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Woven Coronary Artery Anomaly - A Case-Based Insight

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Abstract: ***Woven coronary artery anomaly is an extremely rare congenital condition characterized by the appearance of multiple thin channels or tunnels within the coronary artery that rejoin distally to form a single lumen. It is typically asymptomatic and benign but can sometimes mimic pathologies such as spontaneous coronary artery dissection (SCAD) or recanalized thrombus. This paper discusses a clinical case with detailed imaging and management approach, highlighting the diagnostic challenges and therapeutic decision-making involved.***

Keywords: woven coronary artery anomaly, congenital heart condition, spontaneous coronary artery dissection, diagnostic challenges, therapeutic decision-making

1. Introduction and Case History

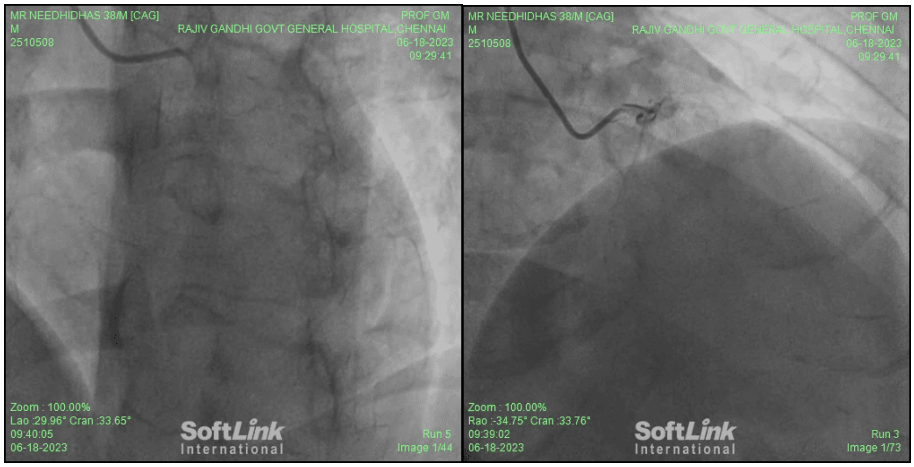
Patient Presentation

A 38-year-old male presented with a 2-day history of anginal chest pain. He was hemodynamically stable upon presentation.

ECG Findings: Normal sinus rhythm with a heart rate of 80 bpm, T wave inversion observed in leads V3 to V6.

Echocardiography: Revealed hypokinesia of the anterior wall and anterolateral wall of the left ventricle with an estimated ejection fraction (EF) of 44%.

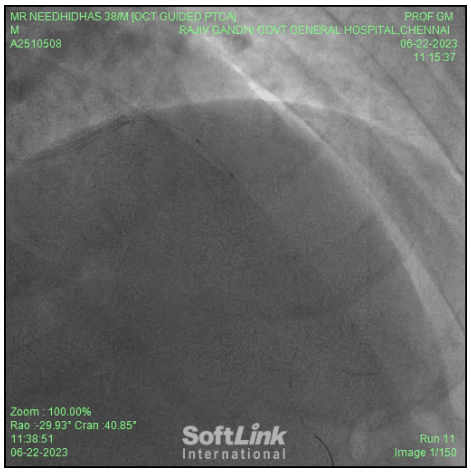
Initial Impression: A working diagnosis of possible coronary dissection was made, and the patient was scheduled for elective coronary angiography (CAG).



