



URGENT SURGICAL REPAIR OF AN EXPANDING ARTERIOVENOUS FISTULA PSEUDOANEURYSM IN A PATIENT WITH MODERATE DILATED CARDIOMYOPATHY: A CASE REPORT

Ferizal Negeri Samudra ^{1*}, Niko Azhari Hidayat ², Elva Rahayuningtyas ³

¹ Faculty of Medicine, Universitas Hang Tuah, Surabaya, Indonesia

² Universitas Airlangga Hospital, Surabaya, Indonesia.

³ Kartini General Hospital, Indonesia

Corresponding Email: Ferizal Negeri Samudra; Faculty of Medicine, Universitas Hang Tuah, Surabaya, Indonesia; ferizal11ns@gmail.com

Article History :

Received date : 2026/06/17

Revised date : 2026/07/15

Accepted date : 2026/08/08

Published date : 2026/09/22



Copyright: © 2024 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (BY NC) license (<https://creativecommons.org/licenses/by-nc/4.0/>).

E-ISSN :

ISSN 3048-1368



P-ISSN

ISSN 3048-1376



ABSTRACT

Background: Arteriovenous fistula (AVF) pseudoaneurysms are critical complications demanding immediate evaluation. It is a medical emergency requiring prompt management, as conservative measures are inadequate for rapidly expanding masses due to the high risk of fatal haemorrhage.

Case description: A 54-year-old female presented to the emergency department with left arm pain and a rapidly enlarging 6 × 4 cm pulsatile mass over approximately one week. A functional AVF had been created 13 years prior. Point-of-care duplex ultrasonography confirmed a large pseudoaneurysm sac with active arterial inflow. Moderate dilated cardiomyopathy (ASA Physical Status Class III) necessitated rigorous preoperative multidisciplinary optimisation. Intraoperatively, temporary vascular control was achieved using proximal and distal sutures,

supplemented by a sterile gauze tourniquet. The pseudoaneurysm sac was entirely excised, and the arterial defect was closed via direct suturing. Permanent AVF ligation was performed due to local tissue compromise, and a pre-existing mature AVF in the contralateral right arm was immediately utilised for subsequent haemodialysis sessions. Postoperatively, the distal limb remained well-perfused with no clinical signs of acute ischaemia. During the early post-operative follow-up on day 9, the wound exhibited delayed healing with the surgical drain still *in situ*, after which the patient defaulted on scheduled appointments (lost to follow-up).

Conclusion: Symptomatic and rapidly enlarging AVF pseudoaneurysms may require prompt surgical assessment because of the risk of rupture. In this case, definitive surgical management was successfully performed despite significant cardiovascular comorbidity, with multidisciplinary perioperative management. Early postoperative follow-up showed delayed wound healing, but further assessment was limited by the patient's subsequent loss to follow-up.

Keywords: arteriovenous fistula, pseudoaneurysm, hemodialysis, vascular surgery.

INTRODUCTION

Arteriovenous fistula (AVF) pseudoaneurysms are a recognised iatrogenic complication in patients undergoing maintenance haemodialysis, primarily resulting from repetitive needle cannulation trauma.^{1,2} Progressive enlargement of these lesions poses a critical threat, as untreated expansion can precipitate life-threatening spontaneous rupture and fatal haemorrhage.^{2,3} Consequently, rapidly expanding pseudoaneurysms demand immediate surgical intervention.

However, a significant clinical dilemma arises when this surgical urgency must be balanced against substantial perioperative risks, particularly in patients with complex cardiovascular comorbidities. While the routine surgical management of AVF pseudoaneurysms is well-documented, literature addressing urgent interventions in high-risk cardiac patients remains limited.

