

## CASE REPORT

## Quantitative assessment of the effect of subclavian steal syndrome on left anterior descending artery flow

### Subklavyen çalma sendromunun sol ön inen arter akımı üzerine etkisinin niceliksel değerlendirilmesi

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**Summary**– We presented a case of subclavian steal syndrome which has been evaluated and treated quantitatively by using fractional flow reserve technique. Treatment strategy to resolve symptoms of angina in patients with steal syndrome is controversial. Quantitative evaluation should direct choice of treatment strategy.

**Özet**– Fraksiyone akım rezervi tekniği kullanılarak niceliksel değerlendirilen ve tedavi edilen subklavyen çalma sendromu bulunan hasta sunuldu. Koroner çalma sendromu olan hastalarda anjina semptomlarının giderilmesi açısından tedavi stratejileri tartışmalıdır, tedavi stratejisinin seçimi nicel değerlendirmeye göre yapılmalıdır.

**I**nternal Mammary Artery (IMA) is the most potent graft for coronary artery bypass graft (CABG) surgery when compared to other saphenous grafts in terms of long-term graft patency rates. Coronary steal syndrome secondary to proximal stenosis of subclavian artery before IMA bifurcation has been well described; however, there are not enough data in the literature about effect of subclavian steal syndrome on coronary flow physiology.

The present case demonstrates that treatment of subclavian steal syndrome can regulate coronary flow reserve.

#### CASE REPORT

A 60-year-old male patient who had undergone CABG surgery (four vessel bypass graft) 5 years earlier was referred to our hospital with complaint of chest pain ongoing for 6 months despite medical treatment. Coronary angiography revealed that all bypass grafts were patent (aorta-right coronary posterior descending artery, aorta-right coronary posterolateral artery, aorta-circumflex obtuse marginal artery, left

IMA [LIMA]-left anterior descending [LAD] artery); however, flow was reversed at LIMA to LAD artery graft (Video 1\*). Subclavian artery angiography documented 90% stenosis of proximal subclavian artery (Video 2\*).

Percutaneous intervention to subclavian artery was planned, as well as fractional flow reserve (FFR) evaluation of LAD artery. LAD artery was cannulated with 6F JL4 guiding catheter and 60 IU/kg of unfractionated heparin was administered intravenously. A 0.014 FFR wire was advanced to distal segment of LAD artery. Basal FFR value was 0.87. FFR measurement at maximal hyperemia induced with intracoronary adenosine was recorded as 0.78 (Figure 1a).

Next, a 9.0x20 mm balloon-expandable bare metal stent was implanted in stenotic subclavian artery segment (Video 3\*). FFR reassessment of LAD artery after stent implantation was performed and determined basal FFR value of 0.95 and maximal hyperemic FFR

#### Abbreviations:

CABG	Coronary artery bypass grafting
FFR	Fractional flow reserve
IMA	Internal mammary artery
LAD	Left anterior descending
LIMA	Left internal mammary artery

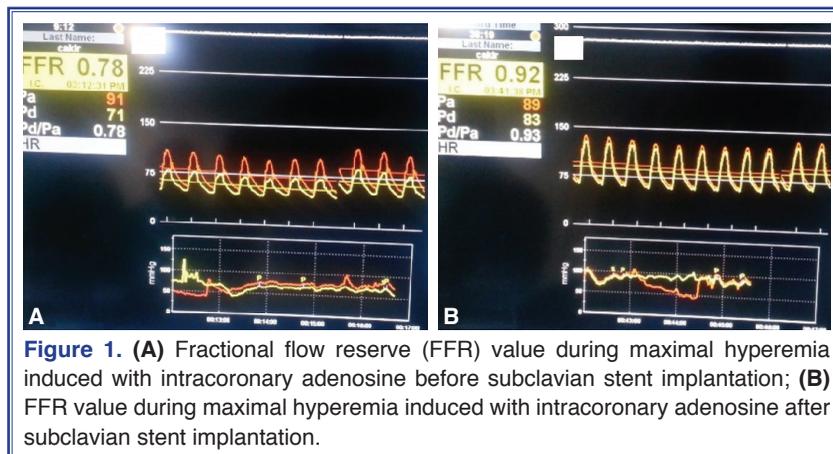
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of 0.92 (Figure 1b). Follow-up angiography indicated that reversed flow of LIMA to LAD graft had been corrected (Video 4\*). At 6-month follow-up, the patient remained symptom-free.

## DISCUSSION

LIMA to LAD artery conduit is the most widely used bypass graft. Subclavian artery stenosis, congenital anomalies of brachiocephalic artery, or open bronchial, intercostal or pericardial branches lead to steal syndrome. Myocardial ischemia and angina may occur as a result.

Treatment strategy to resolve anginal symptoms of steal syndrome, especially in case of open side branches of LIMA, is controversial. (1,2). In our case, cause of subclavian steal syndrome was subclavian artery stenosis. We treated the stenosis with percutaneous intervention and evaluated LAD artery flow at the same time. Effect of this treatment on LAD artery flow was demonstrated quantitatively.

In summary, we recommend quantitative evaluation of blood flow in patients with subclavian steal syndrome to determine treatment strategy.

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*\*Supplementary video file associated with this article can be found in the online version of the journal.*

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**Keywords:** Coronary artery bypass graft; coronary steal; subclavian artery stenosis.

**Anahtar sözcükler:** Koroner arter baypas grefti; koroner çalma; subklavya arter darlığı.