

# Challenges and solutions in day case EVAR

## Abstract

EVAR continues to evolve. A certain proportion of recipients meet criteria for early discharge after surgery, making day case EVAR a possibility. We present our experience with a minimally-invasive arterial closure device prior to instituting a day-case EVAR programme.

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## Introduction

Endovascular aneurysm repair (EVAR) is rapidly becoming the standard of care in the western world.<sup>1</sup> Advances in graft design and technology, as well as a better understanding of how the graft interacts with the aorta, mean that EVAR can be offered to more patients.

As EVAR continues to evolve, certain subtypes of patient can be identified. One end of the spectrum can be characterized by healthy iliac arteries, good aortic neck quality and generally good patient fitness. The prognosis for these patients is generally excellent,<sup>1</sup> with relatively low mortality and low rates of device-related reintervention. At the other end of the spectrum are a group of patients with poor aortic neck quality, difficult access vessels and comorbidities placing them at higher risk of morbidity and mortality.

Given these polarized patient groups, we sought to streamline our treatment strategy. The 'high risk' group require significant perioperative work up, complex fenestrated or branched endografts and the provision of postoperative critical care facilities. They may also require short or medium-term renal or respiratory support.<sup>2</sup> In contrast, the 'low risk' group can benefit from expedient workup, swift device implantation with minimal contrast usage and rapid discharge from hospital. This requires a rapid induction and reversal of anaesthesia, as well as facilitation of minimally-invasive arterial closure after device delivery.

We sought to determine the efficacy of a novel technique for arterial closure. The ProGlide device (Abbott Medical) offers the ability to close large arterial puncture sites (9-20 French) without the need for surgical cutdown to the femoral artery. It allows rapid ambulation with minimal pain after EVAR deployment. The ProGlide device, in common with many interventional radiology devices, has a learning curve. After appropriate training and mentoring, we instituted a percutaneous EVAR programme.

## Methods

All staff involved received appropriate bench-top practice with the ProGlide device followed by supervised training in theatre. Following this, a series of patients with acceptable body habitus and healthy femoral arteries were selected. Details of puncture site, French sheath size, access site bleeding or femoral false aneurysm were recorded. Concurrently, details of conversion to operative repair or femoral artery occlusion were recorded.

All cases were performed under locoregional or general anaesthesia. Acceptable common femoral morphology was identified on preoperative CT. Femoral arteries were classified as suitable if they had less than 30% stenosis at the back wall and healthy anterior walls. All femoral arteries were punctured under ultrasound guidance and standard 0.35" j-wires advanced under fluoroscopy. Tracts were predilated with 8French dilators prior to deployment of the ProGlide devices.

Following delivery of the EVAR device and withdrawal of endovascular hardware, the arteriotomies were closed with the preclose technique. Manual pressure was applied. Surgical support was always available in case of persistent bleeding.

## Results (Table 1)

In summary, 28 femoral arteries in 15 patients had the arteriotomy closed with ProGlide sutures via the preclose technique. 2 arteries were unsuitable for ProGlide and underwent planned surgical reconstruction at the time of EVAR implant. 4 patients had MA deployment of the ProGlide which was recognized at the time of suture placement and required the deployment of another ProGlide (shown as 2+1+2 in the above Table).

2 patients suffered moderate blood loss after closure with ProGlide but both settled with manual pressure and did not require blood transfusion. No patients developed postoperative haematoma or false aneurysm. No femoral arteries were occluded at the time of arteriotomy closure. No puncture site infections were observed at the time of discharge. All patients were ambulant on the first postoperative day.

## Discussion

There has been clear benefit shown to patients for swifter ambulation and discharge from hospital. Protection from nosocomial infections, less risk of thromboembolic complications and faster return to normal activities are all positive benefits. In addition, the current financial climate has encouraged hospital to seek novel ways of optimizing bed stay capacity. We believe our results show that the ProGlide device is safe, effective and provides a facility for early discharge after EVAR.

Not all patients are suitable for rapid discharge however. Patients with complex arterial anatomy, high contrast volumes requiring renal

monitoring, and the need for femoral artery reconstruction will all challenge in certain patients and may not be appropriate. need to stay in hospital for longer. Percutaneous access may be a

Patient	Procedure performed	Access	Number of proglide devices	Bleeding	Haematoma	False aneurysm	Arterial occlusion
1	EVAR	Right 18Fr/Left 12Fr	2+2	No	None	None	None
2	EVAR	Right 18Fr/Left 12Fr	2+ 1 +2	Controlled with 10mins manual pressure	None	None	None
3	EVAR	Right surgical endarterectomy Left 12Fr	2+ cutdown	No	None	None	None
4	EVAR	Right 18Fr/Left 12Fr	2+2	No	None	None	None
5	EVAR	Right 18Fr/Left 12Fr	2+2	No	None	None	None
6	EVAR	Right 18Fr/Left 12Fr	2+1+2	No	None	None	None
7	EVAR	Left 18Fr/Right 12Fr	2+2	Controlled with 20mins manual pressure	None	None	None
8	EVAR	Right 18Fr/Left 12Fr	2+2	No	None	None	None
9	EVAR	Right 18Fr/Left 12Fr	2+2	No	None	None	None
10	EVAR	Left surgical endarterectomy Right 12Fr	2+ cutdown	No	None	None	None
11	EVAR	Right 18Fr/Left 12Fr	2+1+2	No	None	None	None
12	EVAR for iliac aneurysm	Left 18Fr/Right 12Fr	2+2	No	None	None	None
13	EVAR	Right 18Fr/Left 12Fr	2+2	No	None	None	None
14	EVAR	Left 18Fr/Right 12Fr	2+2	No	None	None	None
15	EVAR for penetrating aortic ulcer	Right 18Fr/Left 12Fr	2+1+2	No	None	None	None

### Conclusion

We believe our results show that the ProGlide device is safe, effective and provides a facility for early discharge after EVAR.

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### Conflicts of interest

The authors declare there are no conflicts of interest.

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### References

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