ECG Underwriting Puzzler

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Obtaining Best Results from this presentation

For best results—please do the following:
• Select “Slide Show” from the menu option on top

• Select “From the beginning”

• Slowly click through the presentation
• You will notice I really enjoy PP animation
• Have fun!---Good luck
QUESTION???
What is the major abnormality on this ECG?

Additional information
This ECG was performed on a 47 y/o male with no indication of cardiac disease.
If you said “There are multiple technical issues with this ECG” you are correct. Well done!

Remember that in previous puzzlers I have mentioned that it is not uncommon for multiple technical problems to be present when one is discovered. This is another great example.

First, look at the standardization.

ECG’s are frequently recorded at ½ standard when there is excessive amplitude in the QRS complexes (frequently seen in LVH for instance).

However, I don’t see this concern on this ECG. The voltages all appear relatively normal.

Changing the voltage to ½ standard is frowned upon when the change is not required so I would consider this a mistake by the technician.

As a general rule of thumb when I see one “mistake” like this I frequently keep my eye out for others. Remembering this strategy can save you from making ECG interpretation mistakes.
The cause of a flat line in lead V1 can sometimes be a low voltage isoelectric lead. This might be the situation here, especially given the ½ standard technique.

How about lead V1. What is occurring there?

One quick note: Typically flat lines are not good on an ECG.

However, it could also be from a nonfunctioning electrode. This could be from either the electrode not being attached properly or the electrode could be broken.
Finally, look at lead II. Another flat line!! Uh oh.

The cause of a flat line in leads I, II, or III can be from lead switch involving the neutral cable (which, when correctly placed, is located on the right ankle)

When the RA and neutral cable are switched you will typically find lead II to be flat.

Other findings include:
- Lead aVR and aVF look similar
- Lead III is unchanged
- Lead I and aVL look like –III
- Finally V1-6 are distorted
A good resource for cable switch information is the following:

Batchvarov, V, Malik, M, Camm, J. Incorrect Electrode Cable Connection During Electrocardiographic Recording. Europace 2007; 1081-1090
This ECG Puzzler is now solved—it was a flurry of technical problems.

The question frequently asked at this point is whether the ECG is still interpretable and if so, how would you interpret it.

Given the potential for distortion of multiple leads from the neutral cable switch I would suggest obtaining a new ECG.

This concludes this issue’s ECG Puzzler. Contact me if you have questions!