Although surgical management of dialysis-access pseudoaneurysms has been described, the optimal approach depends on the size, rate of enlargement, anatomical involvement, and the need to preserve vascular access. A recent report described successful resection and ligation of a giant brachial artery pseudoaneurysm associated with haemodialysis access, followed by arterial reconstruction.⁴ In another report, Sorokin et al. described a rapidly enlarging $5 \times 5 \times 4$ cm arteriovenous fistula pseudoaneurysm that was managed with surgical reconstruction to preserve dialysis access.⁵ However, these reports primarily focused on surgical management of large or complex pseudoaneurysms, whereas the present case highlights the challenges of urgent surgical management of a symptomatic, rapidly expanding pseudoaneurysm arising from a long-standing 13-year arteriovenous fistula, with clinical features concerning for impending rupture in a patient with significant cardiovascular comorbidity.

CASE REPORT

A 54-year-old female presented to the emergency department with a sudden enlargement of a vascular mass over her left upper extremity that had progressed rapidly during the previous

approximately one week. The patient reported localised pain that was aggravated by direct pressure over the lesion. A functional arteriovenous fistula (AVF) had been created 13 years earlier for haemodialysis access. Her medical history was significant for chronic kidney disease requiring maintenance haemodialysis twice weekly, hypertension, and moderate dilated cardiomyopathy. While an objective left ventricular ejection fraction (LVEF) was not retrieved from the records, the patient exhibited classic clinical signs of heart failure, notably orthopnea upon lying down. Her daily medications included bisoprolol and isosorbide dinitrate. Physical examination revealed a 6 × 4 cm pulsatile mass with smooth margins, mild hyperpigmentation, and shiny, thinned overlying skin.

While distal pulses were not formally documented during the emergency admission, there were no clinical signs of acute limb ischaemia or neurological deficits. Given the impending risk of rupture, a brief, point-of-care duplex ultrasonography was performed in the operating theatre immediately prior to surgery. The imaging confirmed a large pseudoaneurysm sac with active arterial inflow, which precluded more extensive preoperative imaging such as CT angiography.

The patient's moderate dilated cardiomyopathy (ASA Physical Status Class III) necessitated comprehensive preoperative optimisation by the cardiology, internal medicine, and anaesthesiology teams. The procedure was subsequently performed under general anaesthesia. Intraoperatively, temporary vascular control was achieved using proximal and distal vascular control sutures, supplemented with a sterile gauze tourniquet to arrest pulsatile blood flow. Intraoperative exploration identified the vessels involved as brachial artery and basilic vein. The pseudoaneurysm sac was completely excised, revealing a pseudoaneurysm neck and primary arterial defect measuring approximately 8 mm in diameter. Due to the compromised state of the local tissues and the immediate risk of haemorrhage, AVF reconstruction was not considered technically suitable. The primary arterial defect was repaired by direct closure, and the associated vessels were securely ligated using heavy, black non-absorbable sutures (consistent with silk), resulting in the permanent closure of the AVF. The operative duration was within standard clinical timeframes, and the estimated blood loss was minimal, not necessitating blood transfusion. Because of the risk of active

bleeding, systemic anticoagulation was not given during the procedure. No thrombotic complications occurred during the perioperative period.

Permanent AVF ligation was deemed the safest and most definitive approach, especially given that the patient had a pre-existing, mature AVF in the contralateral right arm, which was immediately utilised for subsequent haemodialysis sessions. Histopathological examination of the excised sac was not performed due to institutional resource constraints. Postoperatively, the patient's left hand remained well-perfused with no clinical evidence of acute limb ischaemia or sensorimotor deficits. During the early post-operative follow-up on day 9, the surgical wound exhibited delayed healing with mild serosanguineous oozing, and the passive surgical drain remained in situ (Figure 5). Despite explicit medical advice to return for drain removal and further wound care, the patient subsequently defaulted on scheduled appointments (lost to follow-up), precluding the documentation of definitive wound closure.



Figure 1 - Preoperative clinical photograph of the left arm on Day 1. The image demonstrates a 6x4 cm expanding, swollen, and pulsatile mass located in the left cubital fossa. The overlying skin is thinned and hyperpigmented (asterisk), strongly indicating an impending rupture of the pseudoaneurysm.

