Multi-vessel coronary artery aneurysms in a patient with Parry Romberg syndrome: a case report

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Background
Coronary artery aneurysms (CAAs) are a very rare finding on coronary angiograms with multiple known aetiologies. Parry Romberg syndrome (PRS) is also a very rare disease, and the underlying aetiology remains unknown. We present a rare case of CAAs in a patient with PRS, and discuss possible implications regarding the primary pathophysiological cause for both of these diseases.

Case summary
A 48-year-old woman with a history of PRS presented with atypical and non-exertional chest pain. Initial evaluation demonstrated a rising troponin without associated electrocardiogram changes, and as such she was taken for left heart catheterization. Left heart catheterization demonstrated diffuse aneurysmal and ectatic disease of multiple coronary arteries. Further evaluation with magnetic resonance angiogram and autoantibody panel did not demonstrate other vascular anomalies or rheumatologic disease, respectively. She was treated with dual anti-platelet therapy and statin, and at 1 year follow-up, she had resolution of her symptoms.

Discussion
It has been postulated that the underlying mechanism causing CAA is intravascular inflammation. Parry Romberg syndrome is theorized to be a neurovasculopathy, as evidenced by cases of associated intracranial aneurysms. Intravascular inflammation may play a key pathological role in CAA, and an association between CAA and PRS may exist.

Keywords
Case report • Coronary artery aneurysms • Parry Romberg syndrome • Intravascular inflammation • Statin therapy • Histopathological studies

Learning points
• Coronary artery aneurysms (CAAs) are a rare pathological finding on coronary angiograms, and while there are many known underlying aetiologies, it has been postulated that the primary pathological mechanism is increased intravascular inflammation.
• Parry Romberg syndrome (PRS) has been theorized to be related to a neurovasculopathy, and as such this population of patients would be at risk for increased intravascular inflammation.
• This case of CAAs in a patient with PRS suggests that an association between these two diseases may exist.
Introduction

Coronary artery aneurysm (CAA) describes a rare abnormal dilatation of the epicardial tree. While atherosclerosis is the most common cause, there are many other known aetiologies. Parry Romberg syndrome (PRS) is a rare disorder with characteristic unilateral atrophy of the face. Although the underlying aetiology is unknown, an inflammatory process has been postulated as the trigger. We have previously described CAA manifestations, and here, we report a rare case of CAA in a patient with PRS and discuss the possible implications regarding the pathology of both diseases.

Timeline

| Time                  | Events                                                                 | Notes                                                                 |
|-----------------------|------------------------------------------------------------------------|----------------------------------------------------------------------|
| Initial evaluation    | Patient presents with concerns for progressive, intermittent, and non-exertional chest pain. Electrocardiography showed voltage criteria for left ventricular hypertrophy (LVH), and initial troponin was 0.7 ng/mL. | Patient was admitted for evaluation of acute coronary syndrome, and followed with serial electrocardiogram and cardiac enzymes. |
| Hospital Day 1        | Troponin rose to peak 6.16 ng/mL. Bedside echocardiography showed moderate LVH, akinesis of the basal inferior myocardial segment. | Patient given aspirin and clopidogrel loading doses, heparin infusion, and taken for coronary angiography. |
| Hospital Day 2        | Coronary angiography showed aneurysmal disease of all epicardial arteries, without evidence of thrombus angiographically. | No percutaneous intervention performed. Dual antiplatelet therapy and high-intensity statin was started. |
| Remainder of hospitalization | Magnetic resonance angiogram did not demonstrate other vascular anomalies. Rheumatologic autoantibody workup was negative. |                                                                      |
| 3-month follow-up     | Occasional palpitations and shortness of breath reported.              |                                                                      |
| 12-month follow-up    | No symptoms or cardiac issues reported.                                |                                                                      |

Case presentation

A 48-year-old African American woman presented to our academic tertiary referral centre for evaluation of progressive, intermittent, and non-exertional chest pain for the past 3 weeks. She had a past medical history significant for PRS, hypertension, obesity, and chronic kidney disease Stage III. She denied history of smoking or coronary artery disease. Physical examination demonstrated poorly controlled hypertension (179/120 mmHg), but other vitals were normal, and her exam did not reveal any significant abnormalities.

Initial workup was significant for troponin of 0.7 ng/mL (reference range 0.00–0.04 ng/mL) and an electrocardiogram that showed sinus rhythm with voltage criteria consistent with left ventricular hypertrophy (LVH) without acute ST changes (Figure 1). A chest X-ray showed no acute cardiopulmonary findings.

Differential diagnosis at this time was broad and included acute coronary syndrome (ACS), hypertensive urgency, and non-cardiac causes of chest pain. She was admitted for further evaluation with serial troponin and electrocardiogram. Her blood pressure quickly improved with resumption of her home anti-hypertensives.

Serial troponin continued to rise to a peak of 6.16 ng/mL over the following 8 h. Electrocardiogram remained stable. A bedside echocardiogram was performed which showed moderate LVH, an estimated ejection fraction of 50–55%, and possible thinning and akinesis of the basal inferior myocardial segment—no pericardial effusion was noted. In the setting of recurrent, albeit atypical, chest pain with rising troponin and echocardiographic evidence of ischaemia, she was treated for ACS with loading doses of aspirin and clopidogrel (325 mg and 600 mg, respectively) and intravenous heparin infusion. She was monitored closely and underwent left heart catheterization (LHC).

