



A false aneurysm of internal mammary artery: A case report

İnternal mamaryan arterin yalancı anevrizması: Olgu sunumu

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ABSTRACT

A false aneurysm of the internal mammary artery is a very rare clinical entity. Early and accurate diagnosis and treatment of false aneurysms of internal mammary artery are critical, as it may result in rupture, severe bleeding, and even death. Currently, endovascular therapeutic approaches such as stenting and coil embolization have been considered the first-line treatment. Herein, we report a case of false aneurysm of the internal mammary artery in the light of literature data.

Keywords: Endovascular, false aneurysm, internal mammary artery, stenting.

ÖZ

İnternal mamaryan arterin yalancı anevrizması çok nadir bir klinik durumdur. Yırtılma, şiddetli kanama ve hatta ölüme neden olabileceği için, internal mamaryan arterin yalancı anevrizmalarının erken ve doğru tanısı ve tedavisi çok önemlidir. Stentleme ve coil embolizasyonu gibi endovasküler tedavi yaklaşımları günümüzde birinci basamak tedavi olarak kabul edilmektedir. Bu yazıda internal mamaryan arterin yalancı anevrizması olan bir olgu literatür verileri ışığında sunuldu.

Anahtar sözcükler: Endovasküler, yalancı anevrizma, internal mamaryan arter, stentleme.

A false aneurysm (FA) of the internal mammary artery (IMA) is an uncommon vascular abnormality which may be asymptomatic or present with symptoms such as chest swelling, pain, dyspnea or, more rarely, with an aneurysmal rupture.^[1,2] Computed tomography (CT), magnetic resonance imaging (MRI), or angiography can be employed for the establishment of the diagnosis. Once diagnosis is confirmed, surgical or endovascular treatment should be performed as soon as possible, since this condition may result in sudden ruptures and life-threatening hemorrhage.^[3]

Herein, we report a case of a FA of the IMA in the light of literature data.

CASE REPORT

A 47-year-old male patient was admitted to the cardiovascular surgery outpatient clinic with the existence of a FA of the left IMA, which was incidentally identified by a multi-slice CT scan. He was asymptomatic at the time of admission. In his medical history, following a blunt chest trauma six years ago, the patient was admitted with acute traumatic type 1 dissection and a modified Bentall procedure and diagonal saphenous bypass was performed at our center. The patient was, then, discharged without any complication and followed annually. At his final follow-up visit, a FA of the left IMA was detected by multi-slice computed tomography angiography

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Figure 1. A pre-interventional multi-slice computed tomography angiographic view of false aneurysm of left internal mammary artery.



Figure 2. A pre-interventional catheter angiographic view of false aneurysm of left internal mammary artery.

(CTA) after six years from surgery. Multi-slice CTA revealed a FA formation of the left IMA measuring a 10-mm diameter along with a 13-mm dilatation of the left main coronary artery button (Figure 1). The aorta was normal. Endovascular stent implantation for the treatment of FA of the left IMA and following the patient without any invasive intervention for the dilatation of the left main coronary artery button were decided. A written informed consent was obtained from the patient.

Using the standard femoral arterial approach, selective catheter angiography was performed and it was observed that the right coronary saphenous graft was patent. Selective catheterization and visualization of the left IMA was performed (Figure 2). Then, two 2.5×18 mm and 3×18 mm Aneugraft® Dx pericardium-covered stent grafts (ITGI Medical, Or Akiva, Israel) were placed to obliterate the aneurysm. Control angiography showed that the FA was successfully repaired and no contrast leakage into the aneurysmal sac was detected (Figure 3). Following the intervention, the patient recovered well without any complication and was discharged after a 36-h hospital stay.

