



Hygroma following endovascular femoral aneurysm exclusion: A case report



Morten Wad^{a,*}, Brian Lindegaard Pedersen^a, Lars Lönn^{a,b}, Henrik Sillesen^a

^a Department of Vascular Surgery, Rigshospitalet, National Hospital, Copenhagen University, Denmark

^b Department of Radiology, Rigshospitalet, National Hospital, Copenhagen University, Denmark

ARTICLE INFO

Article history:

Received 22 February 2013

Received in revised form 17 June 2013

Accepted 22 June 2013

Available online 19 July 2013

Keywords:

Aneurysm

Endovascular

Hygroma

Bypass

Superficial femoral artery

ABSTRACT

INTRODUCTION: Endovascular treatment of aneurysms in the superficial femoral artery (SFA) and popliteal segments is a suggested alternative to open surgical repair. Careful selection of patients for endovascular treatment of SFA aneurysms is mandatory.

PRESENTATION OF CASE: A complication due to endovascular stent-graft treatment in an 80-year old male with a 6 cm aneurysm in the SFA is presented. Hygroma developed after a partially unintended extravascular placed stent-graft. Two consecutive explorations resulted in a femoro-popliteal Polytetrafluoro-ethylene (PTFE) by-pass graft as the final solution.

DISCUSSION: Several explanations for the patient's complications are suggested.

CONCLUSION: A primary femoral-femoral/popliteal by-pass might be the best solution in SFA aneurysms due to risk of stent complications.

© 2013 The Authors. Published by Elsevier Ltd on behalf of Surgical Associates Ltd.

Open access under [CC BY-NC-SA license](http://creativecommons.org/licenses/by-nc-sa/4.0/).

1. Introduction

Endovascular therapy of arterial aneurysms is today an alternative treatment to open surgical intervention. However, migration and fractures of stent struts of the endostent can lead to serious complications.^{1–4} We present a unique case where a hygroma developed 14 months after insertion of three overlapping Viabahn stent grafts in an endovascular exclusion of a superficial femoral artery (SFA) aneurysm. The possible underlying causes and treatment options are discussed.

2. Presentation of case

An 80-year-old male with a pulsating swelling in the left thigh was referred to our department and diagnosed with an aneurysm (4 cm × 5 cm) in the superficial femoral artery (SFA). The patient was lost to follow up due to a long term stay abroad. Three years later, he represented complaining of soreness in the thigh. No ischemic symptoms were reported and his dorsalis pedis pulse was palpable. Duplex ultrasonography and computed tomography

angiography (CTA) revealed an increase in aneurysm diameter to 54 cm × 6 cm.

The patient had an elevated temperature associated with elevated leukocytes due to pneumonia and brucellosis in the blood. After six weeks of intravenous antibiotic treatment, endovascular therapy of the aneurysm was performed. Using an antegrade approach the aneurysm was excluded with three VIABAHN® Endoprosthesis (10 mm × 15 cm, 11 mm × 10 cm, 11 mm × 10 cm) (Gore Medical, Flagstaff, US). Post dilatation was performed with a Fox plus balloon 10 mm (Abbott Vascular) (Fig. 1).

At six weeks follow up ultrasound duplex showed a patent endoprosthesis without stent deformation or stenosis, no signs of rupture and a thrombosed aneurysm sac. One year follow up with duplex scanning confirmed a thrombosed aneurysm, normal arterial flow patterns within the stent-grafts and no signs of complications. Approximately 3 months later the patient noted a progressive swelling in the medial left thigh. A CTA fourteen months after the primary insertion of endostents depicted a hygroma in and around the old aneurysm sac and raised a suspicion of kinking of the endograft systems. 200 mL of seroanguinolent fluid was aspirated from the hygroma under ultrasound guidance. Culture of the fluid revealed no growth of bacterial organisms.

Due to immediate recurrence of the hygroma the lesion was explored surgically. The stent-grafts were found to completely exit and re-enter the SFA lumen through an inside-out proximal perforation of the arterial wall and an outside-in re-perforation approximately 7 cm more distally (Fig. 2A). The thrombosed aneurysm sac had completely disintegrated and the denuded part of the stent graft was found beneath. In the area of the proximal SFA perforation a small leak between the vessel wall and the stent

* Corresponding author at: Lindevej 60, 3500 Værløse, Denmark.
Tel.: +45 61658005.

