



**ANEURYSMORRHAPHY OF ISOLATED THROMBOSED SPONTANEOUS
AXILLARY ARTERY ANEURYSM – A CASE REPORT**

**Nina Apostolovska^{1,4}, Sallah Salihu^{1,4}, Aleksandra Simeonova^{1,4}, Andjela Vitanova^{2,4},
Antonio Georgiev^{3,4}, Nikola Gramatnikovski^{1,4}**

¹University Clinic for Thoracic and Vascular Surgery Skopje, Republic of North Macedonia

²University Clinic for TOARILUC Skopje, Republic of North Macedonia

³University Clinic for Cardiology Skopje, Republic of North Macedonia

⁴Faculty of Medicine, University "Ss. Cyril and Methodius" - Skopje, Republic of North
Macedonia

Correspondent author e-mail: nina_apostolovska@hotmail.com

Abstract

Introduction: Axillary artery aneurysms are rare findings. Iatrogenic or trauma-related pseudoaneurysms are more common than true aneurysms. Atherosclerotic and those linked to systemic inflammatory syndromes raises the possibility of thrombosis and embolic events to the upper extremity. Different surgical approaches can be performed, with preference of interposition with venous or synthetic grafts with distal thrombectomy, with hybrid and endovascular performed in certain cases.

Aim: The aim of this case report is to show the usage of aneurysmorrhaphy as a surgical technique in reconstruction of the proximal part of the right axillary artery aneurysm instead of interposition due to the inflammatory component and attachment of the brachial plexus to the inferior wall of the affected artery.

Case report: Male patient of 62 with loss of motoric and sensory response with progressively worsening pain over 24 hours on the palm and antebrachium was admitted in the ER. After primary diagnostic procedures, thrombosed isolated aneurysm of the right axillary artery with diameter of 1.8 cm x 2cm was found. Causative of the attachment of the brachial plexus to the posterior wall of the aneurysm, intraoperative finding, an aneurysmorrhaphy was performed. Postoperative ultrasonography showed trophasic waves on the brachial, ulnar and



radial artery, with regression of the motoric dysregulation and slight sensory loss on the tips of the fingers.

Conclusion: Minimizing further complications and restoring normal upper limb flow as soon as possible is the main concept of the surgical treatment. The salvage of the collateral circulation and nerves has a big impact to the patient outcomes. Surgical treatment should be optimized by the pathoanatomy and multifactorial nature of the disease. In our case we performed an aneurysmorrhaphy preserving brachial plexus.

Key words: *axillary artery, aneurysm, thrombosis, aneurysmorrhaphy.*

Introduction

Arterial aneurysms located in the upper extremity are not a common diagnosis, generally clinically asymptomatic (1). Upper limb ischemia originated from thrombotic process blocks the anterograde flow to the upper limbs. Most frequent cause of blockage are mural thrombus or atheroma located in the vessels wall. Axillary artery aneurysms are rare lesions. The majority are caused by iatrogenic or trauma-related pseudoaneurysms. Even more unusual are true aneurysms (2). Degenerative aneurysms as well as those linked to systemic inflammatory syndromes raises the possibility of thrombosis and embolic events to the implicated upper extremity. Brachial plexus compression and other mass effects do occur, and rupture with bleeding is a rare possibility (3, 4). The preferred surgical method is interposition with venous or synthetic grafts with distal thrombectomy. Hybrid and endovascular procedures can also be performed (5).

Aim

We report a case of surgical reconstruction of the proximal part of the right axillary artery aneurysm with axillar approach. Due to the inflammatory component and attachment of the brachial plexus to the inferior wall of the aneurysm a surgical aneurysmorrhaphy was performed instead of interposition with saphenous or vascular prosthesis.

Case report

A 62 year male patient was admitted in the emergency department with loss of motoric and sensory response in the palm and forearm in the last 24 hours. He was hypertensive, heavy

smoker with productive cough and clinical aspect of COPD. Absent radial, ulnar, brachial or axillary pulse, clinically presentative pallor and pain. An ultrasonography was performed followed by CT angiography identified thrombosed isolated aneurysm of the right axillary artery with diameter of 1.8 cm x 2cm (figure 1, 2, 3).

Figure1.

