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Case Report

Management of an Elderly Patient Via Trans-Catheter Approach for a Post-Cardiac Surgery Aortic Pseudoaneurysm: A Case Report

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ABSTRACT

Pseudoaneurysm of the ascending aorta is a rare but dreadful complication following cardiac surgery and it has more chances of rupturing in elderly females. It occurs as a result of lengthy cardiopulmonary bypass time and associated degenerative changes in old patients. Due to the poor prognosis, early diagnosis and management of this complication is essential. Our case is of a 68-year-old female who developed a 44 mm large ascending aortic pseudoaneurysm 7 days after undergoing (coronary artery bypass grafting) CABG for long-standing. (Triple vessel coronary artery disease) TVCAD. The location of the pseudoaneurysm was found to be just above the vein graft to the RCA on (computerized tomography) CT-Aortogram. 2D-Echocardiography showed an Ejection Fraction of 45% and a 22 mm neck of the aneurysmal sac. Trans-catheter device closure was planned and the neck was successfully closed with no residual leak seen on (computerized tomography) CT-Aortogram performed after 3 days. However, she developed cardiac arrest during the device closure and even after successful resuscitation she went into a state of septic shock in the following weeks that did not respond to maximum medical treatment which unfortunately led to her death. A review of 3 similar cases of post-cardiac surgery aortic pseudoaneurysms which were successfully managed via trans-catheter device closure is also discussed. Early diagnosis and interventional treatment of post-cardiac surgery aortic pseudoaneurysms in elderly patients is necessary alongside very careful surgical technique while performing cardiac surgery to minimize the risk of aneurysm formation.

Keywords: Aortic pseudoaneurysms, Cardiac surgery, Trans-catheter device closure.

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INTRODUCTION

Ascending aortic pseudoaneurysm is a devastatingly rare complication following cardiac surgery and the chance of rupture is more common in old aged women[1,2]. Pseudoaneurysm of the ascending aorta can present as: continuous infection, embolism, hemorrhage, fistula, compression and erosion of adjacent structures.[3] The incidence of ascending aortic pseudoaneurysms (AAPs) is as low as 0.5%; however, a higher incidence rate of up to 13% was reported in a surveillance imaging series of patients after cardiac or aortic surgeries. The interval between the initial operation and the recognition of thoracic aortic pseudoaneurysms varies from 3 months to 8 years.[1,2]

These false aneurysms have a death rate from 6.7% to 60%,[4] and the areas where these pseudoaneurysms can be found following cardiac surgery are at anastomoses, aortotomy areas, cannulation venting areas or proximal vein graft anastomotic areas.[5] Prompt recognition through diagnosis and management is essential to counter the worst prognosis of this condition.[6] Cardiac surgery requires a lengthy cardiopulmonary bypass time and the need for inducing hypothermia and cardioplegia still adversely impact elderly patients who undergo age-related changes to vascular, neurological and renal systems.[7] The redo surgery requires lengthy and meticulous tissue dissection with significantly high mortality and morbidity. Trans catheter management of ascending aortic aneurysm is really a challenging, comprehensive and fascinating approach with excellent result and fewer complications.[8]

We describe a case of an elderly patient managed for a large aortic pseudoaneurysm that formed after coronary artery bypass grafting surgery and a review of similar cases that were managed via interventional approach.

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CASE REPORT

Our patient was a 68-year-old female who had a longstanding history of shortness of breath on exertion (NYHA Class–IV). She then underwent Coronary Artery Bypass Graft (CABG) for Triple Vessel Coronary Artery Disease (TVCAD). The operation was uneventful and she was discharged 7 days after the surgery. She remained stable at home initially and developed a high-grade fever (101°F) on the 20th postoperative day. She was then brought to our tertiary care cardiac institute where a CT-Aortogram was performed which showed a 44 mm large pseudoaneurysm arising from the ascending aorta just above the vein graft to the RCA (Figure-1A & 1B).