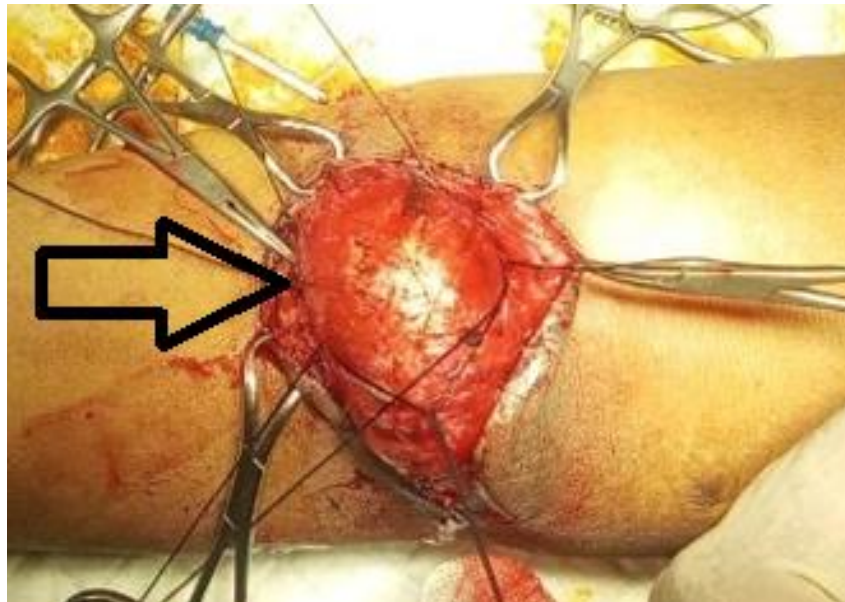


Figure 2 - Intraoperative photograph taken during surgical exploration of the left cubital fossa on Day 2. The pseudoaneurysm sac is exposed and isolated by haemostatic clamps (arrows) placed in situ. Despite lateral and medial ligation of the sac, persistent, active pulsation remains visible and palpable, indicating an unligated deep arterial connection or persistent collateral blood flow feeding the pseudoaneurysm sac.



Figure 3 - Post-resection Macroscopic and intraoperative findings on Day 2. (A) Resected
1321

fragments of the pseudoaneurysm sac wall (arrows). (B) Intraoperative view showing the exposed base of the pseudoaneurysm sac. Both images demonstrate significant macroscopic atherosclerotic changes and plaque formation (asterisks) within the pseudoaneurysm tissues.



Figure 4 - Immediate post-operative clinical photograph on Day 2. Following the pseudoaneurysm surgical repair, the surgical incision in the left cubital fossa (arrow) is closed with interrupted sutures, and a passive surgical drain is placed in situ to prevent post-operative hematoma accumulation.

