CLINICAL VIGNETTE

Resistant Hypertension and STEMI as a Presentation of Fibromuscular Dysplasia

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Case Part 1

A 44-year-old woman with past medical history of untreated hypertension presented to establish care with a primary physician following a recent STEMI hospitalization. She presented to the ER several days prior with substernal chest pain and hypertensive emergency. The ER EKG showed ST elevation in leads I and AVL and was taken emergently to the cath lab. The first diagonal coronary artery was 100% occluded and a Drug Eluting STENT was placed. Transthoracic echocardiogram showed normal LVEF, and she remained stable without chest pain and was discharged home after 3 days on aspirin, ticagrelor, lisinopril, metoprolol, and atorvastatin. She was advised to establish care with primary care and cardiology.

She was seen by her new PCP shortly after discharge. At the post hospital visit, the patient mentioned that she had long standing hypertension, which had been addressed by her previous primary care physician, who advised weight loss before starting medications. The patient was able to lose 11% of her body weight. While the patient was able to achieve a weight loss goal of losing 20% of her body weight without significant improvement in blood pressure. She transferred care before medical management was started, and regained weight with BMI of 28.17.

The post hospital primary care physician's visit revealed, no other significant past medical history. Family history included hypertension and diabetes in her mother. The patient was a nonsmoker. Office blood pressure was 158/106 on lisinopril and metoprolol. Physical exam revealed normal heart sounds, clear lungs, no peripheral edema, and no focal neuro findings. Renovascular hypertension was suspected and renal duplex was ordered along with referral to cardiology.

At the cardiologist evaluation, the possibility of a partial coronary artery dissection resulting in STEMI was raised. Fibromuscular dysplasia (FMD) was suspected as a possible cause of both the STEMI and hypertension unresponsive to two anti-hypertensive medications. She was then referred to a vascular surgeon for further evaluation.

Discussion

Fibromuscular dysplasia is a non-atherosclerotic vascular disease which largely affects medium-sized arteries.[1] Though the exact etiology is unclear, the pathophysiology of FMD is in part attributed to abnormal development of the media of the vessel wall.[2] The disease has high female predominance with the renal and carotid arteries being most affected.[2] As FMD can often be underdiagnosed or overlooked, uncontrolled hypertension, tinnitus, or migraines in a patient without the typical atherosclerosis risk factors, should raise suspicion for FMD as a possible contributing pathology.[2] Additionally, patients presenting with arterial dissection should be evaluated for FMD in other arteries.[2]

The diagnosis of FMD is usually made with direct visualization of the arteries. As FMD can affect various arteries, the current recommendation is screening arteries from head to pelvis.[2] The gold standard for screening is catheter angiography, though less invasive options such as CTA, MRA, and duplex ultrasound can also aid in diagnosis.[3] The classic appearance on duplex ultrasonography is presence of beading or the appearance of "beads on a string."[4] Flow studies can also aid in diagnosis as, change in flow dynamics can suggest diagnosis of FMD, even in the absence of beading.[5]

Once a diagnosis has been established, treatment options are based on the patient's presentation and location of FMD. For FMD involving the renal artery, hypertensive medical management is often the first line of treatment.[5] Stenting the involved artery can be a successful treatment.[5]

Case Part 2

The patient's renal artery duplex results showed elevated velocities in the right and left renal arteries. Renin and Aldosterone levels were within the normal range. MRA of abdomen and lower extremities was remarkable for beading in the proximal left renal artery per vascular surgeon's assessment. Additionally, there was a beaded appearance of the bilateral tibial arteries, consistent with FMD. The patient opted to pursue medical management of hypertension and post STEMI care and deferred stenting of the renal arteries, as well as a full body screening from head to pelvis.

Conclusion

This patient's presentation provided an important opportunity for further evaluation of uncontrolled hypertension. The patient also had no other clear cardiac risk factors for a STEMI. Other than uncontrolled hypertension, this illustrates the pitfall of anchoring bias. The patient's initial PCP suspected her obesity

to be the cause of her hypertension. Her presentation of likely coronary artery dissection and subsequent STEMI at a young age led to a further evaluation and diagnosis of FMD.

REFERENCES

1. **Cook EA, Chen GI**. Late presentation of fibromuscular dysplasia in an elderly female with branch retinal artery occlusion. *Proceedings of UCLA Healthcare*, 2017;Vol 21.
2. **Brinza EK, Gornik HL**. Fibromuscular dysplasia: Advances in understanding and management. *Cleve Clin J Med*. 2016 Nov;83(11 Suppl 2):S45-S51. doi: 10.3949/ccjm.83.s2.06. PMID: 27861117.
3. **Olin JW, Sealove BA**. Diagnosis, management, and future developments of fibromuscular dysplasia. *J Vasc Surg*. 2011 Mar;53(3):826-36.e1. doi: 10.1016/j.jvs.2010. 10.066. Epub 2011 Jan 13. PMID: 21236620.
4. **Slovut DP, Olin JW**. Fibromuscular dysplasia. *N Engl J Med*. 2004 Apr 29;350(18):1862-71. doi: 10.1056/ NEJMra032393. PMID: 15115832.
5. **Olin JW, Pierce M**. Contemporary management of fibromuscular dysplasia. *Curr Opin Cardiol*. 2008 Nov; 23(6):527-36. doi: 10.1097/HCO.0b013e328313119a. PMID: 18830066.