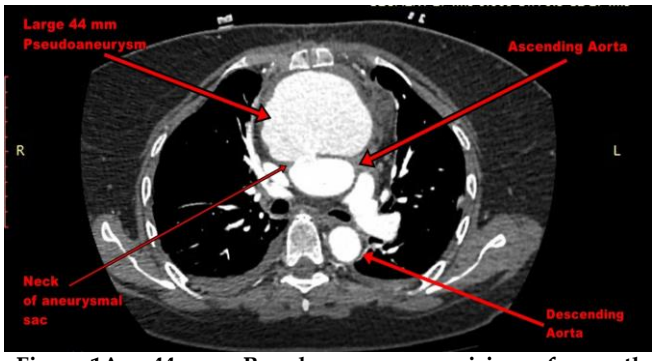


Figure-1A: 44mm Pseudoaneurysm arising from the Ascending Aorta just above the vein graft to the Right Coronary Artery

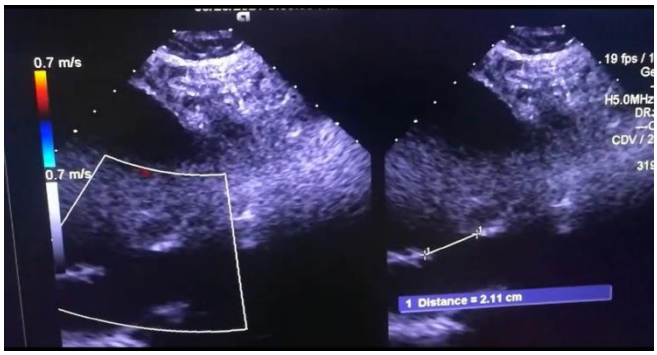


Figure-1B: 2D Echocardiogram showing an Ejection Fraction of 45% and a 22 mm measured neck of the Pseudoaneurysm

She was discussed immediately in MDT and advised to undergo trans catheter closure. Her TLC and CRP were raised and a blood transfusion was started after which she was shifted to the catheterization lab suit for intervention under general anesthesia. The ascending aorta angiogram showed a huge aneurysmal pouch with large defect (Figure-2A-3B). She had cardiac resuscitation during the procedure successful deployment of device.