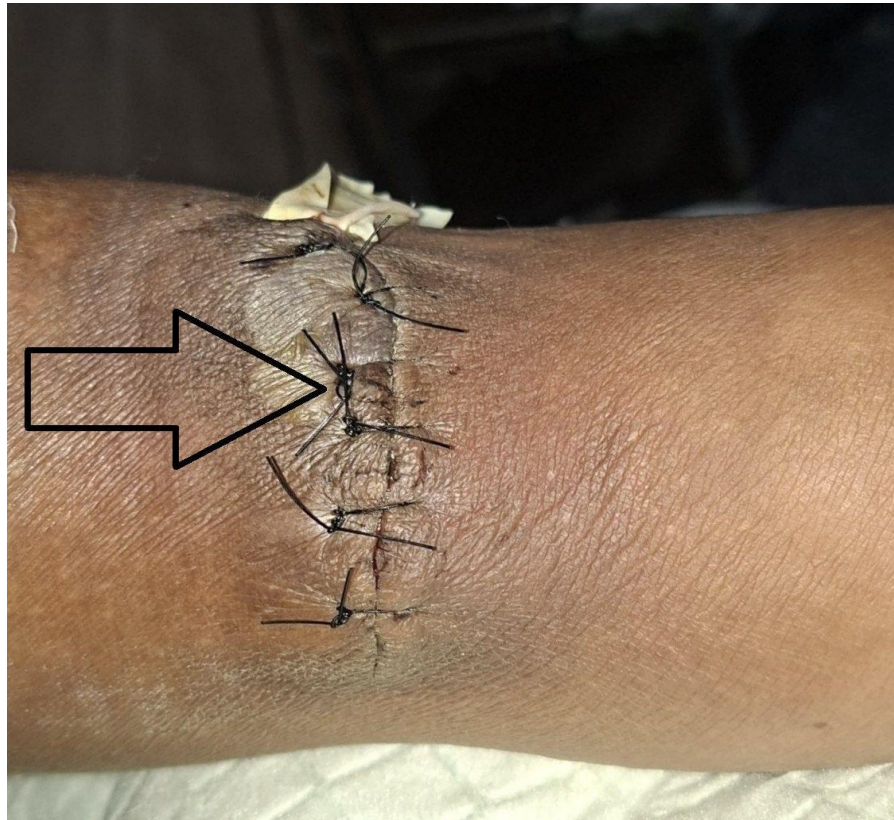


Figure 5 - Late post-operative clinical photograph taken during a follow-up on Day 9. The surgical wound in the left cubital fossa (arrow) exhibits delayed wound healing with mild serosanguineous oozing. The passive surgical drain remains in situ.

Table 1. Timeline of the patient's clinical course

Date	Day	Clinical Events, Investigations, and Interventions
June 9, 2026	Day 1	Presented with swelling and pain in the left cubital fossa. Examination revealed a 6 × 4 cm pulsatile mass. The patient was referred to the cardiothoracic and vascular surgery team and scheduled for urgent surgical repair of the pseudoaneurysm.

June 10, 2026	Day 2	Point-of-care duplex ultrasonography was performed in the operating theatre immediately before the planned surgical repair, confirming the presence of a saccular pseudoaneurysm.
June 11–12, 2026	Days 3–4	Postoperative care and close hemodynamic monitoring were performed due to the patient's underlying cardiomyopathy.
June 13, 2026	Day 5	Discharged in stable condition.
June 17, 2026	Day 9	The wound was cleaned, with the sutures left in place because healing was delayed. Mild serosanguineous discharge was noted, with no active bleeding or signs of infection. The patient was subsequently lost to follow-up.

DISCUSSION

The decision to proceed with urgent surgery was driven by the impending risk of rupture. Clinically, this was indicated by the rapid enlargement of the mass, increasing localised pain, and shiny, thinned skin overlying the lesion. These findings, supported by point-of-care duplex ultrasonography, led to immediate operative management rather than further observation. Pseudoaneurysms arising from arteriovenous fistulas (AVFs) are recognised long-term

1324

The International Journal of Medical Science and Health Research

complications of repeated cannulation and progressive degeneration of the vessel wall.^{4,6} They may develop several years after the initial creation of the access, as seen in this patient, whose AVF had remained functional for 13 years. Although pseudoaneurysms may initially be asymptomatic, this patient presented with clear local symptoms, including pain on pressure and a 6 × 4 cm pulsatile mass. The rapid enlargement of the mass over a two-week period was particularly concerning for progressive expansion and impending rupture. In keeping with previous reports, these findings supported the decision to proceed with urgent surgical intervention.^{4,7,8}

The need for urgent surgery was further complicated by the patient's moderate dilated cardiomyopathy, with an ASA Physical Status of III.⁹ This comorbidity placed the patient at increased perioperative cardiovascular risk.¹⁰ In line with recent perioperative guidelines recommending comprehensive management of high-risk patients,^{11,12} the patient underwent multidisciplinary optimisation involving cardiology, internal medicine, and anaesthesiology. This collaborative approach was used to reduce the perioperative risk while allowing the necessary surgical intervention to proceed.

During surgery, the pseudoaneurysm remained pulsatile despite initial proximal and distal vascular control. As the source of the persistent flow could not be confirmed intraoperatively, this raised concern that blood was still entering the pseudoaneurysm sac from an unidentified source. Further control with standard vascular clamps was difficult because of the distorted and fragile local tissue. A sterile gauze tourniquet was therefore applied as an adjunct to direct compression to achieve temporary haemostasis. This allowed adequate control of the operative field, enabling safe ligation of the involved vessels and excision of the pseudoaneurysm. Direct gauze compression has been described as an adjunct for controlling intraoperative vascular bleeding when conventional methods are insufficient.¹³ In this case, the gauze tourniquet provided a simple and practical solution to an unexpected intraoperative bleeding challenge.

