Thoracic Endovascular Aortic Repair

CM Sullivan [1&2] B Conrad [1] A Gordon [1] A Wood [1]

(1) – Cardiff & Vale University Health Board   (2) – Abertawe Bro Morgannwg University Health Board

NHS WALES GIG CYMRU

INTRODUCTION

❖ Thoracic Endovascular Repair (TEVAR) is used to treat a wide range of pathologies, most commonly aneurysms and dissections [1] but also perforating aortic ulcers and transections [2].

❖ The alternative treatment for these pathologies is open surgery which has a higher 30-day mortality and higher complication rates [3, 4].

❖ Very few randomised trials comparing TEVAR with open surgery have been carried out. Meaning that most evidence is based on observational comparative studies.

AIM

❖ To review the experience of TEVAR in a tertiary referral hospital in terms of indications, procedural details, technical success and follow-up.

METHOD

❖ Retrospective study of all patients who underwent TEVAR from July 1999 to April 2013 in a single centre.

❖ Demographics, procedural data, clinical notes and follow-up CT angiography (CTA) were analysed.

❖ Data reviewed included technical success, 30-day mortality, complications, endoleaks, graft migration, and re-intervention rates.

RESULTS

Demographics

Total number of patients	51
Mean age	65y (range 24-91)
Men	36 (70.6%)

Indication for TEVAR

Aneurysm   **39 (76.5%)**
  ❖Degenerative   29
  ❖Secondary to dissection   3
  ❖Pseudoaneurysm   7
    •Secondary to surgery   2
    •Mycotic   5

Dissection   **6 (11.7%)**
  ❖Acute   3
  ❖Chronic   3
    •Post type-A repair   2
    •Type B   1

Transection   **7 (13.7%)**

Procedure
Revascularisation

• 29 (57%) had 1 or more branch vessels covered by the stent graft
  • 14 were re-vascularised surgically
  • 15 were not re-vascularised
    • Left subclavian artery alone

Unplanned Primary Extensions   5 patients (9.8%)

• 2 x distal migration of stent during deployment
• 1 x stent prolapsing into false aneurysm
• 1 x balloon inflation caused stent migration creating a junctional leak
• 1 x junctional leak

Endoleaks

• 4 patients (7.7%) had completion endoleak
• All resolved spontaneously by initial follow-up

Primary Technical success   51 (98%)
• 1 initial attempt abandoned – small iliac arteries prevented access. Subsequent successful TEVAR with surgical aortic approach (51pts, 52 procedures)

Follow-up

•	Patients lost to follow-up	2 (3.9%)
•	Long term follow-up data	39 patients (76.4%)
•	Average follow-up time	2.7 years
•	Range	6 weeks to 8 years
•	Survival rates	79% at 1 year
		60% at 3 years

30-day mortality   3 (5.9%)

34♂ emergency TEVAR for aortic transection following a RTA
  Died at 2 days due to complications of head injuries

84♀ with a ruptured aneurysm
  Died at 5 days of acute respiratory distress on ITU

76♂ elective TEVAR for aneurysm
  Died at 14 days due to CVA

Re-intervention
❖ 6 (12%) required re-intervention during follow up

Reason for re-intervention	Intervention	Time post procedure
Type 1 Endoleak	1 extension placed Moulding balloon	7 days
Type 1 Endoleak	Extension to cover left subclavian artery & coil embolisation	3 months
Type 1 Endoleak	Moulding balloon	4 months
Type 1 Endoleak	2 extensions placed	2 years 6 months
Type 5 Endoleak	Cranial and caudal extensions	3 years 9 months
Graft migration	Extension placed using conduit	7 years

DISCUSSION

Overall our results compare favourably with those from other centres [2, 3]. The 30-day mortality rate of 5.8% is in line with that of other studies [2, 3]. Some studies [4] report rates as low as 2.1% but these have generally excluded high-risk patients.

A technical success rate of 98% compares well with NICE guidance [3]. We had no cases of paraplegia although rates are often as low as 1% [2] and so it is possible that the absence of paraplegia cases in this study is due to the relatively small sample size.

Endoleak was the most common complication requiring re-intervention in our study as seen in other studies with rates as high as 13% [2, 3]

Survival rates within this study group are not very high, particularly within a year of TEVAR with 9 (17%) patients dying within a year. However this must be taken in the context of older patients with life threatening conditions.

Poor outcomes were particularly seen in the patients who required re-intervention, with 3 of the 6 dying within 3 months and a further death occurring at 9 months secondary to a complication of the re-intervention.

These results show TEVAR to have low early morbidity and mortality. The early follow up results demonstrate the durability of the procedure.

CONCLUSIONS

Our initial experience with TEVAR is encouraging. These early results suggest that it is the a safe and effective device. Mortality, endoleak and re-intervention rates reported here are broadly comparable with the literature. Further follow-up will identify long term complications and the need for re-intervention.

REFERENCES

1. McDonnell, CO. Haider, SN. Colgan, MP. Shanik, GD. Moore, DJ. Madhavan, P. Endovascular Management of Thoracic Aortic Pathology in *Surgeon* 2009 7;1: 24-30.
2. Wiedemann, D. Mahr, S. Vadehra, A. Schoder, M. Funovics, M. Lowe, C. et al Thoracic Endovascular Aortic Repair in 300 Patients: Long-Term Results in *Ann Thorac Surg* 2013 95: 1577–83
3. National Institute for Health and Care Excellence Endovascular Stent–Graft Placement in Thoracic Aortic Aneurysms and Dissections 2005 ISBN 1-84629-038-4. London: National Institute for Health and Care Excellence.
4. Cho, JS. Haider, S. Makaroun, MS. Endovascular Therapy of Thoracic Aneurysms: Gore TAG Trial Results in *Semin Vasc Surg* 2006 19: 18-24.