CLINICAL VIGNETTE

Not GERD: A Case of Angina Decubitus

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Abbreviations: coronary artery disease (CAD), gastroesophageal reflux disease (GERD), myocardial perfusion imaging (MPI), coronary artery bypass graft (CABG), left ventricular end diastolic pressure (LVEDP)

History of Present Illness

A 72-year-old female was referred to cardiology by her primary care physician (PCP) for worsening chest pain after pharmacologic myocardial perfusion imaging was negative for ischemia. She described three months of substernal, non-radiating, 6/10 chest pain with onset after 5-10 minutes of walking and improvement with rest. She had previously noted occasional pain 15 minutes of walking, but the pain had become more predictable with shorter periods of exercise. The pain was associated with diaphoresis and shortness of breath.

In addition to her exertional chest pain, the patient reported chest pain at night while in a recumbent position which was similar to the exertional pain. She noted three weeks of occasional pain while supine in bed which improved with raising her head with four pillows. A transthoracic echocardiogram demonstrated normal left ventricular ejection fraction with no significant valvular dysfunction. She denied paroxysmal nocturnal dyspnea and lower extremity edema. Given this symptomatology and her history of gastroesophageal reflux disease (GERD), the pain was initially thought to be GERD. She started a proton pump inhibitor with no improvement before her cardiology evaluation.

Past medical history includes left breast cancer s/p lumpectomy, radiation and adjuvant hormonal therapy, hyperlipidemia, obstructtive sleep apnea, GERD, and remote2 pack-year smoking. She had no known history of heart disease.

Myocardial perfusion imaging (MPI) and computed tomography (CT) imaging of the chest were obtained, prior to cardiology evaluation. Pharmacologic MPI was unremarkable for stress-induced ischemia. CT imaging demonstrated no significant pulmonary pathology, but revealed three vessel coronary calcification. Multivessel coronary atherosclerosis in the setting of progressive angina symptoms was concerning for a false negative MPI result. Coronary angiography was expedited, given the patient's accelerating exertional symptoms. Coronary angiography demonstrated 95% distal left main coronary artery disease as well as severe distal right coronary artery disease (see Figure 1). During catheterization, the patient developed sinus tachycardia and chest pain while placed in the recumbent position. The discomfort was similar to her exertional symptoms.

Given angiogram findings of severe multivessel coronary artery disease, including distal left main disease, urgent coronary artery bypass surgery (CABG) was recommended. She underwent three-vessel CABG including grafting of the left internal mammary artery (LIMA) to the left anterior descending artery (LAD), and saphenous vein graft (SVG) to the obtuse marginal (OM) and posterior descending arteries (PDA).

Discussion

This case study highlights the phenomenon of "angina decubitus" – angina pectoris induced by supine positioning in setting of severe multivessel coronary artery disease. The term was first described in medical literature in the mid -1900s and has been the subject of only a handful of case reports and case series exploring its etiology and pathophysiology. A case series in 1950 identified angina decubitus as a symptom of coronary artery disease. It had previously been described in cases of aortic regurgitation.[1] One early case report included a case of angina decubitus associated with a large mediastinal tumor compressing the right ventricular outflow tract.[2]

More recent studies have focused on the pathophysiology of angina decubitus which results from a mismatch of coronary oxygen supply and demand. In patients with extensive severe coronary artery disease, decreased coronary oxygen supply is thought to be secondary to left ventricular diastolic dysfunction. With recumbent positioning, there is increased venous return to the heart resulting in pre-load elevation. In the context of diastolic dysfunction, increased pre-load results in an increase in left ventricular end diastolic pressure (LVEDP). When LVEDP increases, coronary perfusion pressure, decrease, calculated as the difference between LVEDP and the aortic diastolic pressure. In setting of severe CAD, this results in relative decrease in coronary perfusion leading to reduced myocardial oxygen supply. In the 1990s, two articles by Chen

Jilin et. al., explored this pathophysiology.[3,4] Swan-Ganz catheters measured pulmonary artery pressures in 20 patients with known CAD, exertional angina, and episodes of angina decubitus. They demonstrated increases in pulmonary artery diastolic pressures, suggesting elevated LVEDP, associated with episodes of recumbent chest pain.[3,4]

When LVEDP is elevated, cardiac baroreceptors are also triggered causing an increase in heart rate which in turn increases myocardial oxygen demand leading to ischemia. Our patient clearly demonstrated this when lying on the catheterization table with sudden rise in heart rate with onset of angina. A series of 5 patients with CAD and angina decubitus found that episodes of nighttime angina, which produced ST segment depressions, were associated with increases in heart rate.[5]

Angina decubitus, a phenomenon resulting from a mismatch of coronary oxygen supply and demand, is concerning for extensive severe coronary artery disease. It can be an important clinical clue prompting evaluation especially in patients, like the one described with false negative stress test. This case also serves as a reminder that in severe multivessel coronary artery disease, cardiac perfusion imaging can have a false negative result secondary to balanced ischemia. This patient also had prior breast cancer radiation to the left chest, increasing risk for accelerated atherosclerosis in left main and proximal LAD.

Figure 1. Coronary Angiogram. The yellow arrow points to critical distal left main stenosis on coronary angiography, the cause of the patient's recumbent chest pain.

Follow-up

Since her bypass surgery the patient has been doing well. She has increased exercise capacity, has lost a significant amount of weight, and is free of chest pain. She completed cardiac rehab and exercises daily with no exertional symptoms.

Conclusions

Angina decubitus is a rare but important phenomenon that can signal extensive coronary artery disease. Symptoms that raise concern for GERD should be evaluated carefully, especially in patients with cardiac risk factors and exertional symptoms.

REFERENCES

1. **Soloff LA**. Angina pectoris during decubitus; hitherto unrecognized manifestation of circulatory failure. *J Am Med Assoc*. 1950 May 20;143(3):225-6. doi: 10.1001/jama.1950.02910380009003. PMID: 15415248.
2. **Werbel GB, Skom JH, Mehlman D, Michaelis LL**. Metastatic squamous cell carcinoma to the heart. Unusual cause of angina decubitus and cardiac murmur. *Chest*. 1985 Sep;88(3):468-9. doi: 10.1378/chest.88.3.468. PMID: 4028858.
3. **Chen J, Chen Z, Xu Y, Gao R, Kou W, Yao K, Lu Z, Tao S**. Hemodynamic observation and treatment approach for patients with angina decubitus. *Chin Med Sci J*. 1992 Sep;7(3):133-6. PMID: 1363074.
4. **Chen J, Chen Z, Xu Y, Gao R, Kuo W, Yao K, Yu A, Tao S**. Re-evaluation of the mechanism and treatment of angina decubitus. *Chin Med Sci J*. 1996 Mar;11(1):8-12. PMID: 9206110.
5. **Quyyumi AA, Wright CA, Mockus LJ, Fox KM**. Mechanisms of nocturnal angina pectoris: importance of increased myocardial oxygen demand in patients with severe coronary artery disease. *Lancet*. 1984 Jun 2;1(8388):1207-9. doi: 10.1016/s0140-6736(84)91693-3. PMID: 6144924.