Definitive surgical management consisted of pseudoaneurysm excision, primary arterial repair, and ligation of the AVF. The choice of procedure was based on the intraoperative tissue quality and the local anatomical conditions. Although a recent case report described successful

treatment of a selected arterial AVF pseudoaneurysm using ultrasound-guided manual compression,¹⁴ conservative management is not suitable for every patient. In the present case, the pseudoaneurysm had enlarged rapidly over approximately one week and showed features suggesting an impending rupture, making definitive surgical repair the most appropriate option. Preservation of the dialysis access was also considered. Current vascular access guidelines generally recommend preserving a functional AVF whenever feasible as part of long-term dialysis access planning.¹⁵ However, reconstruction was not considered technically appropriate in this case because of the poor local tissue condition and the immediate risk of haemorrhage. Permanent AVF ligation was therefore performed to achieve definitive haemorrhage control.

During the early postoperative period, the patient developed persistent arm oedema and serosanguineous wound drainage, without clinical evidence of infection. The wound remained incompletely closed and showed ongoing serosanguineous oozing, but there was no purulent discharge. These findings were consistent with delayed wound healing. Delayed wound healing is recognised in patients with chronic kidney disease undergoing haemodialysis and may be related to impaired tissue quality and the presence of multiple comorbidities.¹⁶

CONCLUSION

This case highlights the importance of early surgical assessment in patients with symptomatic AVF pseudoaneurysms, particularly when there is rapid enlargement and concern for rupture. In this patient, definitive surgical treatment was undertaken because of the rapid progression of the pseudoaneurysm and the local tissue condition. Despite the underlying cardiomyopathy, multidisciplinary perioperative management allowed the procedure to proceed safely. The pseudoaneurysm was successfully excised, with primary arterial repair and ligation of the AVF. At the first postoperative follow-up, the wound remained moist with mild serosanguineous discharge, so the sutures were left in place and the wound was managed conservatively. The patient did not return for further follow-up, limiting assessment of longer-term wound healing and limb outcome.

DISCLOSURE

Funding

The authors declare that no financial support was received for the research, authorship, and/or publication of this article.

Conflict of Interest

The authors declare that they have no conflicts of interest regarding the publication of this case report.

Author Declaration

The manuscript was edited using an English-language writing assistant software tool for language improvement, including grammar, spelling, and clarity. The authors created all scientific content, interpretations, and conclusions.

Author Contribution

FNS was responsible for data collection, literature review, and drafting of the manuscript. NAH served as the primary surgeon and supervising consultant, contributed to the conception of the case report, provided critical revision of the manuscript, and gave final approval of the version to be submitted. Both authors read and approved the final manuscript.

Acknowledgments

The authors would like to thank the Department of Thoracic, Cardiac and Vascular Surgery, Universitas Airlangga Hospital, Surabaya, Indonesia, for granting access to the clinical data used in this report. The authors also thank the patient for granting consent to the publication of this case.

Ethical Clearance

Written informed consent was obtained from the patient to publish this case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

Informed Consent

Written informed consent was obtained from the patient for publication of this case report and all accompanying clinical and intraoperative images.

