Diagn Interv Radiol 2026; DOI: 10.4274/dir.2026.264117

INTERVENTIONAL RADIOLOGY

TECHNICAL NOTE

The Simmons-lock technique: a simple solution for stable left gastric artery engagement

Ömer Faruk Sevinç[1]
Erbil Arık[2]
Onur Taydaş[3]
Muhammed Said Beşler[4]

[1]Kocaeli City Hospital, Clinic of Radiology, Kocaeli, Türkiye

[2]Marmara University Faculty of Medicine, Department of Radiology, İstanbul, Türkiye

[3]Sakarya University Faculty of Medicine, Department of Radiology, Sakarya, Türkiye

[4]İstanbul Medeniyet University Faculty of Medicine, Department of Radiology, İstanbul, Türkiye

Catheterization of the left gastric artery (LGA) is often challenging due to acute angulations that compromise catheter stability. We describe the Simmons (SIM)-lock technique, a novel approach using a standard 5-Fr SIM-1 catheter and a coaxial microcatheter. The microcatheter is first advanced into a distal branch to serve as an anchor, allowing the SIM1 catheter to be deep-seated within the celiac trunk. Upon removal of the microcatheter, the SIM1 catheter assumes its functional recurved shape, with the tip oriented cranially. A controlled pullback maneuver then causes the free tip to slide and lock securely into the LGA ostium. This method transforms a typically unstable engagement into a controlled, stepwise procedure, providing a stable platform for intervention while utilizing standard, cost-effective equipment.

KEYWORDS

Celiac trunk, common hepatic artery, left gastric artery, selective catheterization, Simmons catheter

Catheterization of the left gastric artery (LGA) is a fundamental step in various interventional radiology procedures. Although it was initially indicated primarily for the management of upper gastrointestinal bleeding, selective LGA access has become increasingly necessary with the growing use of transarterial chemoembolization, transarterial radioembolization, and bariatric embolization procedures.[1-3]

The LGA often arises from the celiac trunk at an acute angle or follows a tortuous course. Navigating a guidewire and catheter from the celiac trunk into the LGA can be technically demanding. The challenges are twofold. First, advancing a coaxial microcatheter and guidewire into the LGA after engaging the celiac trunk can be difficult. Second, even after wire access is achieved, the diagnostic catheter may fail to advance over the coaxial system into the LGA or may not remain in a stable position. This instability poses considerable risks during the subsequent therapeutic phase (e.g., drug infusion or embolization).

Simple or complex curved catheters [e.g., Cobra, Shepherd Hook, or standard Simmons (SIM)] often fail to provide the stability or directional control required for this maneuver. A common technical failure occurs when the catheter prolapses into the aorta or disengages from the celiac trunk during attempts to advance a microcatheter or guidewire into the LGA.

To address this instability and streamline the procedure, we describe the SIM-lock technique. This technique incorporates several novel features, including the use of a coaxial system for anchoring support, the specific use of a SIM1 catheter, and a pullback maneuver performed after the diagnostic catheter has assumed its functional configuration within the celiac trunk. We present this technique as a universal approach for achieving stable and efficient catheterization of the LGA across a wide range of anatomic configurations.

Technique

The procedure was performed via standard common femoral artery access using a 5-Fr vascular sheath (Shoocin, Lepu Medical, Beijing, China). The steps of the SIM-lock technique were as follows (Figures 1 and 2; Video 1):

Handling editor: Bahri Üstünsöz

Corresponding author: Erbil Arık

E-mail: erbilarik@hotmail.com

Received 06 May 2026; revision requested 01 July 2026; accepted 04 June 2026.

Epub: 17.07.2026

Publication date:

DOI: 10.4274/dir.2026.264117

You may cite this article as: Sevinç ÖF, Arık E, Taydaş O, Beşler MS. The Simmons-lock technique: a simple solution for stable left gastric artery engagement.. *Diagn Interv Radiol*. 17 July 2026 DOI: 10.4274/dir.2026.264117 [Epub Ahead of Print].

