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Case Report

# The experience of Merit Wrapsody Covered stent for Popliteal Artery Aneurysms: A Case Report

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## Abstract

We present a case report on the off-label use of the Merit Wrapsody® covered stent for popliteal artery aneurysm (PAA) treatment. This device, typically indicated for use in hemodialysis access, was successfully employed to percutaneously exclude a symptomatic PAA. This case highlights the feasibility and potential advantages of this endoprosthesis in arterial settings beyond its original indication.

**Keywords:** health risks; coffee; caffeine; neuroprotection; cardiovascular health

## Introduction

Popliteal artery aneurysms (PAAS) occur when the diameter of the popliteal artery undergoes focal dilation, exceeding 50% of its normal range, which typically varies from 0.7 to 1.1 cm. Popliteal artery aneurysms manifest as either fusiform (diffuse dilation) or saccular (asymmetrical) dilations and constitute a significant majority, comprising 85% of all peripheral aneurysms. Furthermore, the most common surgical treatment is ligation of the popliteal aneurysms associated with a femoro-popliteal bypass with the great saphenous vein. [1] Covered stents formely have been reserved for arteriovenous fistulas, iliac aneurysms, or iatrogenic perforations and ruptures. However, recent studies have provided encouraging results of covered stents compared with open surgeries for popliteal artery aneurysms, demonstrating that endovascular therapy provides similar results, with the same safety and efficacy for limb salvage rates and secundary patency. [2,3] Merit Wrapsody are flexible self-expanding endoprosthesis indicated for use in hemodialysis patients for the treatment of stenosis or occlusion within the dialysis outflow circuit of an arteriovenous (AV) fistula or AV graft, consisting of Nitinol, ePTFE, PTFE structure. Several papers showed encouraging results regarding the target lesion primary patency at 30 days of 100% (45 of 45 patients had reached 30 days of follow-up). The target lesion primary patency for the patients who had completed 12 months of follow-up was 84.6% (33 of 39). [4] Indeed, despite the massive use of Wrapsody in venous obstructions, there is a case report published showing satisfactory results of the use of Wrapsody in popliteal artery aneurysms, with 1-year follow-up. [5]

In this study, we aimed to report the use of Merit Wrapsody for popliteal artery aneurysms in a case report.

## Case Description

A 65-year-old male with arterial hypertension presented with right calf pain, weakness, and difficulty walking, consistent with claudication. On examination, only the femoral pulse was palpable in the right lower limb. CTA revealed an infrarenal aortic aneurysm (5.9 cm), total occlusion of the superficial femoral artery, and a 2.2 cm popliteal artery aneurysm. Due to disabling symptoms, endovascular repair was chosen.

The patient was scheduled to undergo endovascular treatment of the popliteal artery aneurysm. Under general anesthesia, a left common femoral artery was retrograde punctured guided with a duplex ultrasound to perform the whole intervention percutaneously with a 12F sheat. After the puncture, two Perclose Proglide were inserted, in order to preload and guarantee the sealing of the puncture. Then, a 0,035”260cm was used to perform the crossing over the distal arteries. The patient was heparinized with 5000UI intravenous in bolus. We performed a right limb arteriography to confirm the popliteal artery aneurysm (Figures 1 and 2).

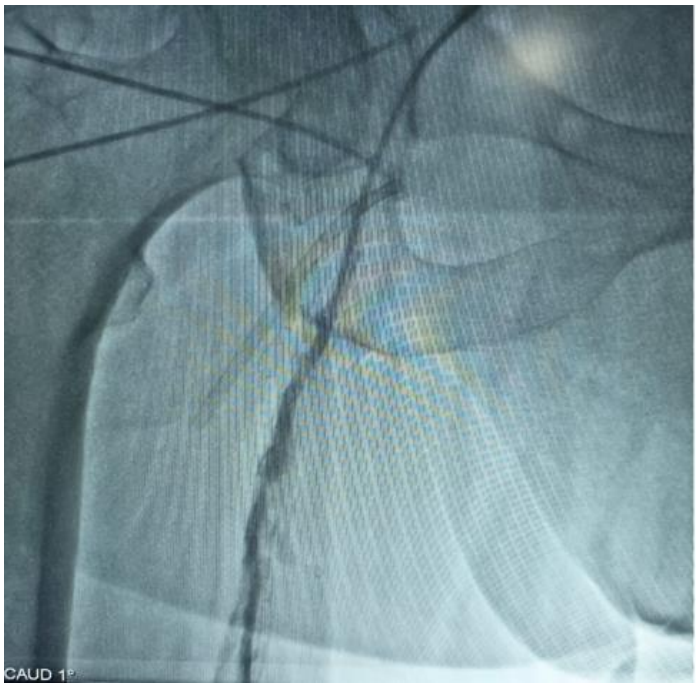


**Figure 1:** Preoperative image showing femoral superficial artery occlusion

**Figure 2:** Preoperative image showing femoral superficial artery occlusion and partial recanalization with thrombus

The popliteal artery was properly catheterized and the superficial femoral artery occlusion was crossed with proper guidewire. After proper evaluation, three covered self-expandable 7x125 9x125 and 10x100 Merit Wrapsody were placed under roadmap into the distal popliteal artery and proximal femoral artery respectively, and post dilatated with a 7x80 and 9x80 catheter balloon Magnus (figures 3 and 4).