DISCUSSION

False aneurysms or pseudoaneurysms are the leakage of the arterial blood from an artery into the



Figure 3. A post-interventional catheter angiographic view of false aneurysm of left internal mammary artery.

surrounding tissue with a persistent communication between the originating artery and the resultant adjacent cavity.^[4] The incidence of FA, particularly in the peripheral artery, has dramatically increased due to the significant increase of invasive diagnostic and therapeutic procedures, as well as blunt and penetrating injuries for the last decades.^[5] A FA of IMA is an extremely rare condition and was first described in 1973 by Martin et al.^[6] and, to date, few cases have been reported in the literature.^[1-3,6-10] In the etiology, a history of sternotomy,^[1-3,6] placement of a central venous catheter or pacemaker leads,^[1,7] chest injuries,^[7,8] and chest wall infections^[9] are responsible for the development of this rare vascular abnormality. In our case, the patient had both a history of blunt chest trauma and median sternotomy. While some cases may go unnoticed asymptotically, as in our case, others may present with parasternal swelling, atypical chest pain, rupture and life-threatening bleeding, hemothorax, and hemodynamic instability.^[1-3] One should suspect the diagnosis of a FA of the IMA, particularly in case of a parasternal mass.^[11]

Radiological imaging methods such as CT, MRI, and angiographic modalities including CTA, magnetic resonance angiography (MRA) and catheter angiography can visualize FAs of the IMA. Proper imaging method is selected based on several variables such as the cause of vascular damage, localization, size, and patient morbidity. Computed tomography and MRI are often utilized after a severe trauma for the determination possible related injuries. While CTA is a minimally invasive modality with catheterization of a vessel and injection of an iodine-rich contrast, MRA is non-invasive and is preferred in cases when a less invasive imaging tool is needed. In some cases, MRI or MRA is contraindicated; for instance, when a patient has foreign materials such as metal implants, clips, or a pacemaker inserted.^[7] Additionally, accurate delineation of localization and size of FAs of the IMA is also essential in terms of treatment planning. Kamath et al.^[12] reported that, among imaging methods, multi-slice CTA scan is favored for not only the diagnosis, but also the treatment of FAs of the IMA. In our case, the patient was asymptomatic, and a FA of the IMA was incidentally detected by multi-slice CTA after six years from the first operation.

When diagnosed a FA of the IMA, appropriate therapeutic modality should be chosen and applied as earlier as possible to avoid complications such as rupture and life-threatening hemorrhage.^[3] Open surgical repair,^[3,8,13] endovascular stent implantation,^[2,14] and coil embolization^[15] have been described as the

main treatment options for the treatment of FAs of the IMA in the literature. Open surgery is mostly preferred in the event of excessive hemorrhage secondary to rupture and is associated with certain complications including anesthesia-related complications, surgical site infections, hematoma, bleeding, prolonged recovery, and death. Therefore, endovascular therapeutic approaches have become more popular treatment options of FAs of the IMA due to minimally invasive nature, although long-term results are still lacking.^[16] The response of the question which endovascular approach, stenting or coil embolization is superior or should be preferred is often based on individual experience. That is, it can be simply stated that both endovascular stenting and coil embolization may be considered as the first option for the treatment of FAs of the IMA. Due to the fact that this vascular abnormality is extremely rare, no case series of FAs of the IMA is available and all available reported literature are case reports. In this context, in a small case series of 18 patients with traumatic injury of the IMA, 12 cases were treated with embolotherapy, two cases surgical ligation, and four patients were followed without any intervention.^[17] One patient in embolotherapy and two patients in the non-interventional therapy group showed late-term bleeding in this observational study. In our case, we preferred endovascular stenting as the treatment modality based on our experience, and the defect was successfully repaired using a covered stent.

In conclusion, tardiness or failure in the diagnosis and treatment of false aneurysms of the internal mammary artery may lead to rupture and mortality and, therefore, rapid and accurate diagnosis and treatment are indispensable. Endovascular treatment methods such as stent implantation should be applied in eligible cases, and it seems that the endovascular stenting is a safe and effective therapeutic option for the treatment of false aneurysms of the internal mammary artery in experienced hands.

