

Exclusion of an Iatrogenic Coronary Aneurysm on the Anterior Interventricular Artery Using a Covered Stent: A Case Report from the Montluçon Hospital Center

Wiyau Dieu-Donné Kaziga^{1*}, Yaovi Mignazonzon Afassinou², Sana Samoura¹, Soulemane Pessinaba³, Mahihude Pio⁴, Jean Bertrand Irakoze¹, Nouhoum Diallo¹, Sylvain Chanseume²

¹Cardiology Department, Montluçon Hospital Center, Montluçon, France

²Cardiology Department, Sylvanus Olympio Teaching Hospital, Lomé, Togo

³Cardiology Department, Campus Teaching Hospital, Lomé, Togo

⁴Cardiology Department, Kara Teaching Hospital, Kara, Togo

Email: *wiyaukaz@gmail.com

How to cite this paper: Kaziga, W.D.-D., Afassinou, Y.M., Samoura, S., Pessinaba, S., Pio, M., Irakoze, J.B., Diallo, N. and Chanseume, S. (2025) Exclusion of an Iatrogenic Coronary Aneurysm on the Anterior Interventricular Artery Using a Covered Stent: A Case Report from the Montluçon Hospital Center. *World Journal of Cardiovascular Diseases*, 15, 62-68.

<https://doi.org/10.4236/wjcd.2025.152005>

Received: January 11, 2025

Accepted: February 23, 2025

Published: February 26, 2025

Copyright © 2025 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background and objective: Coronary aneurysms remain a rare pathology of the coronary vessels, with multiple etiologies and dramatic complications. The majority of patients remain asymptomatic. These complications must be prevented through urgent management. However, management is not clearly codified. The aim of our case report is to demonstrate the benefit of covered stenting in the management of coronary aneurysms. **Case report:** This report is on a patient who was affected by a saccular coronary aneurysm on the anterior interventricular artery, of iatrogenic etiology and had a satisfactory medium-term outcome with a successful covered stenting treatment. **Conclusion:** Coronary aneurysms are rare, of multiple etiologies, increasingly linked to increasingly complex procedures. Their management, especially in emergencies, is not clearly codified. Covered stenting therefore remains a simple technique with good results.

Keywords

Iatrogenic Coronary Aneurysm, Covered Stent, Pericardial Tamponade

1. Introduction

First described in the literature by Morgagni in 1761, coronary aneurysms remain a rare pathology of the coronary vessels [1]. They are classically defined as a segment

of artery whose dilatation exceeds more than one and a half times the diameter of the adjacent healthy portion (considered as the reference point) [1]-[3]. Several etiologies have been described, dominated by atherosclerosis, which is responsible for over 50% of cases described [1] [2] [4]. The pathogenesis remains uncertain [3]. Iatrogenic causes are rare, but are increasingly encountered as a result of complex procedures [5]. The main complications are thrombosis with distal embolization, rupture and vasospasm, leading to myocardial infarction and sudden death [1] [6]. The management of this condition, especially in emergencies, is not clearly codified, depending on the patient's symptoms and the anatomical presentation of the aneurysm [6].

2. Clinical Case

We report the case of a 55-year-old female patient referred by her GP for a cardiovascular work-up. Her cardiovascular risk factors included active smoking, dyslipidemia, hypertension and diabetes. She described exertional dyspnea at New York Heart Association (NYHA) stage I, in a context of severe anxiety. Clinical and echocardiographic examination revealed myocardial scintigraphy, which revealed apical ischemia extending across the apical segments of the anterior and septal walls, raising suspicion of damage to the anterior interventricular artery (AIV). Coronary angiography using the 6F right femoral approach revealed chronic occlusion of the proximal right coronary artery (RCA) (**Figure 1**), with good contralateral anastomosis, and sub occlusion of the proximal AIV (**Figure 2**). Proximal AIV angioplasty was performed after pre-dilatation of the lesion with a 2.5 mm non-compliant balloon using an everolimus-coated stent (XIENCE SIERRA 3.5 mm × 23 mm) deployed at 12 atmospheres for 20 seconds. The guidewire used was BMW 0.014 HYDRO 3CM J (Abbott). Due to a dissection downstream of the stent, another everolimus-coated stent (XIENCE SIERRA 3.0 × 23 mm) was deployed over this dissection at 14 atmospheres for 22 seconds, using the same BMW guide. As the previous stent had been too short to cover the entire dissected area, another everolimus-coated stent (XIENCE SIERRA 2.5 × 15 mm) was required, implanted adjoining the previous stent and deployed at 12 atmospheres for 20 seconds. The final result was good (**Figure 3**). Angioplasty of the RCA was performed a second time (10 weeks later) with excellent results (**Figure 4**). A check of the AIV during the same procedure revealed two simple saccular aneurysmal lesions (**Figure 5**). These saccular lesions of the middle AIV were treated 8 weeks later with a single PK POPYRUS 3.0 × 20 mm covered stent with excellent results (**Figure 6**) through a BMW 0.014 HYDRO 3CM J guide (Abbott). Optimization with a 2.5 mm uncomplicated balloon deployed at 11 atmospheres was performed. A coronary angiogram performed 11 months after implantation of the covered stent showed exclusion of the two aneurysmal lesions (**Figure 7**). Checks on the RCA revealed no aneurysmal lesion at the same time. Optical Coherence Tomography (OCT) confirmed this exclusion and the good result of the covered stent (**Figure 8**).



