

Preservation of internal iliac artery (IIA) patency in endovascular aorto-iliac aneurysm repair using the “banana” technique.

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INTRODUCTION

❖ Successful repair of aorto-iliac aneurysms can necessitate occlusion of the internal iliac artery. This can cause debilitating buttock claudication and sexual dysfunction⁽¹⁾. Whilst devices exist which allow preservation of IIA patency they are not suitable for all cases. An alternative technique that can be used to preserve a single IIA involves placing a contralateral aorto uni-iliac (AUI) stent graft, a surgical fem-fem crossover graft and an ipsilateral stent graft from the external to the internal iliac artery (“banana” technique). There are few publications detailing performance and follow-up of this technique and we aim to describe our experience.

AIM

❖ To report the preliminary experience of the University Hospital of Wales using the ‘banana’ technique.

METHOD

- ❖ Retrospective study of all patients who underwent the banana technique for endovascular repair of an aorto-iliac artery aneurysm between November 2008 and July 2013 in a single centre under 2 operators.
- ❖ Demographics, procedural data and follow-up CT angiography & ultrasound were collected.
- ❖ Data analysis included: devices used, technical success, mortality, complications and endoleaks.

RESULTS

Demographics

Total number of patients	8
Mean age	72y (range 60-84)
Men	8 (100%)
Elective	7
Emergent	1

Stent Graft

Medtronic Talent	1 (12.5%)
Medtronic Endurant	7 (87.5%)

Banana Graft

‘Fluency’ used in all cases

Technical success

AUI device successfully deployed	8 (100%)
Banana successfully placed	6 (75%)

❖ 2 cases of failed banana placement -
1 could not be placed
1 occluded on table

NB ‘success’ - Not requiring open repair, no significant Type 1 or 3 Endoleak at end of procedure, no intra-operative mortality)

Follow-up Period

❖ Total cumulative follow-up time	239	months (omitting 2 ‘failed’ bananas)
❖ Mean	39.8	months
❖ Range	3–80	months

Mortality

- ❖ 30 day mortality 0 patients
- ❖ >30 day mortality (range 3-29 months) 3 patients
No aneurysm related deaths

Complications

- ❖ 1 case of banana occlusion by 1st F/U CT @ 6/52 – not intervened.
- ❖ 1 case of 10mm migration proximally of Endurant graft @ 36/12, observed, CT @ 48/12 showed further migration - aortic extension successfully placed.
- ❖ 1 case with type 1 & 2 endoleaks at 1st F/U – DSA and proximal ballooning performed, unable to cannulate IMA. At 12/12, endoleak resolved, sac size decreased.
- ❖ No complications related to the Fem-Fem cross-over graft