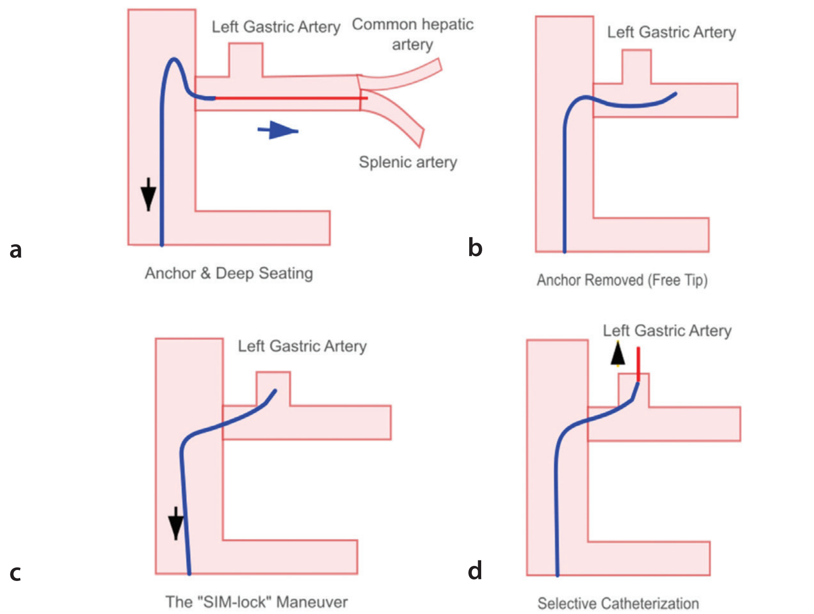

Figure 1. Schematic illustration of the stages of the Simmons (SIM)-lock technique. **(a)** Deep seating of the SIM1 catheter into the common hepatic artery using a coaxial microcatheter anchor. **(b)** Removal of the microcatheter anchor to release the catheter tip within the celiac trunk. **(c)** Engagement of the SIM-lock of the left gastric artery during the pullback maneuver. **(d)** Stable selective catheterization following reinsertion of the microcatheter. SIM-lock, Simmons-lock.

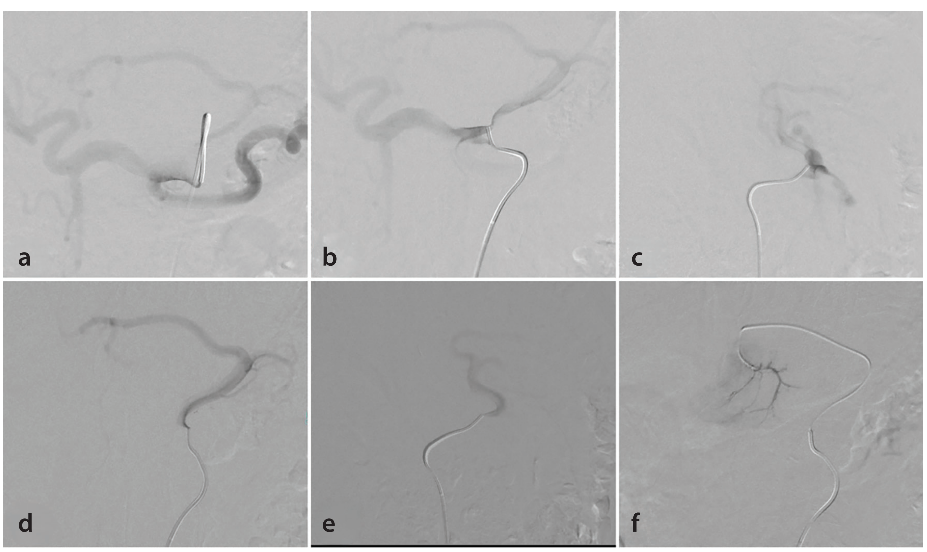

Figure 2. Angiographic demonstration of the Simmons (SIM)-lock technique in a patient with a replaced left hepatic artery originating from the left gastric artery who was scheduled for segment 3 transarterial radioembolization. **(a)** Celiac trunk cannulation. **(b, c)** Deep seating of the SIM1 catheter into the common hepatic artery over a coaxial microcatheter rail (AP and lateral projections). **(d, e)** Engagement of the SIM-lock of the left gastric artery during the pullback maneuver after microcatheter removal (anteroposterior and lateral projections). **(f)** Final stable access allowing distal microcatheter navigation. SIM-lock, Simmons-lock; AP, anteroposterior.

Main points

- A coaxial microcatheter anchor enables stable deep seating of the Simmons-1 catheter within the celiac trunk.
- Withdrawal of the free catheter leverages shape memory to securely lock the tip into the left gastric artery.
- This technique simplifies difficult access using standard, cost-effective equipment.

• **Celiac Trunk Cannulation:** SIM1 catheter (Angio-Clean; Taha Biomedical, Türkiye) was formed in the aortic arch using standard maneuvers to assume its functional curved configuration. The formed SIM1 catheter was then used to selectively catheterize the celiac trunk.

• **Establishing the Anchor:** A coaxial system (microcatheter and guidewire) was advanced through the SIM1 catheter into a stable distal branch (the common hepatic or splenic artery). This step provided distal anchoring of the system.

