



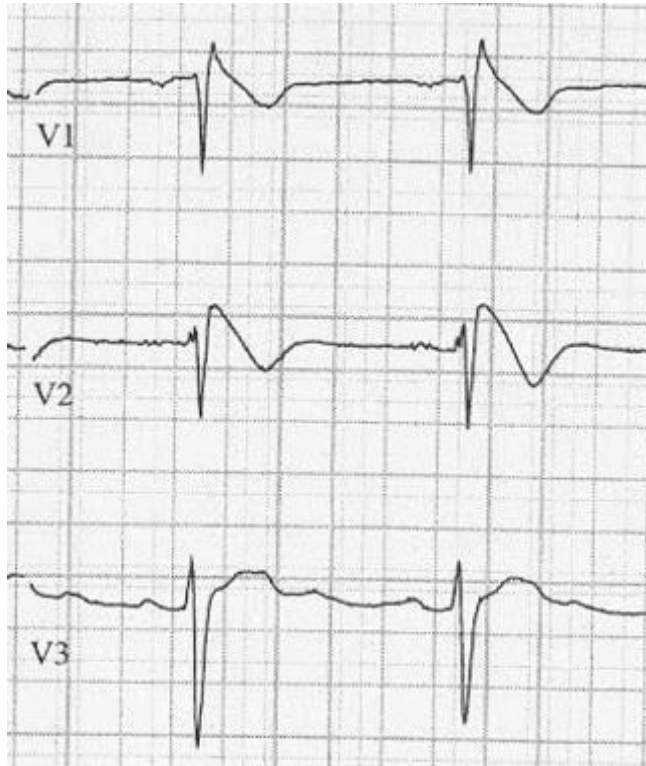
# Foundations EKG I

## Unit 2 Summary - Ischemia Mimics

Although STEMI diagnosis is critical not all ST elevation represents STEMI. There are many possible harms of a false positive STEMI activation or transfer including but certainly not limited to the risks of receiving anti-platelet agents or even tPA in the setting of a transfer, complications of angiography (bleeding, dissection, etc), as well as operational issues of the cath lab team being activated overnight or cancelling a scheduled case.

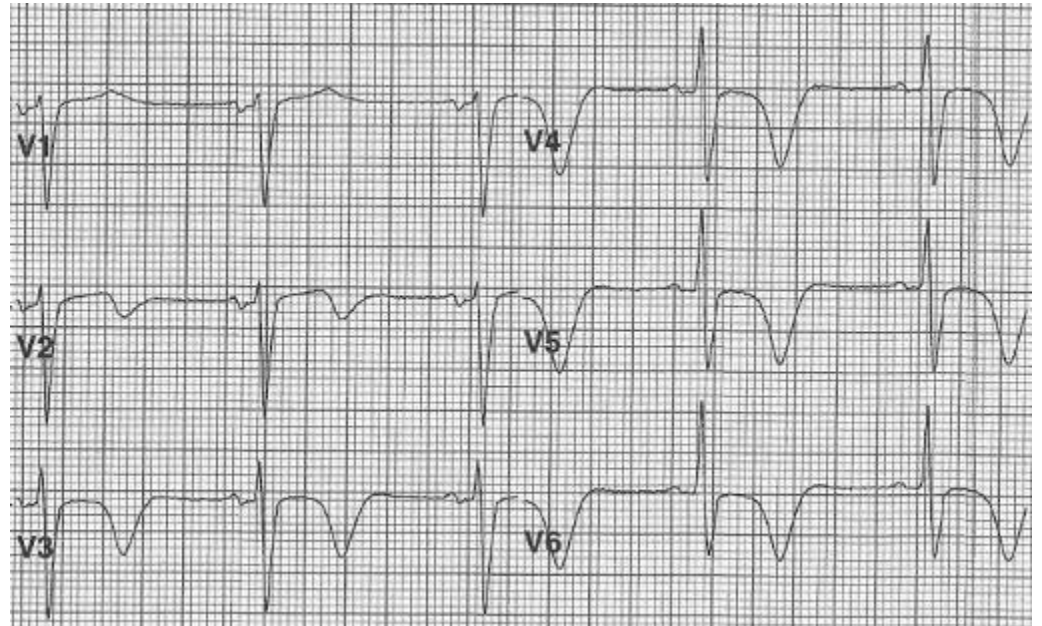
An EKG with a STEMI pattern must be considered in the context of the patient's past medical history, HPI, and exam. This summary will provide an overview of common STEMI mimics including left ventricular aneurysm hyperkalemia, pericarditis, Brugada syndrome, elevated intracranial pressure, and left ventricular hypertrophy.