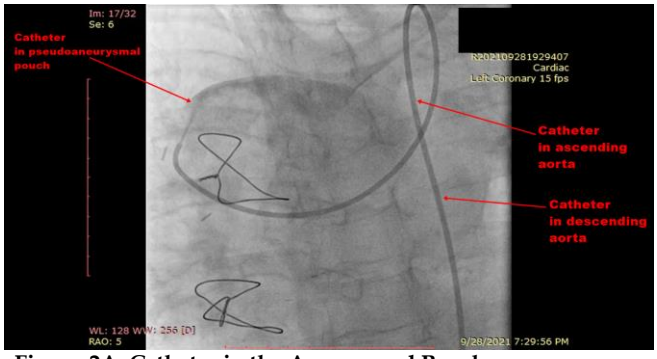


Figure-2A: Catheter in the Aneurysmal Pouch

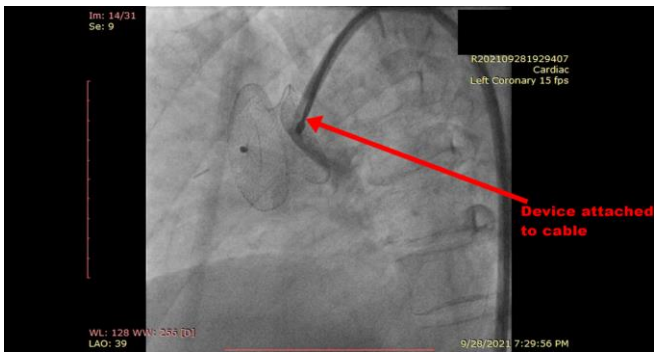


Figure-2B: Device in place to close the neck of the Aneurysm

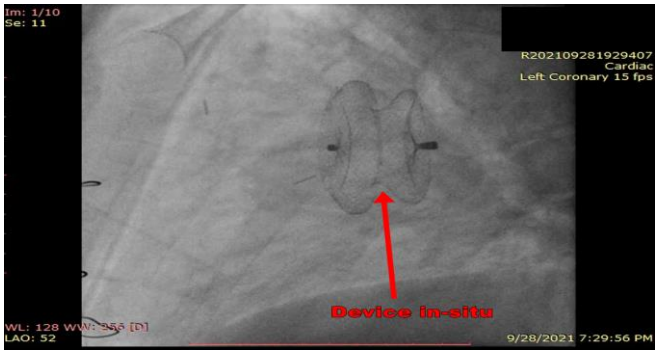
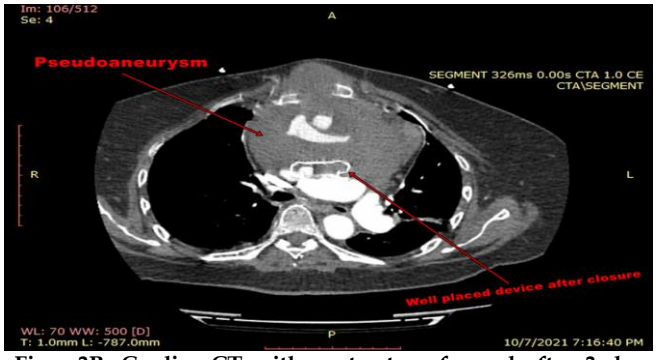


Figure-3A: Final position of the device in-situ after release



Figur-3B: Cardiac CT with contrast performed after 3 days of procedure is showing a well-placed device with no Residual Leak

She remained well during the next 2 weeks but her CRP level remained high at 130 mg/ml. After 4 weeks of indoor treatment she developed a small residual leak. The condition of the patient gradually deteriorated and she became pale due to a low Hemoglobin level of 8.5 g/dl, and developed petechiae all over the body. She was ventilated and acutely managed for septic shock but unfortunately she died after 4 weeks of device closure for the post-CABG aortic pseudoaneurysm.

DISCUSSION

We give an overview of some cases with different etiologies warranting cardiac surgery and all resulting in post-cardiac surgery aortic pseudoaneurysms. One case reported by Sadiq *et al*. was of a 24-year-old young girl who underwent successful trans-catheter device closure for an aortic pseudoaneurysm.[8] Similarly, Agarwal *et al.* reported one case of a slightly older 35-year-old male who also had an uneventful recovery after transcatheter repair of a large ascending aortic pseduoaneurysm.[9] Another case by Ray M. *et al.* was where device occlusion of a post-cardiac surgery large ascending aortic pseudoaneurysm of a much older 57-year-old male was accomplished.[10]

The lower morbidity of interventional procedures is a benefit, certainly in cases when the state of the patient eliminates surgical approach.[11]

For patients with a history of cardiac surgery, repeat thoracotomy imposes additive risks. The high morbidity and mortality rates associated with the surgical management of aortic pseudoaneurysms have led to the development of trans catheter approaches.[12]

Open-repair for aortic pseudoaneurysms is the standard management; however, the interventional approach should also be kept in mind. Although surgical repair is the conventional method of treatment, it is associated with a high mortality rate of 30% and a very poor prognosis.[13] But as stipulated by Amu *et al*. in his study, pseudoaneurysm repair can be effec-tively achieved through open or percutaneous repair but only after careful consideration of anatomical constraints, as well as patient comorbidities.[14]

However, there has not been much local research into the added benefit of transcatheter device closure for correction of an aortic pseudoaneurysm nor has it been compared with open surgical repair. Furthermore, meticulous surgical technique is essential while performing cardiac surgery in older individuals to minimize the risk of aneurysm formation alongside early diagnosis and management of an aortic pseudoaneurysm that develops.

Advanced age carries risk for degenerative vascular disease which predisposes to aneurysm formation, the cardiac surgery itself as well as post-operative infection which can explain why our patient developed an array of complications and succumbed to septic shock after device closure. Postoperative sternal wound complications should be taken into serious consideration and early referral to the cardiothoracic surgical unit is highly recommended.[13] In the other cases mentioned, the patients had a lesser age and were successfully managed for a post-cardiac surgery aortic pseudoaneurysm via trans-catheter device closure and were continuing with regular follow-ups. Owing to the successful repair, there were no complications in these cases which can be possibly attributed to the ages of the patients, types of cardiac surgeries that the patients underwent, the surgical techniques involved or associated health-related factors.