• **Deep Seating:** With the microcatheter anchored distally, gentle traction was applied to the SIM1 catheter to achieve deep seating within the celiac trunk.

• **Removal of the Anchor:** Once the SIM1 catheter was deeply seated and stable within the celiac trunk, the coaxial microcatheter was completely removed. This left the SIM1 catheter free, with its tip oriented cranially.

• **The SIM-Lock Maneuver:** The free SIM1 catheter was then gently withdrawn. As it slid back, the tip followed the superior wall of the celiac trunk. With continued withdrawal, the tip naturally "popped" into the LGA ostium. Contact between the catheter and the aortic wall, together with the catheter's shape memory, generated a locking force that secured the tip at the LGA origin. This stable engagement was referred to as the SIM-lock.

• **Selective Catheterization:** Once the SIM-lock had been achieved, the system provided a highly stable platform. A microcatheter could then be reinserted and advanced into the LGA to perform the intended intervention.

Discussion

The primary challenge in selective LGA catheterization is not merely accessing the vessel but maintaining stable catheter positioning for therapeutic intervention. In standard practice, the catheter tends to prolapse into the aorta during the deep-seating phase. The novelty of our approach lies in the safe, controlled deep seating of the SIM1 catheter within the celiac trunk, followed by a pullback maneuver of the formed catheter to achieve secure engagement at the LGA ostium. This technique therefore transforms standard maneuvers into a cohesive and reproducible protocol for stable catheter engagement. However, it is important to acknowledge that the effectiveness of this maneuver may be limited in cases of extreme anatomic variation, severe tortuosity, or advanced atherosclerotic disease.

Various diagnostic catheters are available for LGA catheterization, but the SIM1 catheter used in this technique offers distinct advantages. As a reverse-curved catheter, the SIM1 is inherently superior to simple angled (e.g., vertebral, multipurpose) or double-angled (e.g., Cobra) catheters for engaging the celiac trunk, which typically requires a withdrawal maneuver after the catheter has been reformed in the aorta.[4-6] Furthermore, compared with the widely used SIM2 catheter, the SIM1 has a shorter distal limb and a smaller radius of curvature.[7] This compact geometry is crucial because, when the proximal curve is straightened during the deep-seating maneuver, the entire SIM1 catheter remains contained within the celiac trunk. In contrast, the larger SIM2 catheter typically requires more space and carries a greater risk of herniating into the aorta during manipulation. Consequently, the SIM1 minimizes the risk of aortic prolapse and provides a more stable platform for LGA catheterization.

Footnotes

Conflict of interest disclosure

Onur Taydaş, MD, serves as Section Editor for Diagnostic and Interventional Radiology. He had no involvement in the peer review of this article and had no access to information regarding its peer review. The other authors declared no conflicts of interest.

Video 1. Angiographic demonstration of the Simmons (SIM)-lock technique. The video illustrates initial deep seating of the SIM1 catheter into the common hepatic artery over a coaxial microcatheter anchor, followed by complete removal of the microcatheter and a controlled pullback maneuver that results in stable engagement of the left gastric artery. Simmons-lock, SIM-lock.: https://youtube.com/shorts/K8gOemF928s

References

1. Prochaska JM, Flye MW, Johnsrude IS. Left gastric artery embolization for control of gastric bleeding: a complication. *Radiology*. 1973;107(3):521-522. **[Crossref]**
2. Syed M, Efridi W, Khan T, Deek F, Kurian M, Shaikh A. A novel approach to catheterizing the left gastric artery for bariatric embolization. *Radiol Case Rep*. 2021;16(11):3574-3576. **[Crossref]**
3. Cherian MP, Mehta P, Kalyanpur TM, Hedgire SS, Narsinghpura KS. Arterial interventions in gastrointestinal bleeding. *Semin Intervent Radiol*. 2009;26(3):184-196. **[Crossref]**
4. Ojha V, Raju SN, Deshpande A, Ganga KP, Kumar S. Catheters in vascular interventional radiology: an illustrated review. *Diagn Interv Radiol*. 2023;29(1):138-145. **[Crossref]**
5. Berman HL, Cornell TJ. A technique for reforming the Simmons curved cerebral catheters. *AJR Am J Roentgenol*. 1982;139(4):824. **[Crossref]**
6. Hadley C, Srinivasan V, Burkhardt JK, et al. Forming the simmons catheter for cerebral Angiography and neurointerventions via the transradial approach-techniques and operative videos. *World Neurosurg*. 2021;147:e351-e353. **[Crossref]**
7. Pretorius ES, Solomon JA. Radiology Secrets Plus [Internet]. Philadelphia (PA): Elsevier Health Sciences; 2010. **[Crossref]**