**LV Aneurysm** is defined by EKG criteria as ST elevation that persists for more than 2 weeks after an MI. It is important to note that it is considered normal for ST elevation to slowly resolve after MI and it may not immediately return to normal. Distinguishing LV aneurysm from STEMI can be difficult however typically there are clear Q waves and a lack of hyperacute T waves. Additionally, the patient should not have pain or active anginal equivalent symptoms. [LITFL Review](#)



**Brugada syndrome** is the result of an inherited or spontaneous mutation in cardiac sodium channels that predisposes patients to ventricular tachyarrhythmias and sudden cardiac death. To be diagnosed with the syndrome, one must have ECG features and symptoms consistent with ventricular tachyarrhythmia (syncope, palpitations, etc). [LITFL Review](#)

The image above is an example of **Type 1 Brugada** with coved ST-elevation in V1-2 sloping into an inverted T-wave.



Large and particularly rapid increase in **intracranial pressure** (a good example would be a large subarachnoid hemorrhage) can cause EKG changes that are often confused with ischemia. Most frequently the changes are deep T wave inversions (aka cerebral T waves) however sometimes there can be associated ST elevation and depression. The history and exam are critical in this situation because normal therapies for ischemia like antiplatelet agents could be devastating if there is a concurrent intracranial hemorrhage. As an example it is atypical for a STEMI patient to be altered or obtunded which can be a clue that there is another or concurrent process. **The image above is an example of cerebral T waves.** [LITFL Review](#)

**Osbourne or J Waves** are upward deflections of the J point that are typically caused by hypothermia but may also be the result of hypercalcemia or elevated intracranial pressure. The elevated J point creates the appearance of significant ST elevation. Consider getting a core temperature in patient's with abnormalities of the J point.