CONCLUSION

Transcatheter device closure is an attractive and newer modality for managing ascending aortic pseudoaneurysms. However, more studies need to be done focusing on the interventional management of post-cardiac surgery aortic pseudoaneurysms so that comparative studies can be done in various setups and the efficacy of transcatheter device closure can be established.

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Conflict of Interest: None.

Author Contribution

Following authors have made substantial contributions to the manuscript as under:

NS: Manuscript writing, concept and editing

AI: Intellectual contribution, concept and final approval

AS: Concept, manuscript writing and critical review

SM: Review of article, formatting and critical review

DK: Proof reading, Intellectual contribution, final approval

RM: Proof reading, interpretation and article finalization

UY: Final approval, proof reading and critical review

KA: Intellectual contribution, concept and final approval

RJ: Review of article, formatting and critical review

AS: Final approval, proof reading and critical review

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Ajay KD, Sunil A, Zvi Z, Jospeh NCJr. Pseudoaneurysms of the ascending aorta following coronary artery bypass surgery. J Card Surg 2006; 21(3): 221-224.
2. Pietro GM, Bart P, van P, Robin HH, Marc AAMS, WIM JM. Reoperations for aortic false aneurysms after cardiac surgery. Ann Thorac Surg 2010; 90(5): 1437-1443.
3. Chalijub BE, Bermudez YGJ, Del Sol BR, Napoles LME, Torres G. False aneurysm of ascending aortic cannulation site after cardiac surgery. Case report and literature review. Cor Salud 2019; 11 (3): 249-257.
4. Fernando AA, Jose LN, Lars GS, Pablo RV, Jingyuan F, Mariano EB, et al. Surgical treatment of pseudoaneurysm of the thoracic aorta. J Thorac Cardiovasc Surg March 2006; 132(1): 379-385.
5. Samuel A, Pedro B, Antonio RA, Alvaro LS, Nuno B, Jose F, Carlos R. Iatrogenic aortic pseduaneurysm: A forgotten complication. Revista Portuguesa de Cardiologia 2014; 33(2): 113-115.
6. Sven P, Ahmed MM, Mohammad AZ, Kabir T, John AR, Bulat AZ, et al. Elective surgery for ascending aortic aneurysm in the elderly: should there be an age cut-off? European J Cardio Thorac Surg 2017; 51(5): 965-970.
7. Nadeem S, Daud K, Mehboob S, Sohail A, Khurram A, Syed AAS. Management of huge ascending aortic pseudo-aneurysm with transcatheter device. Vascular Dis Ther 2018; 3(3): 4-4.
8. Mridul A, Mili R, Pallavi M, Supratim S, Debosree G, Pankaj J, et al. Device occlusion of pseudoaneurysm of ascending aorta. Ann Pediatr Cardiol 2011; 4(2): 195-199
9. Moosavi J, Ahmadi S, Firouzi A, Sadeghipour P, Mohebbi B, Shafe O, et al. Cardiac solution for a vascular scenario! CVIR Endovasc 2022; 5(1): 4–8.
10. Harky A, Khosravi A, Colledge J, Kolvekar S. Interventional repair of pseudoaneurysm of ascending aorta following prosthetic aortic valve replacement. BMJ Case Rep 2017; 2017: 3–5.
11. Stamou SC, Conway BD, Nores MA. Management of Aortic Pseudoaneurysms: Evolving Concepts and Controversies. Aorta 2020; 8(1): 1–5.
12. Scali ST, Waterman A, Feezor RJ, Martin TD, Hess PJ Jr, Huber TS, et al. Treatment of acute visceral aortic pathology with fenestrated/branched endovascular repair in high-surgical-risk patients. J Vasc Surg 2013; 58(1): 56-65.e1. doi: 10.1016/j.jvs.2012.12.043.
13. Kotelis D, Bischoff MS, Rengier F, Ruhparwar A, Gorenflo M, Böckler D. Endovascular repair of pseudoaneurysms after open surgery for aortic coarctation. Interact Cardiovasc Thorac Surg. 2016; 22(1): 26-31. doi: 10.1093/icvts/ivv297. Epub 2015 Oct 26.
14. Medical Advisory Secretariat. Endovascular repair of descending thoracic aortic aneurysm: an evidence-based analysis. Ont Health Technol Assess Ser 2005; 5(18): 1-59.