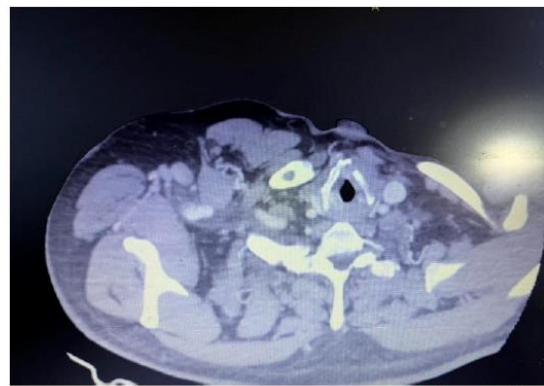


Figure 2.

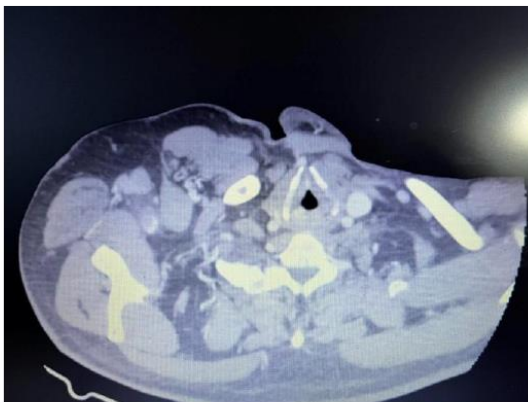


Figure 3.

Figure 1, 2, 3. CT angiography verified aneurysm of the right axillary artery in arterial phase.

Under general anesthesia, first axillary vein was pepped and divided from the artery. The distal and proximal aneurysm neck were located, and substantial attachment of artery posterior wall to the brachial plexus was found. The longitudinal arteriotomy and endarterectomy was



MIT UNIVERSITY
SKOPJE

performed. (Figure 4, 5). An aneurysmorrhaphy suture line was on a healthy arterial wall above the brachial plexus attachment to the aneurysm posterior wall (Figure 6).

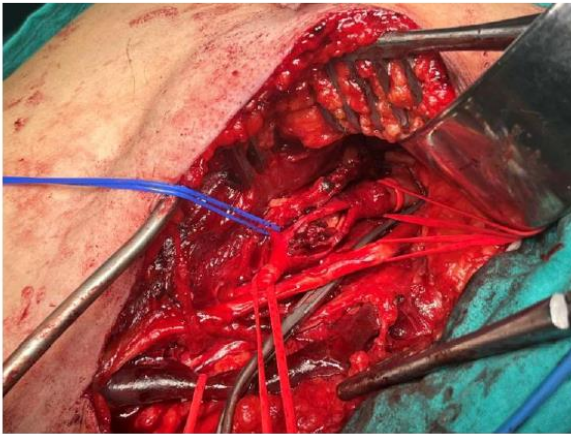


Figure 4. Intraoperative finding after arteriotomy



Figure 5, 6. The axillary artery after endarterectomy and after the suture of the arterial wall

Postoperatively the patient had pulse on all of the right arm arteries, verified by biphasic ultrasonographical wave. The palm restores normal motoric response with slight sensory dysregulation on the fingertips. The patient had LOHS of 5 days, with no further complications.



MIT UNIVERSITY
SKOPJE

Discussion

The rarity of axillary artery aneurysms is evident in large reviews of peripheral arterial aneurysms. The vast majority of cases are pseudoaneurysms caused by blunt or penetrating trauma (iatrogenic) (6, 7).

The size of the aneurysm, its precise anatomic location is all determined by arteriography, whether it is brachial plexus or distal vascular compromise. As a result, arteriography is the preferred diagnostic test when planning surgical intervention. The postoperative imaging is routinely done by color duplex sonography as quick, non-invasive, and safe in experienced hands (8-11).

Operative approach is finally determined on an individual basis, dependent on the patient risk factors, and aneurysm and artery anatomy and location, benefit from different approaches (11). Surgery as a primary treatment option for axillary artery aneurysms, regardless of whether pseudoaneurysms or true aneurysms (9). The fundamental idea behind arterial reconstruction was to use the shortest conduit possible to obtain normal circulation distally (5).

Aneurysmorrhaphy, described as reduction aneurysmoplasty, partial aneurysmectomy, or vessel wall recalibration, can be considered a suitable surgical plan for treating aneurysms of the upper limb, including the true axillary aneurysms. In our case aneurysmorrhaphy have been performed, with partial excision with longitudinal suture line, providing excellent arterial inflow. When this technique is performed is in order to salvage the biological arterial wall, lessen the percentage of infections, and obtain a homeostasis within the inflow and outflow of the vessel, sparing plexus brachialis (9-12).