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REFERENCES

1. Nasir A, Viola N, Livesey SA. Iatrogenic pseudoaneurysm of internal mammary artery: case report and literature review. *J Card Surg* 2009;24:355-6.

2. Nair SU, Patel NC, Cox DA. Endovascular repair of ruptured pseudoaneurysm of left internal mammary graft following redo aortic valve replacement and coronary artery bypass grafting. *JACC Cardiovasc Interv* 2015;8:3-5.
3. Yamashiro S, Kuniyoshi Y, Arakaki K, Inafuku H, Morishima Y, Kise Y. Post-sternotomy hemorrhage due to left internal thoracic artery pseudoaneurysm. *Asian Cardiovasc Thorac Ann* 2009;17:519-21.
4. Yuksel A, Nas OF, Kan II, Tok M, Erdogan C. Percutaneous coil embolization for the treatment of a giant brachial artery pseudoaneurysm in a child. *Ann Vasc Surg* 2017;45:266.
5. Balcı AE, Çakır Ö, Eren Ş, Özçelik C, Eren N. Diagnosis and treatment in pseudoaneurysms. *Turk Gogus Kalp Dama* 1999;7:324-7.
6. Martin A, Ross BA, Braimbridge MV. Peristernal wiring in closure of median sternotomy. False aneurysm of the internal mammary artery. *J Thorac Cardiovasc Surg* 1973;66:145-6.
7. Khorasani H, Eiberg J, Bigaard J. Idiopathic pseudoaneurysm in a patient with breast implants. *J Surg Case Rep* 2016;2016.
8. Grande AM, Cattadori B, D'Armini AM, Viganò M. Post-traumatic pseudoaneurysm of internal mammary artery: a case report. *G Chir* 2006;27:377-9.
9. Wani NA, Rawa IA, Pala NA, Kosar T. Pseudoaneurysm of internal mammary artery caused by pulmonary actinomycosis. *Br J Radiol* 2010;83:e235-8.
10. Balbay Y, Tikiz H, Demir D, Yelgec NS, Korkmaz S, Saritas A. Spontaneous false aneurysm of left internal mammary artery. *Int J Cardiol* 2001;81:269-70.
11. Falconieri F, Raevsky E, Davies S, Moat N. Pseudoaneurysm of a branch of left internal mammary artery: a late and potentially fatal complication after redo-sternotomy. *Interact Cardiovasc Thorac Surg* 2015;20:866-7.
12. Kamath S, Unsworth-White J, Wells IP. Pseudoaneurysm of the internal mammary artery as an unusual cause of post-sternotomy hemorrhage: the role of multislice computed tomography in the diagnosis and treatment planning. *Cardiovasc Intervent Radiol* 2005;28:246-8.
13. Datta S, Manoly I, Karangelis D, Hasan R. Pseudoaneurysm of the right internal mammary artery post vacuum-assisted closure therapy: a rare complication and literature review. *Ann Vasc Surg* 2016;31:207.e1-3
14. Cheung PK, Philipp RK, Freed DH. Endovascular stenting for treatment of a left internal mammary artery pseudoaneurysm following redo-sternotomy: a case report. *Catheter Cardiovasc Interv* 2013;82:778-81.
15. San Norberto EM, Cilleruelo A, Martin-Pedrosa M, Taylor J, Garcia-Yuste M, Vaquero C. Endovascular treatment of posttraumatic pseudoaneurysm of the internal mammary artery. *Ann Vasc Surg* 2014;28:743.
16. Heyn J, Zimmermann H, Klose A, Luchting B, Hinske C, Sadeghi-Azandaryani M. Idiopathic internal mammary artery aneurysm. *J Surg Case Rep* 2014;2014.
17. Whigham CJ Jr, Fisher RG, Goodman CJ, Dodds CA, Trinh CC. Traumatic injury of the internal mammary artery: embolization versus surgical and nonoperative management. *Emerg Radiol* 2002;9:201-7.