

## Anomalous origin of left internal mammary artery from distal subclavian artery

*Sol internal mammaryan arterin distal subklaviyan arterden çıkış anomalisi*

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The internal mammary artery arises from the first part of the subclavian artery. The left internal mammary artery (LIMA) is an excellent graft for myocardial revascularization of the left anterior descending artery. In this article, we describe a quite important variation of an anomalous origin of LIMA, which is rarely seen. In our case, LIMA was arising from the distal of the third part of the subclavian artery. Therefore, it is of utmost importance to perform LIMA angiography before coronary artery bypass grafting surgery.  
**Keywords:** Angiography; anomaly; left internal mammary artery.

The internal thoracic artery (ITA) arises from the inferior edge of the first part of the subclavian artery and then descends. The ITA, which was previously known as the internal mammary artery (IMA), a name still common among surgeons, is an artery which supplies the anterior chest wall and the breasts.

The IMA provides an excellent conduit for coronary artery bypass graft (CABG) surgery thanks to its low incidence of arteriosclerosis and excellent early and long-term patency. The IMA is of specific interest in cardiovascular surgery, as the left internal mammary artery (LIMA) is the graft of choice for myocardial revascularization of the left anterior descending artery (LAD).<sup>[1]</sup> However, in current clinical practice, IMA anomalies are uncommon and routine identification of the LIMA by selective angiography prior to surgery is not recommended by most clinicians, unless clinical symptoms suggest subclavian stenosis. However, it is of utmost importance to know its origin, course and branches preoperatively to tailor the surgical procedure for LIMA harvesting.

İnternal mammaryan arter subklaviyan arterin birinci kısmından çıkar. Sol internal mammaryan arteri (sol İMA) sol ön inen arterin miyokardiyal revaskülarizasyonu için mükemmel bir grefttir. Bu yazıda oldukça nadir gözlenen anormal çıkışlı sol İMA'nın oldukça önemli bir varyasyonu tanımlandı. Olgumuzda, sol İMA subklaviyan arterin üçüncü kısmının distalinden çıkmaktaydı. Bu yüzden, koroner arter baypas greft cerrahisi öncesi sol İMA anjiyografisinin değerlendirilmesi oldukça önemlidir.

**Anahtar sözcükler:** Anjiyografi; anomalisi; sol internal mammaryan arter.

Herein, we describe a rare variation of an anomalous origin of LIMA from the distal of the third part of the subclavian artery.

### CASE REPORT

A 56-year-old male patient presented with stable angina pectoris, weakness and exertional dyspnea of two-year history. He underwent CABG with the LIMA to LAD operation four years ago. The patient had no history of intra- and postoperative complications. He was a smoker and had concomitant hyperlipidemia as a risk factor. Physical examination and electrocardiographic findings were normal. His blood pressure was 130/80 mmHg. We performed coronary angiography based on the positive treadmill exercise test. Coronary angiography surprisingly showed LIMA which was arising from the distal of the third part of the subclavian artery (Figure 1). The distal anastomosis between LIMA and LAD was patent and other vessels were normal. The patient was discharged with medical therapy with beta blocker, aspirin, nitrate, and statin.

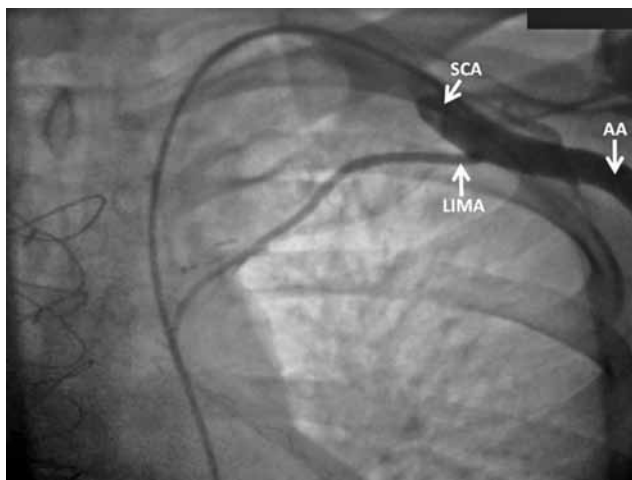


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**Figure 1.** Left internal mammary artery arising from the distal subclavian artery. SCA: Subclavian artery; AA: Axillary artery; LIMA: Left internal mammary artery.