The vast majority of upper limb aneurysms go undiagnosed until complications arise. Contingent on the multifactorial nature of the case, different types of treatment can be used, either surgical or hybrid procedure, and a different type of surgical approach can lead to different types of outcomes, most commonly distal embolization. Treatment includes resection and reconstruction, stent grafts, or exclusion and bypass surgery (5). We performed partial resection of the aneurysmal sac with longitudinal aneurysmorrhaphy above the contact line of the artery



MIT UNIVERSITY
SKOPJE

International Journal of Recent Research in Arts and Sciences

ISSN: 1857-8128

posterior wall and brachial plexus. Ballon catheter thrombectomy should be performed removing blood clots from distal arteries prior completion of the suture (7).

Conclusion

The primary goal of surgery reconstruction is to minimize further complications and restore normal upper limb flow as soon as possible. Protecting collateral circulation and nerves is vital to the final patient outcomes. The choice of the surgical treatment should always be optimized by the multifactorial nature of the disease and be patient based. In our case we choose to perform an aneurysmorrhaphy without causing damage of the brachial plexus.

References

- [1] Upper extremity arterial aneurysms: Etiology, management, and outcome, Aneurismas arteriales de extremidad superior: etiología, manejo y resultado- Metin Onur-Beyazl*, İbrahim Demir2, Emin Can-Ata3. 2022.
- [2] Laura Isabel Inga Távora, Giuseppe Corte, Jorge Bartolomé Cuenca Manteca, Bilateral axillary aneurysm repair by open surgery: A case report, Hellenic Journal of Vascular and Endovascular Surgery. 2023; 10.59037/hjves.v5i2.50, (63-64).
- [3] Sher-lyn Tham, Yuxin Guo, Maria Cui-Ying Pang, Jack Kian Chng, Surgical Management of Axillary Artery Aneurysms with Endovascular Stenting versus Open Repair: A Report of Two Cases and Literature Review, Annals of Vascular Surgery. 2019; 10.1016/j.avsg.2018.11.010, 58, (385.e11-385.e16).
- [4] Richard J. Gray, William M. Stone, Richard J. Fowl, Kenneth J. Cherry, Thomas C. Bower. Management of true aneurysms distal to the axillary artery. Journal of Vascular Surgery. 1998; Volume 28, Issue 4:606-610.
- [5] Senarlan DA, Yildirim F, Tetik O. Three Cases of Large-Diameter True Brachial and Axillary Artery Aneurysm and a Review of the Literature. Ann Vasc Surg. 2019;57:273.e11-273.e15. doi: 10.1016/j.avsg.2018.08.100. Epub 2018 Nov 27. PMID: 30496904.
- [6] Correia M, Antunes L, Gonçalves Ó. Aneurysms of the Upper Limb: Review of an Experience. Rev Port Cir CardioracVasc. 2017;24(3-4):152. PMID: 29701383.



MIT UNIVERSITY
SKOPJE

- [7] Irwin V. Mohan, Michael S. Stephen, Peripheral Arterial Aneurysms: Open or Endovascular Surgery?, *Progress in Cardiovascular Diseases*. 2013; Volume 56, Issue 1: 36-56.
- [8] Walter J. McCarthy, William R. Flinn, James S.T. Yao, Larry R. Williams, John J. Bergan. Result of bypass grafting for upper limb ischemia. *Journal of Vascular Surgery*. 2020; Volume 3, Issue 5, Pages 741-746.
- [9] Joseph H. Rapp, Linda M. Reilly, Jerry Goldstone, William C. Krupski, William K. Ehrenfeld, Ronald J. Stoney. Ischemia of the upper extremity: Significance of proximal arterial disease. *The American Journal of Surgery*. 2018.
- [10] McCready RA, Brown OW, Pairolero PC, Pluth JR, Hollier LH. Recurrence and rupture of an axillary artery aneurysm. *The American Surgeon*. 1982;48(5):241-242. PMID: 7081841.
- [11] Gallen J, Wiss DA, Cantelmo N, Menzoin JO. Traumatic pseudoaneurysm of the axillary artery: report of three cases and literature review. *J Trauma*. 1984;24(4):350-4. PMID: 6708159.
- [12] Gupta S, Lee DC, Goldstein RS, Villani R. Axillary artery aneurysm. *J Emerg Med*. 2005;28(2):215-6. doi: 10.1016/j.jemermed.2004.06.016. PMID: 15707819.