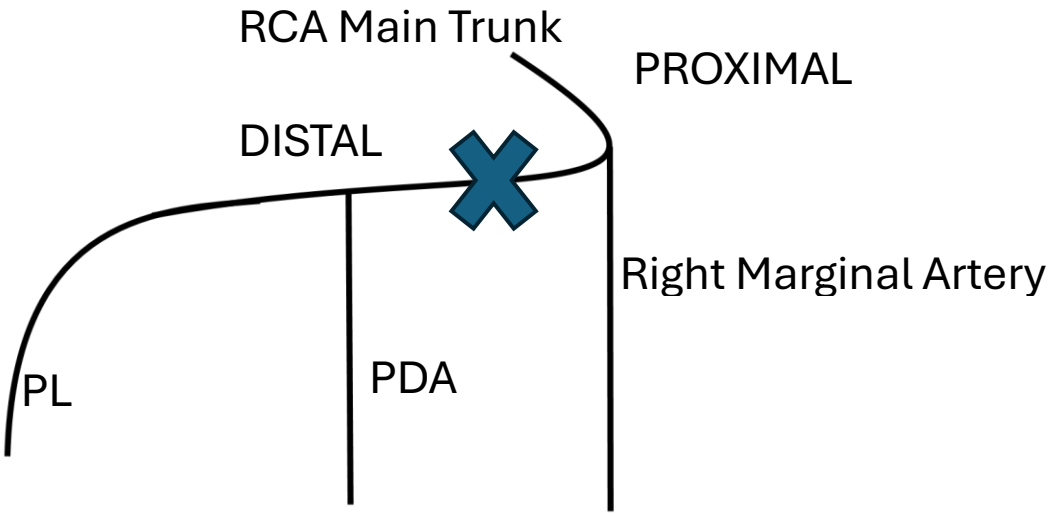
RESPONSE: WHY IS A DISTAL RCA OCCLUSION SOMETIMES PRESENT WITH BOTH INFERIOR AND POSTERIOR (INFEROLATERAL) ISCHEMIA AND SOMETIMES WITH JUST INFERIOR ISCHEMIA?

If we look at the RCA as it appears on the posterior surface of the heart…



The PROXIMAL RCA extends from its origin in the aorta to the right marginal artery. The DISTAL RCA extends from the right marginal artery to the end of the posterolateral branch (PL).

An occlusion ("X") proximal to the posterior descending artery (PDA) *should* cause acute ischemic changes (ST elevation) in BOTH the INFERIOR and POSTERIOR (INFERO-LATERAL) walls of the left ventricle. On the 12-lead ECG, this would appear as ST elevation in Leads II, III and aVF with reciprocal ST depression in Leads I and aVL. There should also be ST elevation in Leads V7 – V9 and sometimes in Leads V5 and V6. On the 12-lead ECG this would appear as reciprocal ST depression in Leads V1 – V3 (and sometimes Lead V4).

But it is quite common for a distal RCA occlusion to result in an acute ischemia of the inferior wall only! How does this happen?

REASON #1 – Even when the RCA is dominant, there can be significant variability in the anatomy… especially of its terminal portion. Sometimes the posterolateral branch is short – too short to have any significant effect on the posterior wall of the left ventricle. However, the left circumflex (LCx) - *even when it is non-dominant* – still supplies the posterior wall via its own posterolateral branch and its obtuse marginal branch. The posterolateral branch (PL) of the LCx arises *proximal* to the posterior descending artery

(PDA) so even if the PDA is missing (and it *is* missing about 85-90% of the time), there is still a posterolateral branch.

REASON #2 – Collateral circulation can protect the posterior (inferolateral) wall.

REASON #3 – Cancellation of forces on the ECG can obscure the presence of ST depression in Leads V1 – V3 so that you are not aware of the posterior (inferolateral) ischemic changes.

So… whether there is acute ischemia of BOTH the inferior and inferolateral walls of the left ventricle or just ischemia of the inferior wall – it all depends on 1) how developed the posterolateral branch of the RCA is, 2) on the presence of collateral circulation to the infero-lateral wall and 3) whether or not an actual ischemia is being hidden from you.