REFERENCES

1. Sulistyaningsih NK, Lie ZY, Limanto DH. Iatrogenic pseudoaneurysm as a complication of hemodialysis vascular access: a descriptive study. *J Indones Vasc Access*. 2022;2(2):25-28. doi:10.51559/jinava.v2i2.23
2. Djajakusumah TM, Hapsari P, Nugraha P, Muhammad A, Lukman K. Characteristics of Vascular Access Cannulation Complications in End-Stage Kidney Disease Patients in West Java from 2018 to 2022: A Retrospective Observational Study. *Int J Nephrol Renovasc Dis*. 2024 Feb 12;17:47-58. doi:10.2147/IJNRD.S440467. PMID: 38370010
3. Khan AV, Nair S, Sailukar M, Javalekar P. Trauma-Induced Pseudoaneurysm of Hemodialysis Arteriovenous Fistulae: A Case Series and Surgical Management Outcomes. *Int J Med Pharm Res*. 2026;7(2). doi:10.5281/zenodo.19466085
4. Rahman NA, Wang A, Chihade DB, Feghali A. Giant 20 × 35 cm brachial artery pseudoaneurysm after fistulogram treated with surgical resection of pseudoaneurysm and patch angioplasty of brachial artery. *J Surg Case Rep*. 2024 Apr 2;2024(4):rjae213. doi:10.1093/jscr/rjae213
5. Sorokin A, Filippov A, Shmatov D. Complex reconstructive procedure for pseudoaneurysm in arteriovenous fistula: a clinical case. *J Vasc Access*. 2026 Mar;27(2):820-822. doi:10.1177/11297298251347092
6. Chaudhary A, Acharya S, Karmacharya RM, Lamsal A, Pokharel S, Bhatt S. Venous pseudoaneurysm of left brachiocephalic fistula treated by excision and aneurysmorrhaphy: a case report. *Int J Surg Case Rep*. 2022 Sep;98:107496. doi:10.1016/j.ijscr.2022.107496. Epub 2022 Aug 10. PMID: 36027828; PMCID: PMC9424355

7. Cirillo-Penn NC, Breite MD, Mendes BC. Impending arteriovenous fistula bleeding with skin ulceration. *Mayo Clin Proc.* 2022 Aug;97(8):1577-1580. doi:10.1016/j.mayocp.2022.05.032
8. Hanada H, Niiyama S, Hirata A, et al. Arteriovenous fistula pseudoaneurysm mimicking cutaneous neoplasm arising from a stenosed arteriovenous fistula. *J Plast Reconstr Surg.* 2024;4(1):38-40. doi:10.53045/jprs.2023-0065
9. Hendrix JM, Garmon EH. American Society of Anesthesiologists Physical Status Classification System. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Feb.
10. Thompson A, Fleischmann KE, Smilowitz NR, de Las Fuentes L, Mukherjee D, Aggarwal NR, et al; Peer Review Committee Members. 2024 AHA/ACC/ACS/ASNC/HRS/SCA/SCCT/SCMR/SVM Guideline for Perioperative Cardiovascular Management for Noncardiac Surgery. *Circulation.* 2024 Nov 5;150(19):e351-e442. doi:10.1161/CIR.0000000000001285
11. 2024 ACC/AHA guideline on perioperative cardiovascular management before noncardiac surgery: what's new? *Cleve Clin J Med.* 2025;92(4):213. doi:10.3949/ccjm.92a.24075
12. Murali K, Baliga R, Belani KG. Preoperative Cardiac Assessment in 2025: What Anesthesiologists Must Know. *ASA Monitor.* 2025 Dec;89(12):1,4. doi:10.1097/01.ASM.0001173484.78997.cc
13. Milosevic E, Forster A, Moist L, Rehman F, Thomson B. Non-surgical interventions to control bleeding from arteriovenous fistulas and grafts inside and outside the hemodialysis unit: a scoping review. *Clin Kidney J.* 2024 Mar 27;17(5):sfae089. doi:10.1093/ckj/sfae089
14. Beigh A, Mazumder MA. Successful treatment of a brachial artery pseudoaneurysm in a brachiobasilic arteriovenous fistula using ultrasound-guided manual compression. *J Ultrasound.* 2023;26(4):955-7. doi:10.1007/s40477-022-00701-3
15. Lok CE, Yuo T, Lee T. Hemodialysis Vascular Access: Core Curriculum 2025. *Am J Kidney Dis.* 2024. doi:10.1053/j.ajkd.2024.05.021

16. Sandepudi K, Shah KV, Melnick BA, Li RA, Ho K, O'Connor MJ, et al. Pathophysiology of Wound Development and Chronicity in Renal Disease: A Narrative Review. Int Wound J. 2025;22(7):1-11. doi:10.1111/iwj.70123