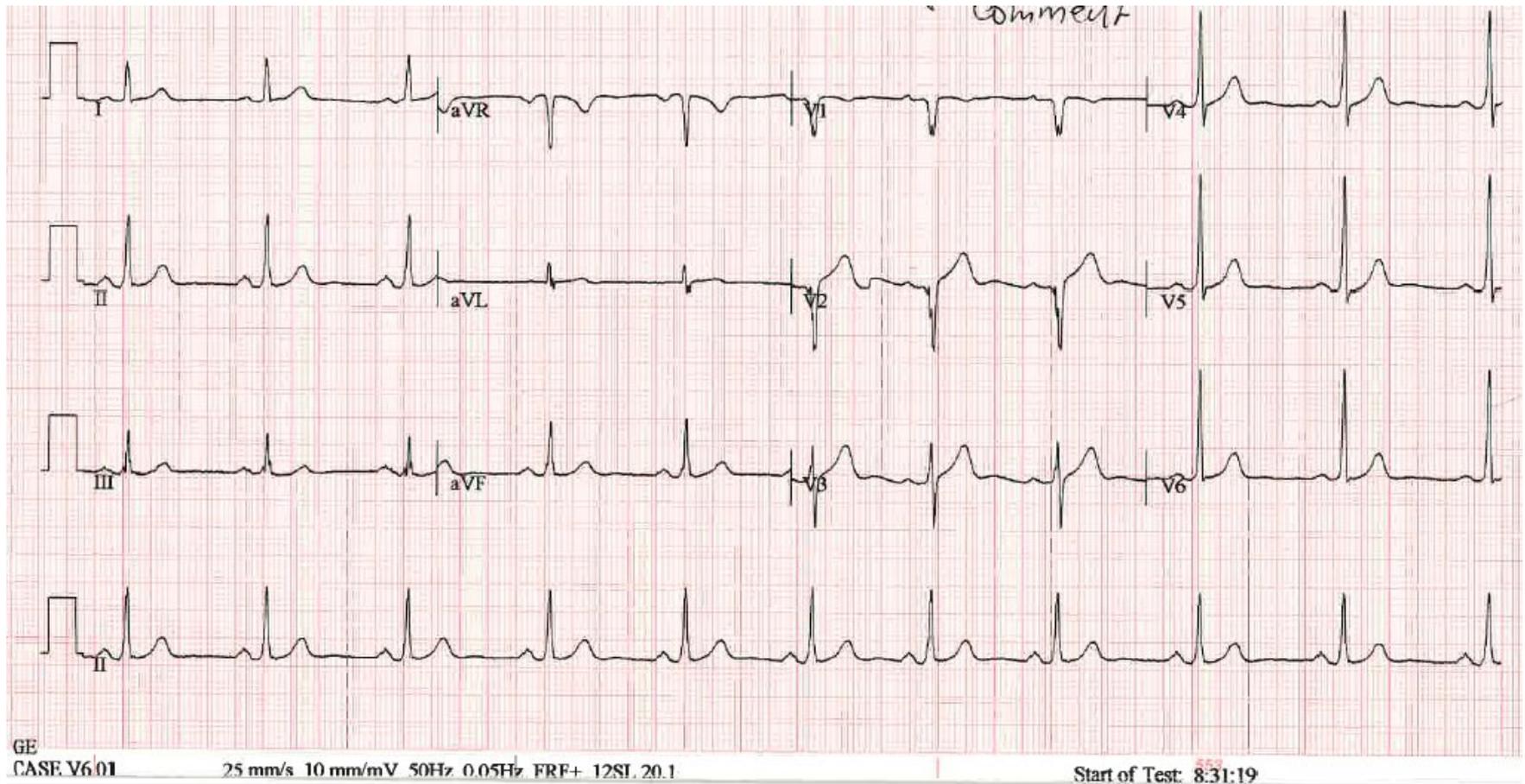


**An echocardiogram performed last year was normal as well as a CT calcium score = 0.**

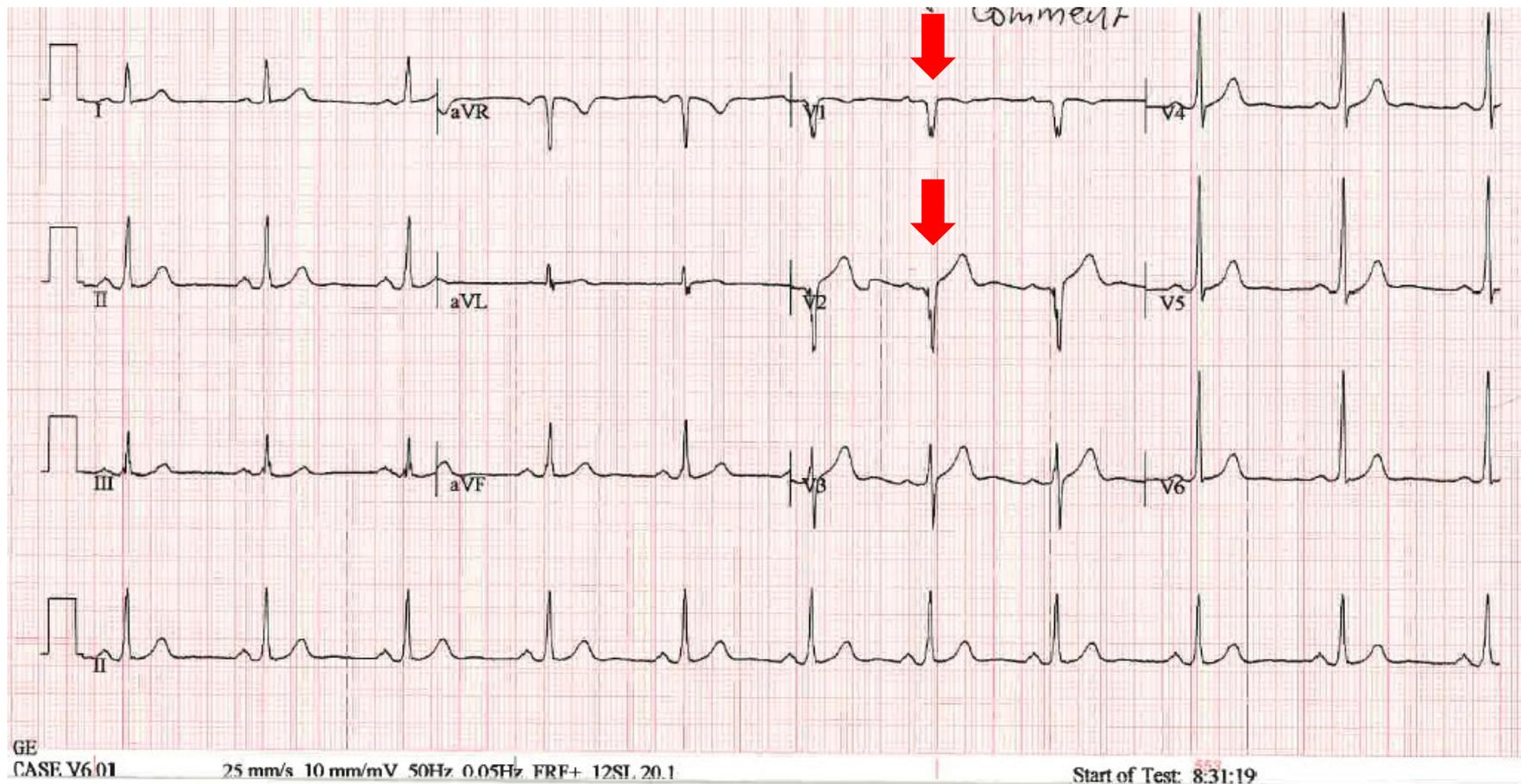


**An ECG is obtained.**

# What is the major abnormality on this ECG ?



At first look, this QS aspect in V1 interval with a poor R wave progression is striking.