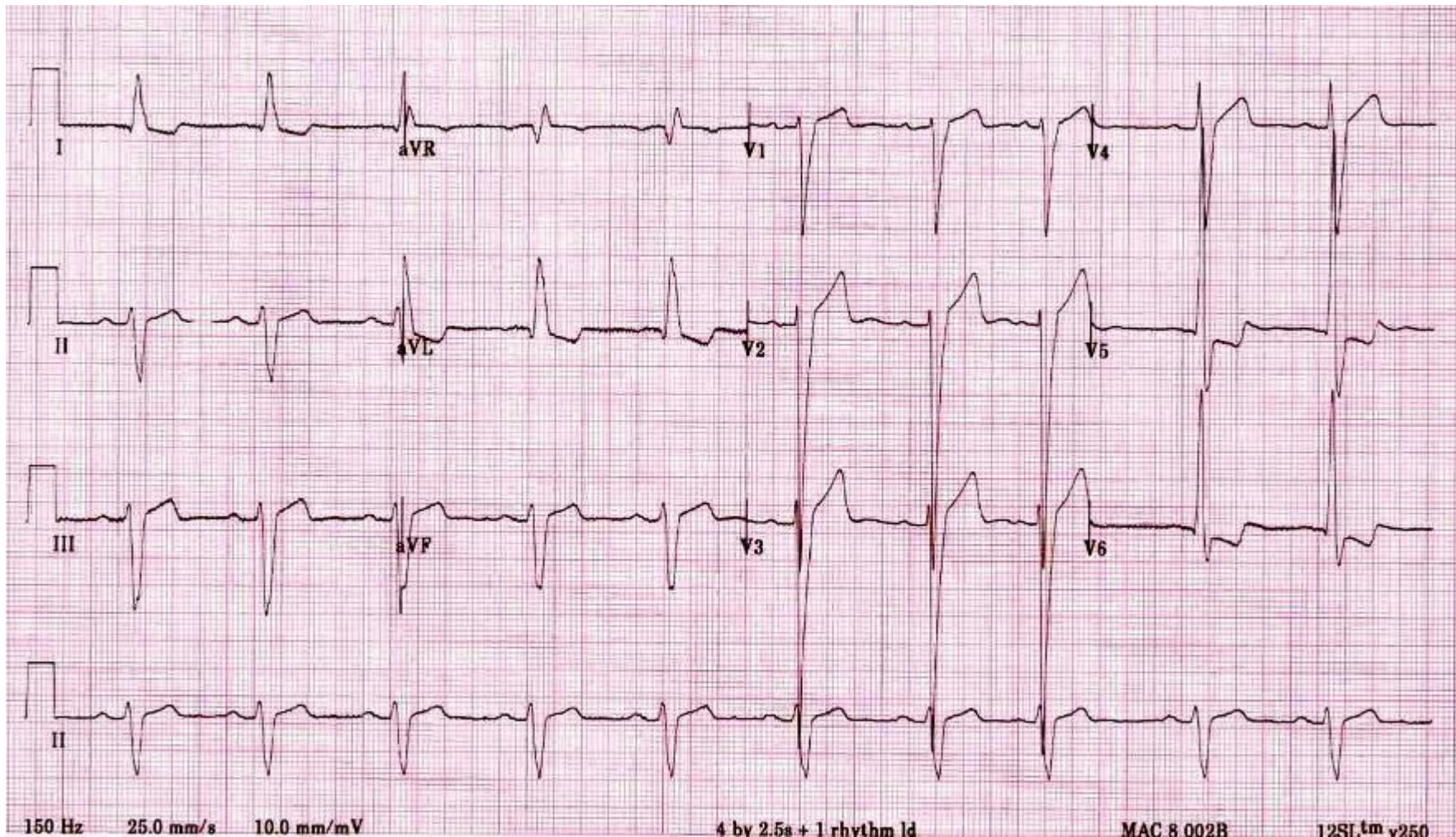


Courtesy of Edward Burns of [Life in the Fast Lane](#)

[Creative Commons License](#)