**Figure 3:** Preoperative image showing femoral superficial artery occlusion and partial recanalization with thrombus

**Figure 4:** Postoperative image showing three covered self-expandable 7x125 9x125 and 10x100 Merit Wrapsody

**Figure 5:** Postoperative image showing three covered self-expandable 7x125 9x125 and 10x100 Merit Wrapsody

**Figure 6:** Postoperative image showing **three covered self-expandable 7x125 9x125 and 10x100 Merit Wrapsody**

There were no endoleaks, and the popliteal artery patency was identified. All the materials were removed, and we completed the final step of the perclose Proglide puncture closing. The patient was transferred to the nursery room, being discharged from the hospital two days after the

surgery with no complications, femoral, popliteal and podal pulses present bilaterally, taking Rivaroxaban 20mg / day and Clopidogrel 75mg/day. After 1 month the patient was evaluated, presenting no further symptoms, no palpable mass in the right popliteal artery, and was submitted to a Duplex Ultrasound, that showed deep popliteal artery patency, stent patency, reduction of the aneurysm sac and no endoleaks. Furthermore, after one year follow-up, the patient remained asymptomatic, with Duplex Ultrasound showing popliteal artery with stent patency and no endoleaks.

## Discussion

Most commonly, popliteal artery aneurysms are asymptomatic. If patients exhibit chronic symptoms, these are usually secondary to mass effect and compression of adjacent structures, such as the tibial nerve, which causes leg pain or paresthesias. The popliteal vein also may be compressed, which causes calf swelling. Progressive luminal narrowing of the popliteal artery from thrombus formation may cause an insidious onset of claudication—approximately 50% of the patients present with bilateral aneurysms. When an aneurysm acutely thromboses, the most common symptoms are acute lower extremity ischemia resulting in the acute onset of pain, paresthesias, paresis, pallor, and poikilothermia due to either aneurysmal intraluminal thrombosis or distal embolization of thrombus. Currently, high quality studies comparing the main repair methods of PAA are lacking. All currently published data on endovascular repair for PAA come from a heterogeneous patient population. Popliteal artery aneurysms (PAAs) represent 70% of peripheral aneurysms. Despite this, their estimated incidence is <0.1%. [8] PAAs mainly affect people aged >65 years and have two characteristic features: they are often bilateral, and in 40% to 60% of cases, aneurysmal disease is also observed at other levels. Most PAAs are asymptomatic, although up to 30% may show complications, especially those related to embolization to infrapopliteal vessels or aneurysm thrombosis. PAA rupture has only rarely been reported. [8] Nowadays, the two most widely accepted therapeutic options for the treatment of a PAA are exclusion, followed by venous or prosthetic bypass and the use of a stent graft for endovascular repair. In a prospective randomized trial comparing the open repair and endovascular treatment of asymptomatic PAAs, 15 PAAs were treated using the Viabahn stent graft, and a further 15 were surgically treated. Mean follow-up was 46 months. [9] Results revealed no significant differences between the two groups: primary patency at 12 months was 100% for the open repair group and 87% for the endovascular repair group. Furthermore, in another paper, [10] these same authors reported similar midterm results for 27 patients in their open surgery group and 21 in the endovascular treatment group, including no difference in 6-year patency. In this present paper we describe a patient submitted to successfully endovascular repair. Joshi et al [11] performed a metanalysis regarding endovascular and open surgery treatment for PAA where they found that at one year there is moderate-certainty evidence that primary patency may be improved in the surgery group but assisted primary patency rates were similar between groups. At four years there was no clear benefit from either endovascular stent graft or surgery to primary or assisted primary patency (moderate-certainty evidence). As both operating time and hospital stay were reduced in the endovascular group (moderate-certainty evidence), it may represent a viable alternative to open repair of PAA. The advantages of endovascular repair are low invasiveness, minor blood loss; and a short duration of intervention. Further major benefits of this minimally invasive procedure are a short hospitalization and short recovery times with fewer wound complications. However, the use of endovascular repair is limited by the patient's anatomy. For a successful stent graft implantation, patients with at least two runoff vessels and suitable proximal and distal landing zones (2 cm) are preferred. [12] However, graft thrombosis is more likely following endovascular repair during the first 30 post-operative days. Reasons for early stent graft thrombosis include inadequate stent graft expansion, stent graft kinking, or inappropriate inhibition of platelet aggregation. [13] Therefore, the stent graft material, which is placed into the popliteal artery, needs to be very flexible. The popliteal artery is bent many times daily, which is associated with popliteal artery compression or occlusion. Due to this anatomical condition, common complications of endovascular repair for PAA are stent graft thrombosis, migration, kinking, fractures, and the occurrence of endoleaks. [12,13] Merit Wrapsody□□are flexible self-expanding endoprosthesis indicated for use in hemodialysis patients for the treatment of stenosis or occlusion within the dialysis outflow circuit of an arteriovenous (AV) fistula or AV graft, consisted of Nitinol, ePTFE, PTFE structure. Several papers showed encouraging results regarding the target lesion primary patency at 30 days of 100% (45 of 45 patients had reached 30 days of follow-up). The target lesion primary patency for the patients who had completed 12 months of follow-up was 84.6% (33 of 39). [14] Due to the flexibility of the Merit Wrapsody□□it may be considered a feasible endograft for using in popliteal aneurysms. This case report has some limitations, since it is a single case report, with no long-term follow-up. Larger studies should be performed in order to evaluate the safety and efficacy of endovascular treatment with Merit Wrapsody® for PAA.

## Conclusion

Endovascular treatment with Merit Wrapsody covered stents for PAA seens to be safety and effective alternative for treating minimally invasive this condition, leading to an adequate flow sealing and proper aneurysms exclusion. Further and more robust studies are needed to validate these preliminary results.

## Funding

None

## Conflict Of Interest

There are no conflicts of Interest

## Informed Consent

Proper informed consent has been obtained from the patient for publication of the case report and accompanying images

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