

## Femoral vein cannulation passing through patent foramen ovale and injuring left atrial appendage: An unusual complication

*Femoral ven kanülasyonunun patent foramen ovaleden geçmesi ve sol atriyal apendiski yaralaması: Nadir bir komplikasyon*

Denyan Mansuroglu<sup>1</sup>, Kenan Sever<sup>1</sup>, Oguz Konukoglu<sup>1</sup>, Mehmet Balkanay<sup>1</sup>, Ali Dogan<sup>2</sup>

*Institution where the research was done:*

İstanbul Yeni Yüzyıl University Faculty of Medicine, Gaziosmanpaşa Hospital, İstanbul, Türkiye

*Author Affiliations:*

<sup>1</sup>Department of Cardiovascular Surgery, İstanbul Yeni Yüzyıl University Faculty of Medicine, Gaziosmanpaşa Hospital, İstanbul, Türkiye

<sup>2</sup>Department of Cardiology, İstanbul Yeni Yüzyıl University Faculty of Medicine, Gaziosmanpaşa Hospital, İstanbul, Türkiye

In a 42-year-old male patient who was scheduled to undergo minimally invasive direct coronary artery bypass (MIDCAB), left internal mammary artery (LIMA) was harvested with left anterior mini-thoracotomy in an appropriate position. A written informed consent was obtained from the patient. Anatomic landmarks were used to guide venipuncture and the Seldinger technique was applied to accomplish percutaneous cannulation of the femoral vein. During right femoral vein cannulation, hypotension and bradycardia developed. Once the pericardium was opened through thoracotomy, the pericardium was tense and hemorrhagic bleeding had occurred. Following femoral artery cannulation, operation was emergently converted to on-pump surgery. Emergency sternotomy was performed. Right atrium, vena cava superior and inferior, pulmonary artery and aorta were seemed to be clean; however, the left atrial appendage (LAA) was injured. Bicaval cannulation was applied. The right atrium was opened. It was observed that the cannula passed through patent foramen ovale (PFO) (Figure 1, Video 1) and pierced the LAA (Figure 2, Video 2). The left atrium was repaired and PFO was closed. The PFO was not noted on preoperative transthoracic echocardiography. Then, a three-vessel bypass was performed as

planned. There were no additional complications after the operation. The patient was transferred to the intensive care unit. He was discharged without any further problems.

Cannulation techniques are an essential component of minimally invasive cardiac surgery, and different cannulation technologies are currently available for different types of minimally invasive operations.<sup>[1]</sup> Many surgeons prefer to use femoral arterial cannulation, when there is no severe aortoiliac illness. A minor risk of embolization, ipsilateral limb ischemia, and retrograde aortic dissection exists with femoral artery cannulation.<sup>[2]</sup> Venous drainage for cardiopulmonary bypass is carried out through the femoral vein during a minimally invasive cardiac surgery. Since it aligns more straightly with the inferior vena cava, the right femoral vein is preferred. Complications of femoral vein cannulations are rather uncommon and include seroma and infection. However, more serious complications such as right ventricular perforation have been also reported.<sup>[3]</sup> To ensure the most optimal possible drainage, transesophageal echocardiogram (TEE) should be utilized to place the cannula tip in vena cava.<sup>[4]</sup> In our daily practice, we do not use TEE during MIDCAB. This is an important point for the prevention of such complication as in our case. To the best of our knowledge, no such complication has been

