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Don't let depressions to depress you

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"DON'T LET DEPRESSIONS TO DEPRESS YOU"

Introduction:

The electrocardiogram (ECG) is a valuable tool in diagnosing various cardiac conditions, providing crucial information about the heart's electrical activity. While certain ECG findings are well-known and commonly observed, there are instances where rare or unusual findings can lead to diagnostic challenges. In this case, a 40-year-old patient presented with chest pain and dyspnea, and the ECG revealed PR depression, a less common finding that raised questions about its significance and underlying cause.

This is the ECG of a 40-year patient who presents with chest pain and dyspnea. This is the first ECG taken for him and it is a routine ECG.

Questions:

1. What are the ECG findings?
2. What are the causes of these ECG findings?
3. Why is this clue?

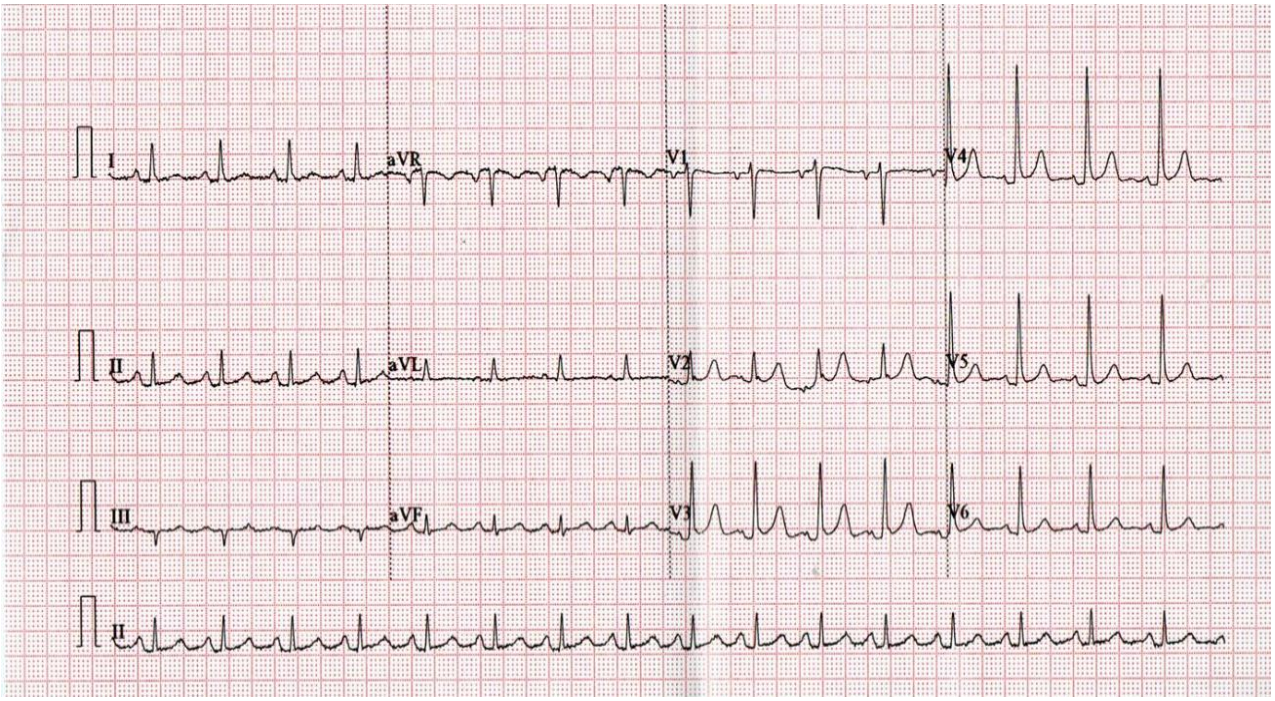
ECG Findings:

1. The striking feature in this ECG **is PR depression especially in leads V4, V5, and V6** with no significant ST elevation and PR changes in other leads, especially limb leads

2. There are 3 differential diagnoses for PR depression.

1. Normal Variant 2. Atrial Infarction 3. Acute pericarditis

A normal variant of PR depression is less than 1mm. In this ECG it is 1 mm and above, which makes the normal variant unlikely.



Atrial infarction almost always is accompanied by Acute Inferior Wall Infarction or lateral infarction. If PR depression happens in chest leads it should be more than 1.5mm (LIU's criteria). This ECG has no acute inferior or lateral infarction and PR depression is not more than 1.5mm in chest leads.

In acute pericarditis, PR depression is usually accompanied by concave ST elevation in all leads except in lead avR and possibly V1 and at this stage most often clinical evidence of pericarditis in the form of pericardial rub is present. This patient had no pericardial rub and the chest pain does not suggest acute pericarditis.

Cause of ECG Findings:

Then what is the cause of PR depression in the absence of a normal variant, atrial infarction and acute pericarditis?

There are 4 stages of ECG signs in pericarditis

Stage 1: Classical ST elevation concavity upwards in all leads except lead avR which shows reciprocal depression with PR depression and Spodick's sign of downsloping TP segment

Stage 2: In stage 2 ST elevation settles down with normal T wave. In early stage 2, ST may settle down, but PR depression may take more time to normalize. So early stages of stage 2, there may be only PR depression. However our patient had no previous history suggestive of pericarditis, and the chest pain he had is typically non-cardiac.

Stage 3: the T wave gets inverted with normal ST and PR

Stage 4: there is normalization of ST and T waves

The second and most probable possibility of PR depression in this ECG is asymptomatic pericardial effusion. PR depression finding alone has been noted in asymptomatic pericardial effusion with no clinical signs of pericarditis (JACC 2002). Our patient had mild but significant pericardial effusion which is the probable cause of PR depression.

3. This rare sign of pericardial effusion (PR depression) has taken away our concentration from the most important but subtle sign of LA abnormality in V1 in the form of the deep negative force of the P wave. This may be the only sign in some of the patients with mitral stenosis or LV dysfunction which is due to left atrial hypertension in the absence of classical wide and bifid p wave in L II. This patient had moderate to severe Mitral Stenosis of VA of 1.2cm2. He may need an intervention for this finding rather than PR depression.

CLUE:

Sometimes, rare signs of ECG may take our attention away from a subtle but the most important sign in the ECG which is more crucial in the management of the patient. This ECG is a typical example of this phenomenon. So don't get depressed because you may have missed LA abnormality due to your concentration on rare signs of PR depression. There is always another time!

Conclusion:

ECG interpretation requires attention to detail and consideration of both common and rare findings. While PR depression can be indicative of various conditions, including atrial infarction and pericarditis, this case highlighted the importance of not overlooking more subtle yet clinically

significant findings. In this instance, the presence of moderate to severe mitral stenosis, evidenced by deep negative force of P wave in V1, underscored the need for a comprehensive assessment beyond the initial focus on PR depression. This case serves as a reminder to approach ECG interpretation with a broad perspective, ensuring that all findings, even the rare ones, are considered in the context of the patient's overall clinical presentation.