

Title: Left Internal Mammary Artery Side Branch Steal Phenomenon Treated with Covered Stenting

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Background:

Left internal mammary artery (LIMA) side branches (SBs) supplying the chest wall are usually ligated at the time of bypass surgery. Patent SBs may cause ischemia by diverting blood flow from the heart, known as LIMA-SB steal phenomenon. We report two cases treated with a novel use of the Papyrus covered stent (Biotronik); increased LIMA flow was documented by Doppler flow wire.

Case Series:

Case 1: 63-year-old male with LIMA graft to the left anterior descending (LAD) coronary artery presented with angina; stress testing showed anterior-antrolateral ischemia. Angiography revealed a large LIMA SB. Doppler coronary flow measurements (CombWire, Philips) in the LIMA distal to the SB showed baseline average peak velocity (APV) of 6 cm/s. SB balloon occlusion increased LIMA APV to 12 cm/sec. A 3.0x15 mm Papyrus covered stent was deployed in the LIMA across the SB ostium. Final LIMA APV was 13cm/sec. The patient remained angina-free at 1-year follow-up.

Case 2: 72-year-old-male with LIMA-LAD graft presented with angina; stress testing showed anterior ischemia. Angiography revealed a large LIMA SB. Doppler coronary flow in the LIMA distal to the SB showed baseline APV 12 cm/s. SB balloon occlusion increased LIMA APV to 24 cm/s. A 2.5x15 mm Papyrus covered stent was deployed in the LIMA across the SB ostium. Final LIMA APV was 22 cm/s. The patient remained angina free at 1-month follow-up.

Discussion:

LIMA-SB steal phenomenon occurs because coronary resistance exceeds peripheral arterial resistance, thereby shunting blood to the lower pressure periphery. Increased LIMA flow with SB balloon occlusion confirms steal, justifying SB exclusion. Papyrus is a cobalt-chromium stent with siloxane-based polyurethane covering approved for perforations. Unlike coils/plugs, a covered stent yields complete, smooth coverage of the SB without risk of LIMA occlusion.

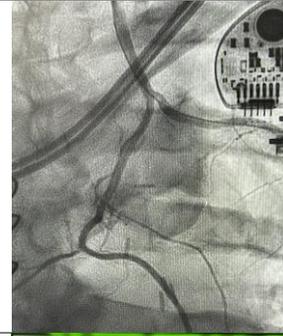
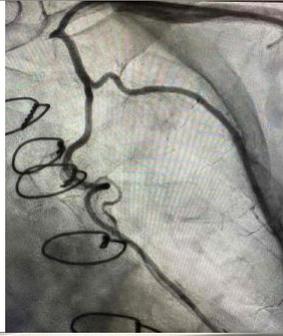
Conclusion:

Doppler flow-guided Papyrus covered stenting is safe and effective therapy for LIMA-SB steal phenomenon.

Case 1

Case 2

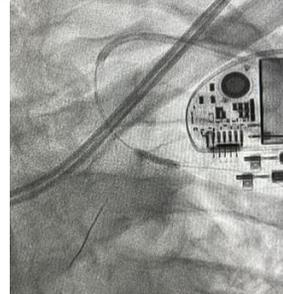
Initial Angiogram



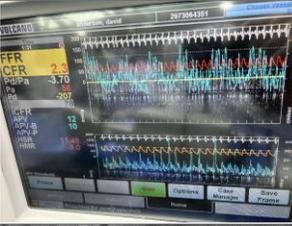
Rest Combo Wire Doppler



Angiographic Occlusion



Occlusive Combo Wire Doppler



Post Covered Stent Angiogram w/ Final Doppler