**Corresponding author:** Ali Dogan.

E-mail: drdali@hotmail.com

Doi: 10.5606/tgkdc.dergisi.2024.26110

**Received:** March 12, 2024

**Accepted:** June 17, 2024

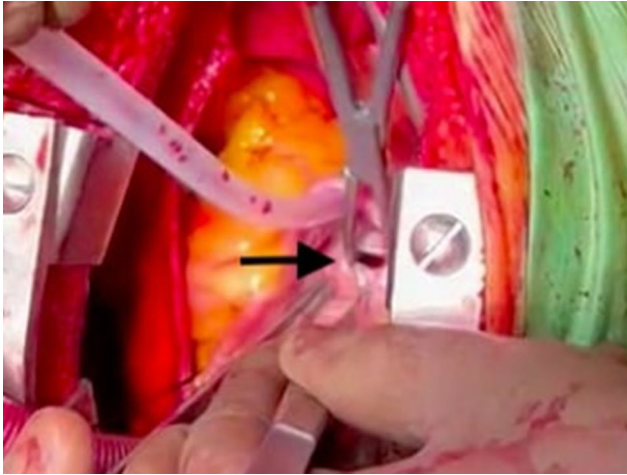
**Published online:** October 30, 2024

**Cite this article as:** Mansuroglu D, Sever K, Konukoglu O, Balkanay M, Dogan A. Femoral vein cannulation passing through patent foramen ovale and injuring left atrial appendage: An unusual complication. Turk Gogus Kalp Dama 2024;32(4):462-464. doi: 10.5606/tgkdc.dergisi.2024.26110.

©2024 All right reserved by the Turkish Society of Cardiovascular Surgery.



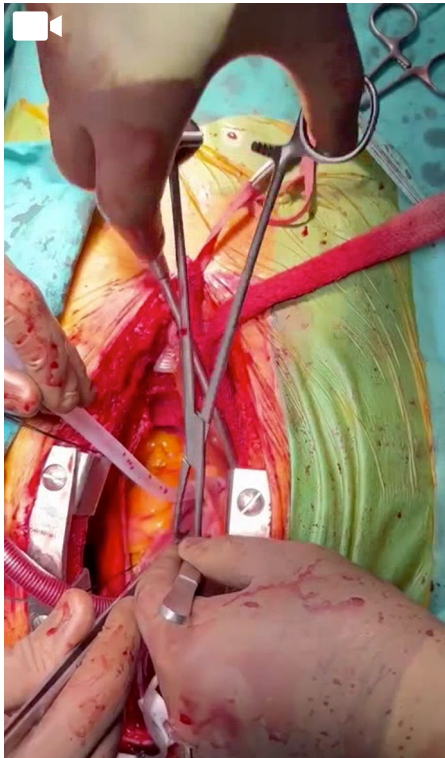
This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes (<http://creativecommons.org/licenses/by-nc/4.0/>).



**Figure 1.** Patent foramen ovale indicated by black arrow as an intraoperative image.



**Figure 2.** Rupture of left atrial appendage indicated by black arrow.



**Video 1.** Intraoperative view of patent foramen ovale through which cannula passed.



**Video 2.** Intraoperative view of damaged left atrial appendage showing free wall rupture.

reported in the literature. Finally, physicians should be cautious about this condition.

**Data Sharing Statement:** The data that support the findings of this study are available from the corresponding author upon reasonable request.

**Author Contributions:** Concept: M.B., K.S.; Design: M.B., K.S.; Data collection and processing: K.S, O.K.; Analysis or interpretation: A.D., D.M.; Literature search: A.D., O.K, D.M.; Writing: A.D., D.M.

**Conflict of Interest:** The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

**Funding:** The authors received no financial support for the research and/or authorship of this article.

## REFERENCES

1. Ramchandani M, Al Jabbari O, Abu Saleh WK, Ramlawi B. Cannulation strategies and pitfalls in minimally invasive cardiac surgery. *Methodist DeBakey Cardiovasc J* 2016;12:10-3. doi: 10.14797/mdcj-12-1-10.
2. Rupperecht L, Lunz D, Philipp A, Lubnow M, Schmid C. Pitfalls in percutaneous ECMO cannulation. *Heart Lung Vessel* 2015;7:320-6.
3. Passage J, Joshi P. Right ventricular perforation during femoral venous cannulation--lessons learned. *Heart Lung Circ* 2013;22:772-4. doi: 10.1016/j.hlc.2012.12.005.
4. Hemamalini P, Dutta P, Attawar S. Transesophageal echocardiography compared to fluoroscopy for aavalon bicaval dual-lumen cannula positioning for venovenous ECMO. *Ann Card Anaesth* 2020;23:283-7. doi: 10.4103/aca.ACA\_75\_19.