E-mail address: mortenwad@gmail.com (M. Wad).



Fig. 1. Angiography obtained during implantation of the Viabahn endovascular stent-grafts. (A) DSA of the SFA aneurysm with a calibrated catheter in place. Contrast in the SFA. (B) A non subtracted image of the SFA with the stentgrafts inserted and positioned. (C) The three Viabahn endostents deployed and the aneurysm excluded.

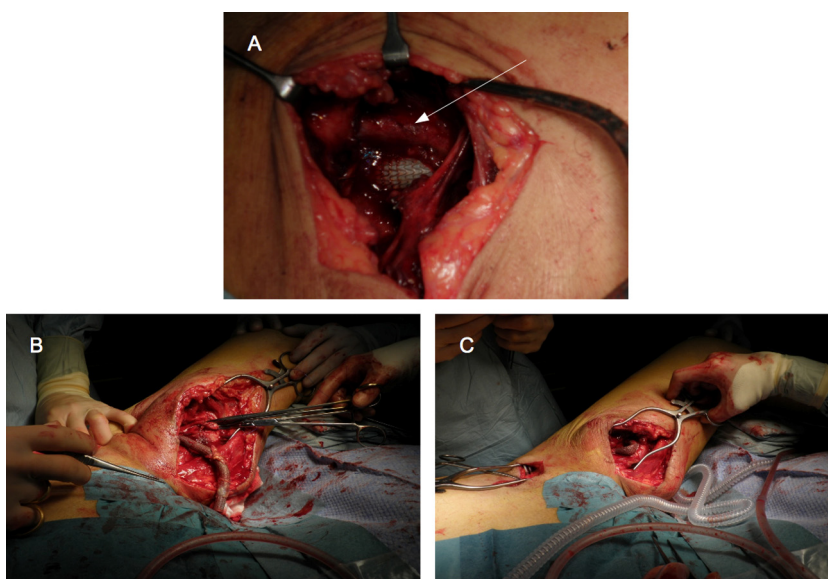


Fig. 2. Picture (A) shows the first exploration of the hygroma (2nd operation). Exposure of the stent-graft in the hygroma cavity placed on the medial part of the femur. Notice the bleeding in the proximal part of the stent-graft and the great saphenous vein passing through the lateral side of the cavity (arrow). (B) and (C) obtained during the 3rd operation with the implantation of the PTFE by-pass. In the femoral incision the Viabahn stent graft is exposed (B). (C) Part of the removal procedure of the stent-graft. The distal part is removed and arterial clamps are placed on the proximal and distal part of the superficial femoral artery.

graft was detected. The leak was sutured, necrotic tissue removed and the wound was closed over a plate of Gentacoll® (Gentamicin collagen sponge 1.3 mg/cm², EUSA Pharma (Europa) Ltd, England). The patient was discharged three days after surgery. Notably, the patient had insisted that localized surgery in the area of the swelling was the only option he could accept. Thus a primary bypass was not an option in this case, and the patient resented the idea of open surgery until no other option was available.

The patient was readmitted three weeks after the exploration of the endostent due to recurrent swelling and spontaneous secretion of fluid from a cutaneous fistula. The fistula was covered by a compression bandage. An endoleak of the distal end of the graft was discovered with ultrasound and thus it was decided to treat the patient with an extra-anatomical (lateral tunnelation) femoro-popliteal polytetrafluoroethylene (PTFE) by-pass graft. In addition to the PTFE by-pass, removal of most parts of the stent graft was

performed (medial incision) (Fig. 2B and C). Follow-up after one week and three months after the surgical procedure showed a patent bypass graft, reduced swelling of the leg, palpable pedal pulses and no claudication.

3. Discussion

In this case, a hygroma developed after an unintended, partially extra-vascular deployment of a stent-graft. Two consecutive explorations resulted in a femoro-popliteal polytetrafluoro-ethylene (PTFE) by-pass graft as the final solution. When deploying a stent-graft in an aneurysmal region there is a risk of damaging the arterial wall. The SFA is known for added stress of continuous mobility and a significantly increased inflammatory response after stenting. Secondary migration of the stent graft might be an alternative explanation to iatrogenic perforation of the vessel. Additionally,

the use of three stent grafts might have contributed to unfavorable movements and forces within the SFA. This is supported by Tielliu et al.,² who found a high incidence of stent fractures in overlapping stents in popliteal aneurysms. Another explanation for the observed leak and development of a hygroma could be due to the disintegration of the thrombosed aneurysm sac leaving the stent-graft denuded. This is supported by the relatively late development of the hygroma.