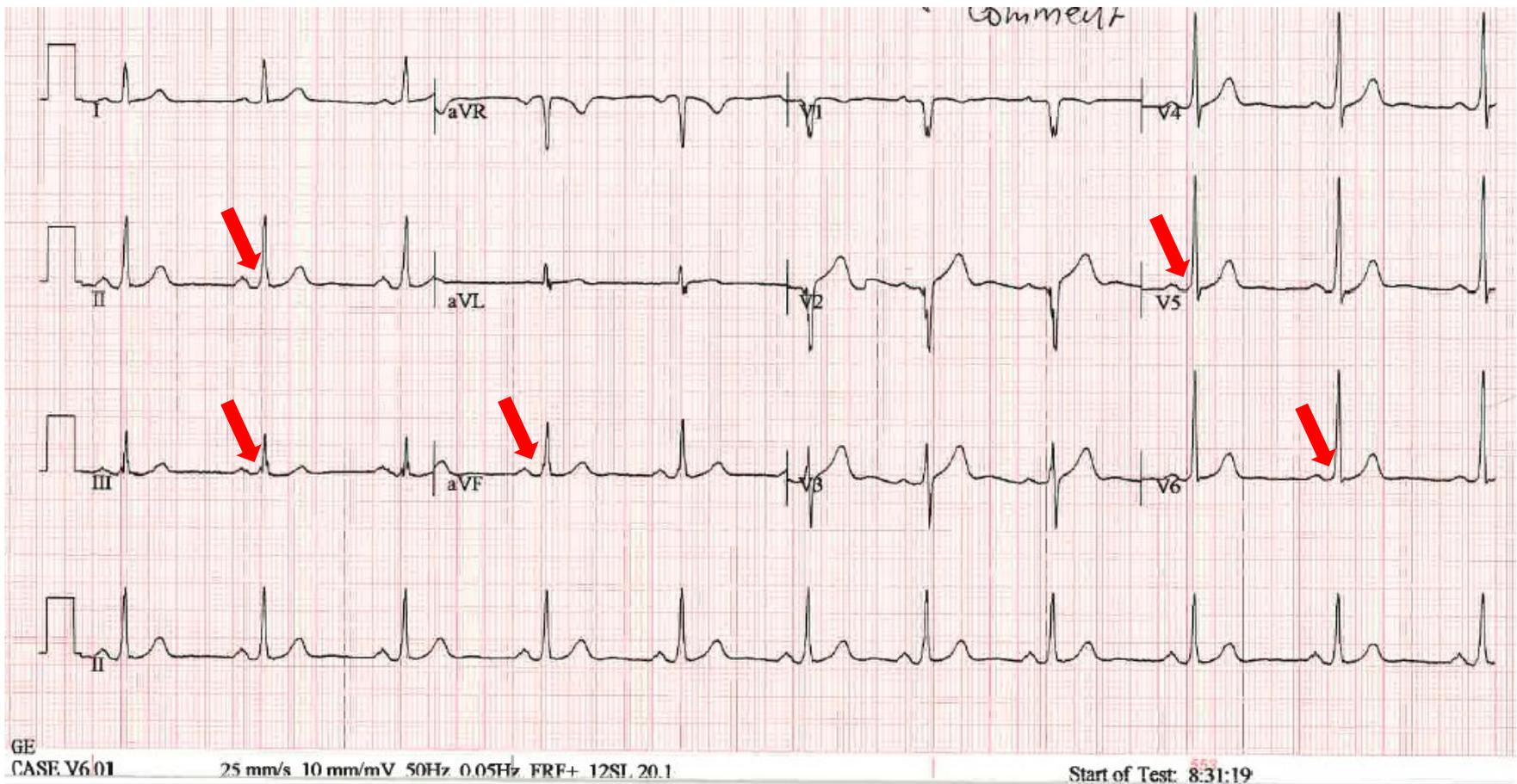


## What are the potential causes of a poor R wave progression ?

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- ⇒ **Old anteroseptal myocardial infarction.**
- ⇒ **Left ventricular hypertrophy**
- ⇒ **Left bundle branch block**
- ⇒ **Incomplete left bundle branch block .**
- ⇒ **Wolff-Parkinson-White pattern**
- ⇒ **Right ventricular hypertrophy associated with COPD**
- ⇒ **High placement of right and midprecordial electrodes**
- ⇒ **Less common : spontaneous pneumothorax, corrected transposition of great vessels, congenital absence pericardium**

The second main abnormality is the slurring of the upstroke limb of R wave in inferior leads and V5, V6.



Additionally normal septal q waves in I, aVL and V5, V6 are absent, and the QRS duration is 0.11 sec.

Finally, there is a delayed intrinsicoid deflection (time from beginning of QRS to its maximal amplitude in V6) at 0.065 sec.



# Conclusion

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- An old anteroseptal myocardial infarction seems unlikely in this clinical context and with a R wave at 9 mV in lead I, 8 mV in lead V3, no repolarization abnormalities.
- There is no voltage criteria of LVH and no strain.
- LBBB is easily ruled out since QRS duration is  $< 0.12$  sec.
- PR duration is normal, therefore a WPW is excluded.
- Misplacement of precordial electrodes is not the cause, since P waves in V1 and V2 are upright.
- RVH and congenital cardiac anomalies are ruled out within this clinical context and investigations.

Eventually, the diagnosis is incomplete LBBB for which all criteria are present:

1. QRS duration is  $> 0.10$  sec but  $< 0.12$  sec.
2. Dominant S wave in V1.
3. Broad monophasic R wave, and absence of Q waves in lateral leads.
4. R peak time greater than 0.06 sec in V5, V6.