Left heart catheterization demonstrated a large and aneurysmal left main artery, along with aneurysmal segments distal to the 1st diagonal branch as well as in the proximal left circumflex artery, and a diffusely ectatic right coronary artery. There was a discrete 90% lesion at the proximal posterior descending artery with chronic total occlusion distal to the lesion. Angiographically, there was no evidence of thrombus, dissection, intramural haematomata, nor other acute pathology. There were no signs of acute plaque rupture, nor obstructive disease amenable to percutaneous intervention (Figure 2).

Following catheterization, the patient underwent extensive work-up to rule out other vascular anomalies and rheumatologic disease. She denied any history of Kawasaki’s disease or similar illness. Magnetic resonance (MR) angiogram of the head, chest, abdomen, and pelvis did not reveal other aneurysmal disease. Antinuclear, anticientromere, anti-double stranded DNA, rheumatoid factor, and anti-neutrophil cytoplasmic antibodies were negative. C-reactive protein and erythrocyte sedimentation rate were mildly elevated (1.01 mg/dL and 32 mm/Hr, respectively). Lipid profile showed LDL of 114 mg/dL.

The patient was started on a high-intensity statin and discharged on dual antiplatelet therapy with cardiology follow-up.

At 3-month follow-up, the patient reported occasional and mild palpitations and chest pain. At 12-month follow-up, she had complete resolution of her cardiac symptoms.
Discussion

There are many known causes of CAA. In the Western world, atherosclerosis is the most common aetiology and is responsible for more than 50% of cases. Coronary artery aneurysm may also be congenital, mycotic, or related to systemic inflammatory disease such as Kawasaki disease or other vasculitides. Predisposing risk factors include hyperlipidaemia and male gender, however surprisingly, there

Figure 1Electrocardiogram obtained on admission demonstrates sinus rhythm with borderline left ventricular hypertrophy by voltage criteria. There are no ST changes suggestive of acute ischaemia.

Figure 2 Coronary angiography demonstrates a large and aneurysmal left main artery, as well as aneurysmal segments distal to the 1st diagonal branch and in the proximal left circumflex artery. The right coronary artery is very large and ectatic from the ostium to distal aspects. There is a 90% stenotic lesion in the proximal posterior descending artery with a chronic total occlusion distal to it; no other significant abnormalities noted angiographically.
does not appear to be a significant correlation between CAA and hypertension.1,4

The underlying pathophysiological mechanisms behind CAA remains controversial.6 It was previously believed that aneurysms formed as a result of post-stenotic transformation of energy, pressure abnormalities, and increased shear stress promoting endothelial injury and post-stenotic dilation.3 However, more recently it has been postulated that an inflammatory process may be paramount in aneurysm formation. This theory is supported by histopathological studies of CAA, which have demonstrated ubiquitous destruction of the tunica media, with severe cystic medial degeneration and lymphohistiocytic inflammation. It is believed that this cystic medial degeneration and aneurysm formation may merely be a side effect of ‘spillover inflammation’.1 This theory is also supported by reports of CAA in vessels without evidence of any stenosis.6

Parry Romberg syndrome is a rare disorder with characteristic unilateral atrophy of the face. The aetiology of this disease is not known; however, it has been hypothesized that this disease may be caused by an inflammatory disorder and has been likened to a systemic vasculitis.7 This theory is supported by the inflammatory changes seen at disease onset and the high frequency of autoimmune antibodies observed.8 It is further supported by histopathological studies that have shown variable degrees of perivascular chronic inflammation.7

Vascular anomalies have been reported in PRS, specifically intracranial aneurysms and vascular malformations.7 but to the best of our knowledge, there have been no other reports of CAA in patients with PRS. While current research does not provide a causal relationship between these two diseases, we believe this case has important implications to both CAA and PRS, as it suggests that intravascular inflammation plays a key role in both diseases’ processes. This patient had multi-vessel CAA of uncertain aetiology, and although it is possible that her disease was related to atherosclerosis or congenital disease, it is possible her coronary disease is associated with her PRS. Other systemic vasculitides were effectively ruled out by MR angiogram, and her LHC did not demonstrate the distinct pattern of coronary disease seen in fibromuscular dysplasia.9 Of note, our patient did demonstrate objective, albeit non-specific, evidence of a pro-inflammatory state, as evidenced by elevated inflammatory markers. Furthermore, statin therapy has been shown to interfere with the detrimental effects of inflammation in coronary arterial disease,10 and therefore may play a key role in attenuating disease in CAA. Our patient had an improvement in symptoms after 1 year of statin and dual antiplatelet therapy.

Conclusion

In conclusion, CAA is a rare condition that has been theorized to occur as a result of increased intravascular inflammation. We report a unique case of CAA occurring in a patient with PRS. We believe this case highlights a possible causal association of inflammation in CAA as well as in PRS.

Lead author biography

Dr Andrew Mehlman is a resident physician currently training at the University of South Florida Internal Medicine programme in Tampa, FL, USA. He received undergraduate education at Emory University prior to his doctorate training at University of South Florida.

Supplementary material

Supplementary material is available at European Heart Journal - Case Reports online.

Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as Supplementary data.

Consent: The author(s) confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: none declared.

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