A primary vein bypass with exclusion of the aneurysm as opposed to endovascular treatment was clearly a better solution in our case. Use of the great saphenous vein was not possible at the third operation (bypass procedure) due to severe fibrosis of the vein, as a result of the vein passing through the hygroma cavity (Fig. 2A). Use of the contralateral vein was not considered due of the patient's general resentment of open surgery.

Endovascular treatment of aneurysms in the SFA-popliteal segment is emerging, especially popliteal aneurysms,⁵ but very few large series reporting on the long-term outcomes have been published.^{6–8} No large randomized studies comparing open and endovascular treatment have been performed. SFA aneurysms are rare and only case reports and smaller series with endovascular treatment have been reported. A review from 2008 found 61 reported cases of SFA aneurysms. Only three of them were treated with endovascular stent grafts.⁹ In order to maximize long term patency after endostenting of SFA/popliteal segments, inflow and outflow is crucial, i.e. an outflow of at least one, but preferably, two crural vessels is required.¹⁰

Conclusion

The lack of evidence for best surgical treatment, open or endovascular, mandates careful selection for endovascular treatment of aneurysms in the femoro-popliteal artery segment.

Conflict of interest

No competing interests declared.

Funding

None.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Morten Søholt Wad and Brian L. Pedersen: 'study design, writing, correction.

Henrik Sillesen and Lars Lönn: Analysis, writing, corrections, overall responsibility.

References

1. Schoenefeld E, Donas KP, Schönefeld T, Osada N, Austermann M, Torsello G. Mid-term outcome after endovascular therapy in the superficial femoral and popliteal artery using long stents. *Vasa* 2012;**41**(January (1)): 49–56.
2. Tielliu IF, Zeebregts CJ, Vourliotakis G, Bekkema F, van den Dungen JJ, Prins TR, et al. Stent fractures in the hemobahn/viabahn stent graft after endovascular popliteal aneurysm repair. *Journal of Vascular Surgery* 2010;**51**(June (6)):1413–8 [Epub 2010 April 10].
3. Civilini E, Melissano G, Baccellieri D, Chiesa R. Delayed upstream migration of an iliac stent. *European Journal of Vascular and Endovascular Surgery* 2007;**34**(August (2)):214–6.
4. Siani A, Accrocca F, Gabrielli R, Marcucci G. Acute lower limb ischaemia due to delayed upstream migration of an iliac stent. *Interactive Cardiovascular and Thoracic Surgery* 2012;**14**(February (2)):231–3.
5. Geraghty PJ. Endovascular treatment of lower extremity aneurysms. *Seminars in Vascular Surgery* 2008;**21**(December (4)):195–9.
6. Etezadi V, Fuller J, Wong S, Pena C, Benenati JF, Diehm N, et al. Endovascular treatment of popliteal artery aneurysms: a single-center experience. *Journal of Vascular and Interventional Radiology* 2010;**21**(June (6)): 817–23.
7. Idelchik GM, Dougherty KG, Hernandez E, Mortazavi A, Strickman NE, Kravcer ZJ. Endovascular exclusion of popliteal artery aneurysms with stent-grafts: a prospective single-center experience. *Endovascular Therapy* 2009;**16**(April (2)):215–23.
8. Midy D, Berard X, Ferdani M, Alric P, Brizzi V, Ducasse E, et al. AURC French University Association for Vascular Surgery. A retrospective multicenter study of endovascular treatment of popliteal artery aneurysm. *Journal of Vascular Surgery* 2010;**51**(April (4)):850–6.
9. Leon Jr LR, Taylor Z, Psalms SB, Mills Sr JL. Degenerative aneurysms of the superficial femoral artery. *European Journal of Vascular and Endovascular Surgery* 2008;**35**(March (3)):332–40.
10. Cina CS. Endovascular repair of popliteal aneurysms. *Journal of Vascular Surgery* 2010;**51**(April):1056–60.

Open Access

This article is published Open Access at scimedirect.com. It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.