Procedural Challenges and Imaging Approach

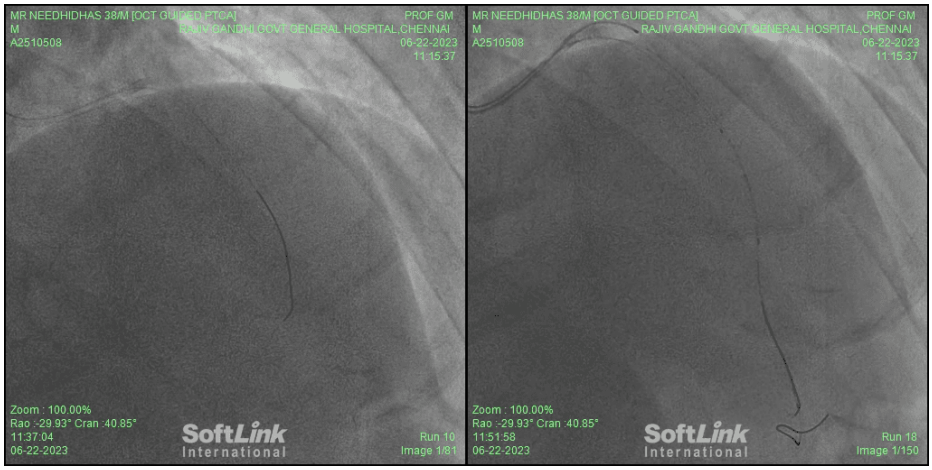
Angiographic Challenges:

During the coronary angiography, difficulty was encountered in advancing the balloon catheter across the lesion. This raised suspicion of an abnormal vessel anatomy or false lumen entry.



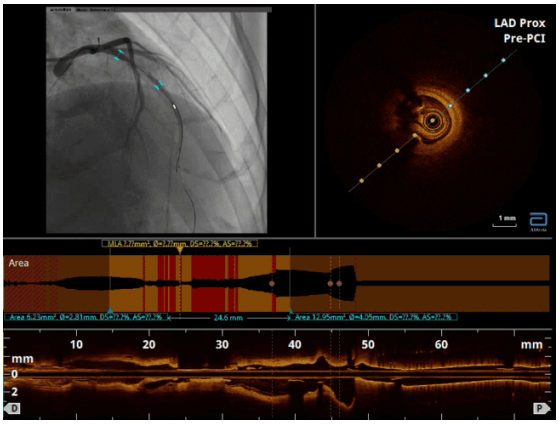
A guidewire appeared to enter a false lumen, complicating device delivery.

An imaging-guided percutaneous coronary intervention (PCI) was planned, but optical coherence tomography (OCT) wire also failed to advance beyond the lesion.

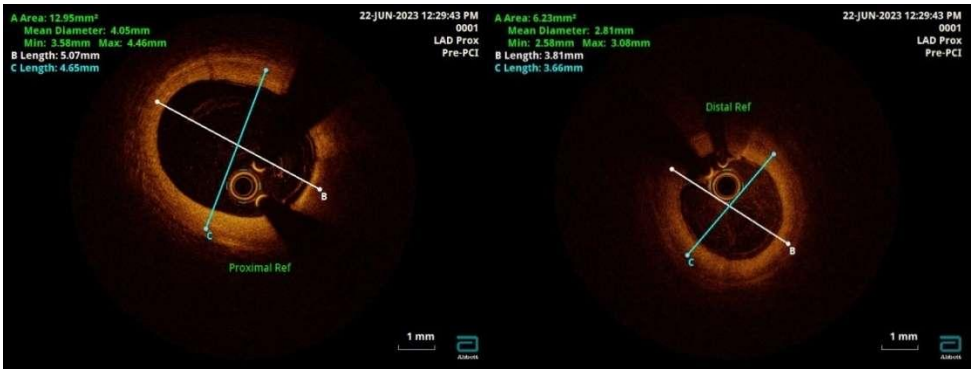


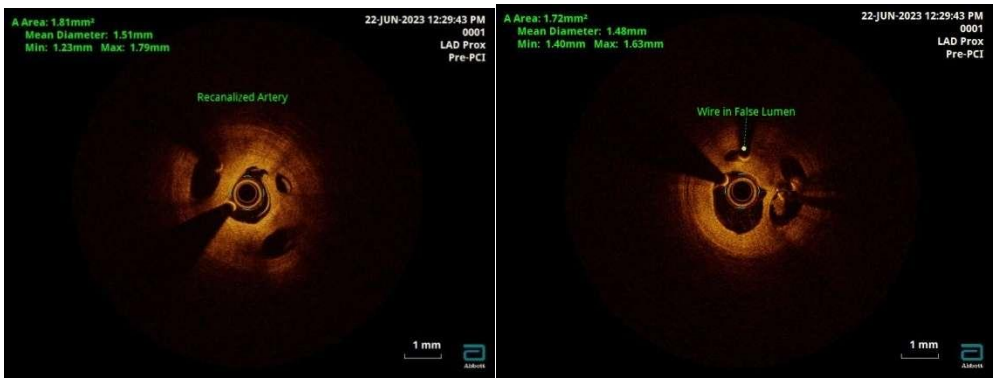
OCT Imaging and Diagnosis:

After careful manipulation and re-entry into what was presumed to be the true lumen, a successful OCT run was performed.



Findings: The OCT images revealed a segment resembling multiple fine channels separated by thin septa, giving an appearance akin to a braided or woven structure.





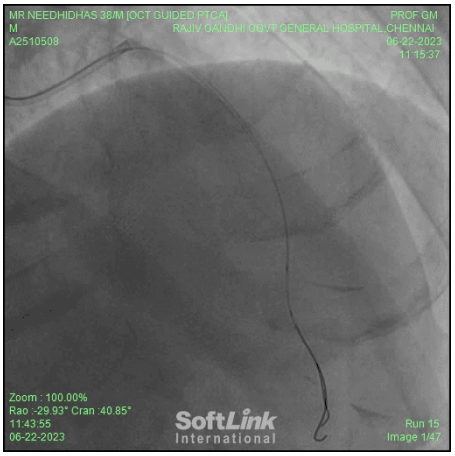
This morphology strongly suggested a woven coronary artery anomaly rather than dissection or thrombus.

Differential Diagnoses Considered:
Recanalized thrombus: Usually shows organized thrombus with multiple channels but lacks the uniformity of woven vessels.

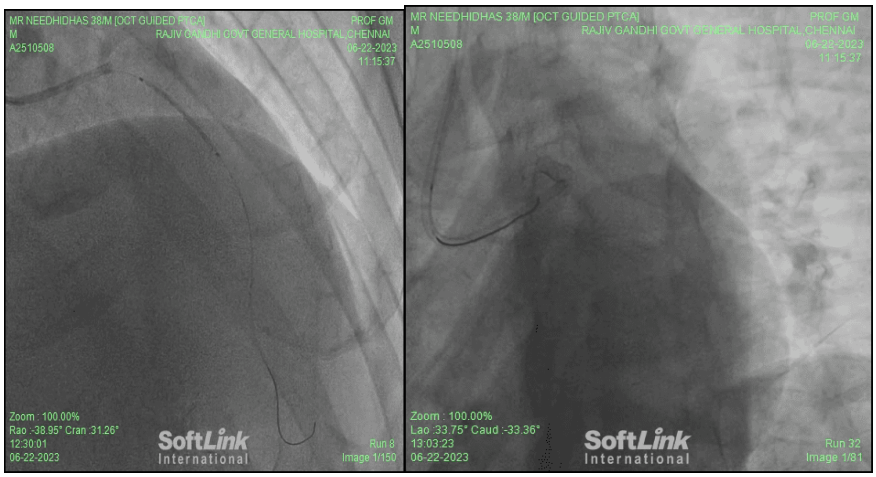
Spontaneous coronary artery dissection (SCAD): Typically shows flap and false lumen but not the braid-like structure.

Bridging collateral vessels: Usually seen in chronic occlusions and differ in course and structure.
Management and Outcome

Intervention Performed:
Once true lumen confirmation was achieved:

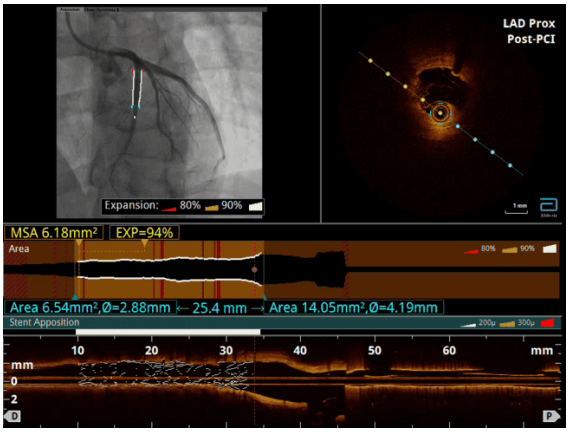


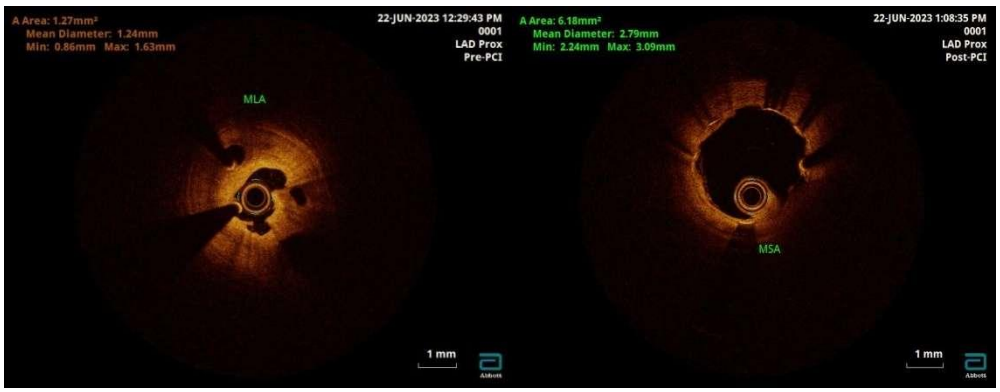
PTCA was performed on the proximal left anterior descending artery (LAD).



A 3.5 x 24 mm Everolimus-eluting stent (EES) was deployed.

Post-PCI Evaluation:





A repeat OCT run post-PCI confirmed excellent stent apposition and expansion.

Restoration of normal distal flow was noted.

No residual dissection or thrombus was identified.

Prognosis and Follow-up:
The patient had an uneventful recovery and was discharged on standard dual antiplatelet therapy.

Follow-up at 1 month showed symptomatic improvement and no adverse cardiac events.

Discussion and Take-home Points

What is Woven Coronary Artery Anomaly?

A rare congenital condition where a segment of the coronary artery splits into multiple small channels (resembling a hair braid) that reunite distally.

Histologically, all channels are true lumens with intact endothelium.

The anomaly is usually benign but can cause diagnostic confusion, particularly during acute coronary events.

Role of Imaging:
OCT (Optical Coherence Tomography) proves superior to IVUS in such cases due to higher resolution.
Helps differentiate between woven anomaly, SCAD, thrombus, and other vascular pathologies.

Take-home Messages:
Woven coronary artery anomaly should be considered in young patients with atypical angiographic findings and no atherosclerosis.

It may not compromise flow, but when symptomatic or confused with other pathologies, careful imaging and expert interpretation are essential.

- OCT plays a crucial role in diagnosis and guiding intervention.
- PTCA can be safely performed if true lumen wiring is confirmed.
- Prognosis is generally excellent with appropriate management.

2. Conclusion

Woven coronary artery anomaly, though exceedingly rare, poses a significant diagnostic challenge due to its close resemblance to other coronary pathologies such as SCAD, recanalized thrombus, or bridging collaterals. This case highlights the importance of maintaining a high index of suspicion when encountering unusual angiographic findings, especially in young patients without significant atherosclerotic burden.

Advanced intracoronary imaging modalities, particularly optical coherence tomography (OCT), play a pivotal role in correctly identifying the anatomical characteristics of such anomalies, guiding appropriate wire positioning and intervention strategy. When symptomatic or flow-limiting, percutaneous coronary intervention (PCI) can be performed safely, provided the wire is confirmed in the true lumen.

Timely diagnosis and tailored management not only avoid misinterpretation and potential complications but also ensure favorable outcomes. As awareness and recognition of this anomaly increase, clinicians can avoid unnecessary interventions and provide more accurate patient care.