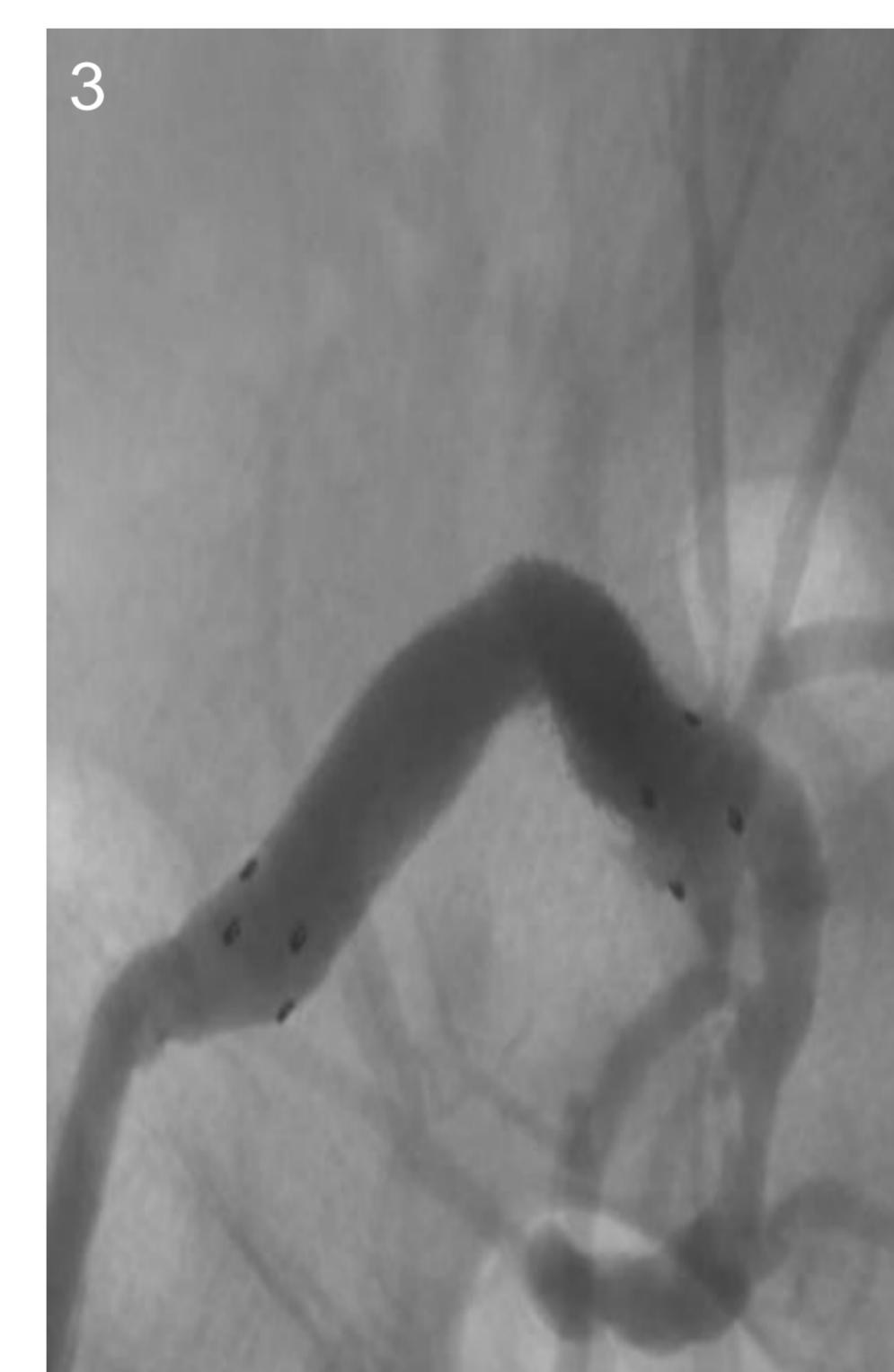
FIGURES



1 – Pre-procedure.
3D CT reconstruction showing Right CIA aneurysm & tortuous iliac arteries



2 – Post-procedure.
3D CT reconstruction showing left Aorto-femoral stent graft, Fem-fem cross over and Right EIA to IIA stent graft



3 – Post-procedure.
DSA showing patent right external to internal iliac stent graft excluding the right CIA aneurysm

DISCUSSION

- ❖ Two cases of endoleak were noted on completion - A single type 4 and type 1 endoleak. These underwent early CT F/U which demonstrated complete resolution and as such no intervention was required.
- ❖ One case (12.5%) developed an endoleak during follow-up which resolved after treatment. This is comparable with the reported endoleak incidence of between 3.9 and 16% ^(2,3).
- ❖ 1 of the bananas occluded during placement and was not recoverable, and another occluded by the 1st F/U CT.
- ❖ No patients died within 30 days corresponding to a 0% 30 day mortality – lower than the 1.7% reported in the EVAR 1 study⁽⁴⁾. Especially as our study included ‘all-comers’ meaning that we operated on patients whose co-morbidities would have disqualified them from EVAR 1.

CONCLUSIONS

The use of a covered stent from the EIA to IIA in conjunction with a contralateral AUI and a surgical fem – fem crossover graft (banana technique) offers a method to preserve the patency of the IIA in selected cases.

REFERENCES

1. Rayt HS, Bown MJ, Lambert KV, et al. Buttock claudication and erectile dysfunction after internal iliac artery embolization in patients prior to endovascular aortic aneurysm repair. *Cardiovasc Interv Radiol*. 2008;31:728-734.
2. Rationale and design of the Endurant Stent Graft Natural Selection Global Postmarket Registry (ENGAGE): Interim analysis at 30 days of the first 180 patients enrolled; Bockler D et al. *J Cardiovasc Surg* 2010;51:481-9.
3. Endovascular Aortic Aneurysm Repair with the Endurant Stent-graft: Early and 1-year Results from a European Multicenter Experience; Giovanni Torsello et al. *J Vasc Interv Radiol* 2010; 21:73–80.
4. Endovascular versus Open Repair of Abdominal Aortic Aneurysm: The United Kingdom EVAR Trial Investigators. *N Engl J Med* 2010; 362:1863-1871.