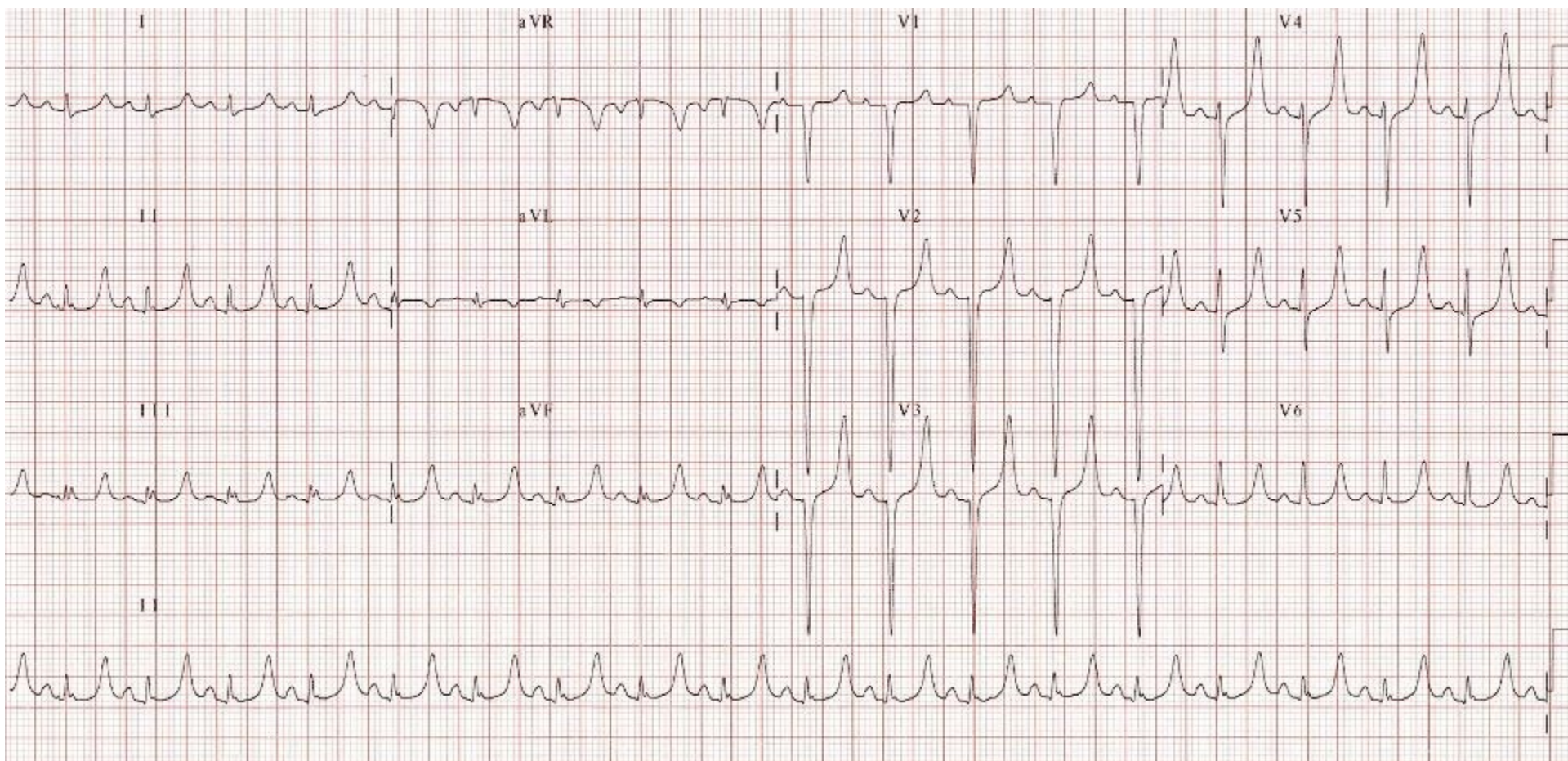
**Left Ventricular Hypertrophy** is frequently the result of untreated hypertension and aortic valve dysfunction. It causes characteristic EKG abnormalities including massive QRS amplitudes (typically large S waves in V1-3, III, aVR and large R waves in V4-6, I, and aVL) as well as prolonged QRS duration and ST segment changes like ST elevation and ST depression. [LITFL Review](#)