Figure 1. Chronic occlusion of the middle right coronary.

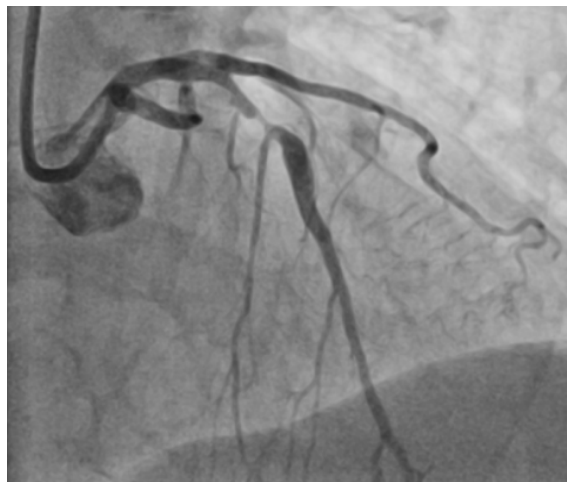


Figure 2. Subocclusion of the proximal AIV.

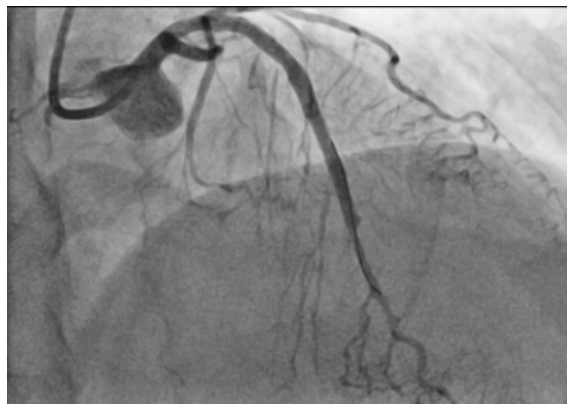


Figure 3. Results of AIV angioplasty.



Figure 4. Angioplasty of the right coronary artery.



Figure 5. Saccular aneurysmal lesions on the AIV.



Figure 6. Result after covered stent.

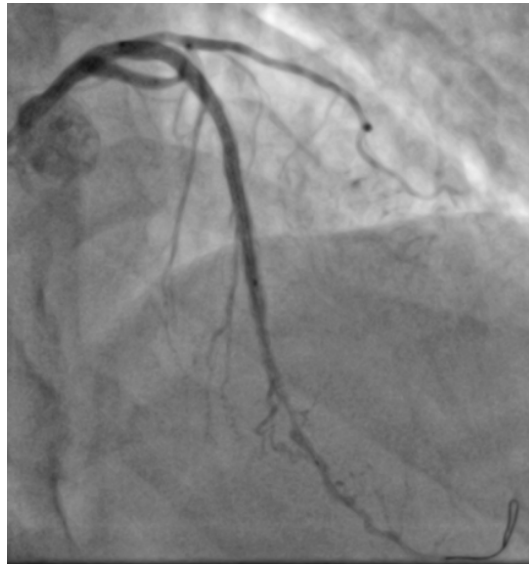


Figure 7. Coronary angiography 11 months after covered stenting.