## DISCUSSION

The LIMA arises from the inferior edge of the first portion of the subclavian artery and then descends. Previous studies reported various anatomical variations of the LIMA origin in angiography and cadaver dissection. Henriquez-Pino et al.<sup>[2]</sup> found that LIMA originated directly from the subclavian artery in 70% of 100 fresh adult cadavers and from a common trunk with other arteries in 30%. In their study, the LIMA arose from the first portion of the subclavian artery in 92% of patients, from the second portion in 7%, and from the third portion in 1%.<sup>[2]</sup> Anomalous IMA origin from the third part of the subclavian artery was also demonstrated in the literature in less than 1% of the cases, thus 0.78% in 769 specimens,<sup>[3]</sup> 0.83% in 60 cadaver (120 arteries).<sup>[4]</sup> Daseler and Anson<sup>[3]</sup> observed IMA with an abnormal origin in six of 769 arteries and only two of these variations were on the left side. Aziz and Ramsdale<sup>[5]</sup> described a case of LIMA originating from the third part of the left subclavian artery. This variation may also present as a bilateral origin of the IMA from the third part of the subclavian artery.<sup>[6]</sup> In our case, we describe a quite important variation of an anomalous origin of LIMA, which is rarely observed.

The LIMA is being used for revascularization of the myocardium in coronary artery diseases. However, plastic surgeons may use LIMA for autologous free flap reconstruction of the breast after mastectomy. Therefore, it is important to be aware of this rare variation concerning the LIMA.

Since anomalous origin of LIMA affects surgical technique and the outcomes, increasing the vessel injury risk during percutaneous subclavian catheterization, variations in LIMA anatomy are critical. Comprehensive diagnostic studies are needed to prevent surgical complications and clinical discomfort. Furthermore, if the LIMA used for CABG surgery arises from the third part of subclavian artery, the graft patency may be also reduced due to the vessel traction. During surgery, it is important to accurately identify the conduit length, course, and mobility of LIMA within the surrounding structures, thereby, traction and angulation can be avoided. Variations in LIMA may be undetected during surgical operations, may result in LIMA graft injury during harvesting, prolonged surgical times, or continued postoperative ischemia.

In conclusion, cardiologists should keep in mind the possibility of distal origin of LIMA when re-studying patients with postoperative symptomatology such as angina pectoris and exercise-induced dyspnea, since it may induce reduced flow rate due to traction, angulation, mobility and conduit length. Therefore, it is of utmost importance to perform preoperative LIMA angiography before CABG surgery on a regular basis.

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## REFERENCES

1. Erdil N, Nisanoğlu V, Kaynak M, Eroğlu T, Berat CH, Aydın N, et al. Usage of internal thoracic artery and radial artery T graft in patients undergoing coronary surgery. *Turk Gogus Kalp Dama* 2008;16:80-5.
2. Henriquez-Pino JA, Gomes WJ, Prates JC, Buffolo E. Surgical anatomy of the internal thoracic artery. *Ann Thorac Surg* 1997;64:1041-5.
3. Daseler EH, Anson BJ. Surgical anatomy of the subclavian artery and its branches. *Surg Gynecol Obstet* 1959;108:149-74.
4. Vorster W, du Plooy PT, Meiring JH. Abnormal origin of internal thoracic and vertebral arteries. *Clin Anat* 1998;11:33-7.
5. Aziz S, Ramsdale DR. Anomalous origin of left internal mammary artery. *J Invasive Cardiol* 2003;15:657-8.
6. Omar Y, Lachman N, Satyapal KS. Bilateral origin of the internal thoracic artery from the third part of the subclavian artery: a case report. *Surg Radiol Anat* 2001;23:127-9.