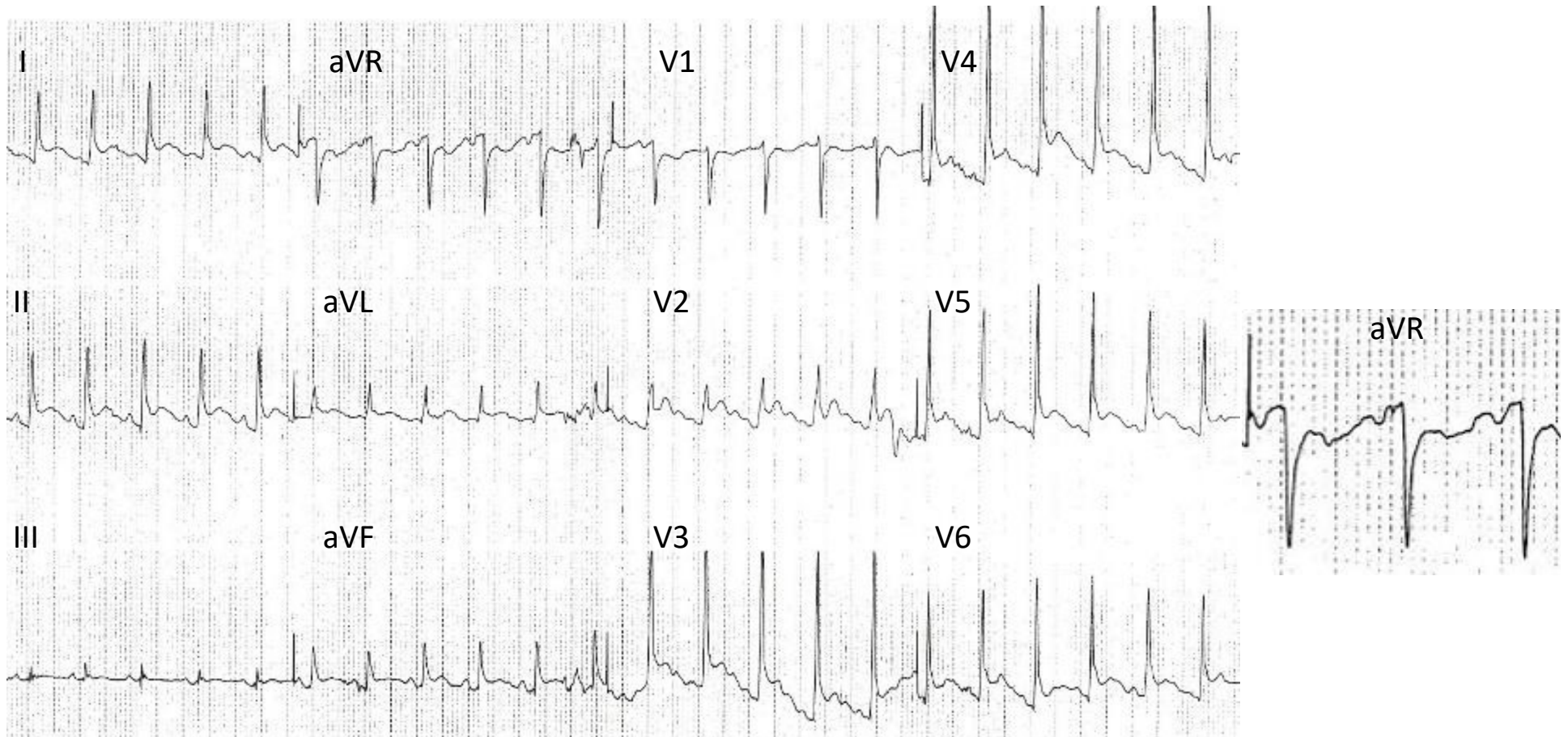
Courtesy of Edward Burns of [Life in the Fast Lane](#) [Creative Commons License](#)



**Hyperkalemia** is a common electrolyte derangement that can cause significant changes to a patient's EKG. Classically hyperkalemia progressively leads to peaking T waves, PR prolongation, loss of P waves, QRS widening, bundle or fascicular block morphology, sine wave, and ventricular dysrhythmia or asystole as the potassium rises. The bizarre appearance of the EKG in hyperkalemia can be easily confused with STEMI and it is important to keep hyperkalemia in your differential particularly in patients with known renal dysfunction/failure, patients undergoing chemotherapy, patients using ACE inhibitors or potassium sparing diuretics, and all patients receiving potassium supplementation. [LITFL Review](#)



Courtesy of Edward Burns of [Life in the Fast Lane](#) [Creative Commons License](#)



**Pericarditis** frequently causes diffuse ST elevation that can be confused with STEMI however it is important to recognize that the ST elevation of pericarditis should also be associated with PR depression (except in aVR which has PR elevation) and NOT be associated with ST depression in leads other than aVR and V1. Patients with pericarditis often have pain that improves when sitting forward and is exacerbated by laying back. The clinical history and exam is very important with this diagnosis as well as it can sometimes be difficult or impossible to distinguish pericarditis and STEMI. The EKG above is an example of diffuse STE and STD in aVR/V1 with diffuse PR depression and PR elevation in aVR and V1. [LITFL Review](#)