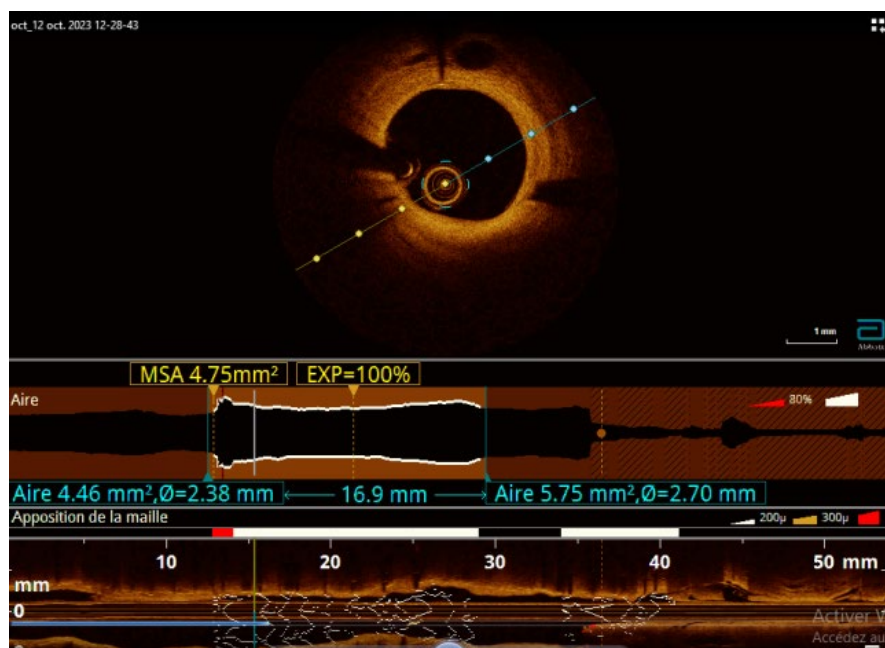


Figure 8. OCT of the AIV.

3. Discussion

A coronary aneurysm is defined as a dilatation of more than 1.5 times the diameter of the widest coronary artery or normal adjacent segment [1]-[3]. It is a rare condition, with an incidence ranging from 0.2% to 4.9% [1] and a male predominance [3]. Known risk factors include male sex, hypercholesterolemia, smoking and cocaine use [1].

Coronary aneurysms are most frequently found on the right coronary network, followed by the circumflex artery and the AIV; involvement of the left coronary

trunk is rarer [3] [6]-[8]. They may be single or multiple, saccular or fusiform [9]. Because of its iatrogenic aetiology, in our case, saccular aneurysms were found on the AIV.

The pathophysiology remains uncertain. However, some authors suggest the presence of an anomaly in the medial layer of the artery secondary to lipid deposits in the intima [2] [10]. Others suggest that aneurysms are caused by media destruction, thinning of the arterial wall, increased wall stress and progressive dilatation of a segment of the coronary artery [8] [11]. In our case, iatrogenic dissection had weakened the wall, causing segmental dilatation of the artery under pressure.

In the literature, few cases of iatrogenic aneurysms have been described. However, with the advent of coronary angiography and increasingly complex and traumatic coronary angioplasty procedures, iatrogenic coronary aneurysms are likely to develop. The main complications are thrombosis with distal embolization, rupture and vasospasm, leading to myocardial infarction and sudden death [1] [6]. In our case, we proposed a covered stent whose indications are coronary perforation and saccular and fusiform coronary aneurysms [12].

Classically, a distinction is made between bare stents and, currently, active stents, the aim of which is to reduce the recurrence of immediate, medium- and long-term ischemic events, by counteracting the phenomenon of restenosis and coronary thrombosis [13]. It consists of a wire mesh crimped onto an initially deflated coronary angioplasty balloon. Unlike bare or active stents, covered stents are covered by a synthetic membrane that can exclude a collateral branch [12] [13]. Thus, their use must be cautious and comply with certain rules, namely the absence of significant collateral branches likely to be excluded by the device, the absence of implantation in a bifurcation carina and a longer duration of double platelet anti-aggregation [12]. In our context, the choice of a covered stent was straightforward, given the absence of significant collateral branches and the patient's low risk of bleeding. The final result at 11 months was excellent.

4. Conclusion

Our particular case on saccular aneurysm of the acute interventricular artery suggests a management approach to this condition, despite the lack of consensus. Consideration of the existence of an important collateral branch (risk of exclusion) and the risk of bleeding due to the long duration of double anti-aggregation is essential to the choice of treatment. It would also be useful to assess the long-term complications of coronary stents with covered stent implantation.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Pham, V., Hemptinne, Q.D., Grinda, J., Duboc, D., Varenne, O. and Picard, F. (2020) Giant Coronary Aneurysms, from Diagnosis to Treatment: A Literature Review.

- Archives of Cardiovascular Diseases*, **113**, 59-69.
<https://doi.org/10.1016/j.acvd.2019.10.008>
- [2] Ssi-Yan-Kai, G., Berthoumieu, P., Dumonteil, N., Rousseau, H. and Chabbert, V. (2011) Tamponnade péricardique par rupture d'un anévrisme coronarien. *Annales françaises de médecine d'urgence*, **1**, 286-288.
<https://doi.org/10.1007/s13341-011-0066-8>
- [3] Syed, M. and Lesch, M. (1997) Coronary Artery Aneurysm: A Review. *Progress in Cardiovascular Diseases*, **40**, 77-84. [https://doi.org/10.1016/s0033-0620\(97\)80024-2](https://doi.org/10.1016/s0033-0620(97)80024-2)
- [4] Lenihan, D.J., Zeman, H.S. and Collins, G.J. (1991) Left Main Coronary Artery Aneurysm in Association with Severe Atherosclerosis: A Case Report and Review of the Literature. *Catheterization and Cardiovascular Diagnosis*, **23**, 28-31.
<https://doi.org/10.1002/ccd.1810230108>
- [5] Merchán, A, López-Mínguez, J.R., Alonso, F., Fernández De La Concha, J., González, R., Martínez De La Concha, L. (2002) Aneurisma gigante del tronco común de la arteria coronaria izquierda sin lesiones coronarias asociadas Giant Left Main Coronary Aneurysm without Associated Coronary Lesions. *Revista Española de Cardiología*, **55**, 308-11. [https://doi.org/10.1016/S0300-8932\(02\)76600-1](https://doi.org/10.1016/S0300-8932(02)76600-1)
- [6] Gunduz, H., Akdemir, R., Binak, E., Tamer, A. and Uyan, C. (2004) Spontaneous Rupture of a Coronary Artery Aneurysm: A Case Report and Review of the Literature: A Case Report and Review of the Literature. *Japanese Heart Journal*, **45**, 331-336.
<https://doi.org/10.1536/jhj.45.331>
- [7] Ozaydin, M., Gedikli, O., Dogan, A., Altinbas, A. and Varol, E. (2004) Right Coronary Artery Aneurysm Mimicking Aortic Root Dissection. *The Texas Heart Institute Journal*, **31**, 196-197.
- [8] Raveloson, H.F.R., Miandrisoa, R.M., Rakoto Sedson, O., Fouché, R., Rakotoarimanana, S. (2012) Découverte fortuite angiographique d'un anévrisme de l'artère coronaire chez une patiente présentant une cardiomyopathie dilatée hypokinétique. *La Revue Médicale de Madagascar*, **2**, 105-108.
- [9] Topaz, O., DiSciascio, G., Cowley, M.J., Goudreau, E., Soffer, A., Nath, A., et al. (1991) Angiographic Features of Left Main Coronary Artery Aneurysms. *The American Journal of Cardiology*, **67**, 1139-1142.
[https://doi.org/10.1016/0002-9149\(91\)90881-k](https://doi.org/10.1016/0002-9149(91)90881-k)
- [10] Okmen, E., Sanli, A., Kasikcioglu, H., Uyarel, H. and Cam, N. (2004) Left Main Coronary Artery Aneurysm Associated with Extensive Coronary Arterial Calcification: Case Report and Review. *The International Journal of Cardiovascular Imaging formerly the International Journal of Cardiac Imaging*, **20**, 231-235.
<https://doi.org/10.1023/b:caim.0000021950.28940.7c>
- [11] Gottesfeld, S., Makaryus, A.N., Singh, B., Kaplan, B., Stephen, B., Steinberg, B., et al. (2004) Thrombosed Right Coronary Artery Aneurysm Presenting as a Myocardial Mass. *Journal of the American Society of Echocardiography*, **17**, 1319-1322.
<https://doi.org/10.1016/j.echo.2004.07.004>
- [12] COMMEAU, P., Les Fleurs, P., Ollioules (2017) Pathologie coronaire—Le point sur les stents couverts.
<https://www.cardiologie-pratique.com/cathlab/article/pathologie-coronaire-point-sur-stents-couverts>
- [13] HAS (2018) Endoprothèses (stents) coronaires.
https://www.has-sante.fr/upload/docs/application/pdf/2018-05/rapports_devaluation_endoprotheses_stents_coronaires_2018-05-18_16-37-11_73.pdf