Abstract P-011

Outcomes of EVAR Surveillance: a Population Based Approach To The Ongoing Dilemma

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Objective: Endovascular aneurysm repair (EVAR) is the predominant treatment modality for infrarenal abdominal aortic aneurysm (AAA) repair. Despite the large advances, complications after EVAR are not uncommon and occur in up to one in five patients in the first five years after EVAR. Guidelines by various societies recommend lifelong surveillance to prevent complications and late rupture. Frequently patients are not compliant to EVAR surveillance and there is a paucity of evidence as to whether EVAR surveillance is preventing EVAR complications and AAA rupture. The primary aim of this study was to determine the compliance rate of EVAR surveillance in the Maltese population. The secondary aim was to determine all cause mortality (ACM) and re-intervention rates among compliant, non-compliant and lost to follow up patients in this population.

Methods: The STROBE guidelines were followed for this observational study. Demographic and procedural data of patients undergoing elective standard infrarenal abdominal aortic aneurysm repairs between 1 January 2009 and 31 October 2020 were collected from the Maltese Vascular Registry and official hospital electronic databases. Follow up was censored on 31 December 2021. Any patient with a temporary national identity number (i.e., non-resident) was excluded from this study. Patients who expired before 12 months had elapsed after EVAR were excluded due to inadequate follow up opportunity. There has been a shift from yearly computed tomography (CT) and/or duplex ultrasound scan (DUS) and/or plain X-rays to yearly DUS with a CT every five years. Compliance to EVAR surveillance was defined as uninterrupted DUS and/or CT scan (referred to as medical imaging) every 12 months ($\pm$ 2 months). Non-compliance was defined as non-attendance to one or more 12 monthly imaging surveillance scans with resumption of follow up after the patient defaulted. Lost to follow up was defined as initially had regular 12 monthly surveillance imaging which was subsequently abandoned. Imaging data were obtained from the hospital Picture Archiving and Communication System. Analysis of data was carried out using GraphPad Prism version 9.3.1 for MacOS (GraphPad Software, San Diego, CA, USA, www.graphpad.com).

Results: The study included 155 patients (146 men and nine women). One patient was excluded given the patient was non-resident, and 13 patients were excluded as they passed away before the one year interval. Age varied between 53 and 93 years (mean 75 years). Eighty nine patients (57%) were compliant to EVAR surveillance, 39 patients (25%) were non-compliant, and 27 patients (17%) were lost to follow up. At six years of follow up, 50% of patients had defaulted from EVAR surveillance. Up to 31 December 2021, 47 patients (30%) passed away. ACM was lowest in the non-compliant group but at six years, compliant patients had better survival rate than non-compliant and lost to follow up groups (Fig. 1). The median survival for the non-compliant group was 11 years, while for the lost to follow up group this was six years. Compliant groups had even better survival outcomes if non-compliant and lost to follow up groups were grouped together (Fig. 2). Of the compliant patients, 11% ($n = 17$) underwent re-intervention, while 6% ($n = 9$) of non-compliant patients and 2% ($n = 3$) of lost to follow up patients had re-intervention, respectively. Five patients (two compliant, one non-compliant and two lost to follow up) had limb extensions. Seven patients (five compliant, two non-compliant) had re-intervention for type II endoleak, one compliant patient needed endoanchors for type 1a endoleak, one compliant patient needed explantation of the endograft, while 15 patients needed re-intervention for various other reasons. Five patients needed more than one re-intervention (one was compliant, two non-compliant and two lost to follow up).

Conclusion: Despite the small size of the country and ease of travel, only 57% of patients in Malta were compliant with EVAR surveillance. Survival was initially better in the non-compliant group; however, six years after EVAR, compliant patients had a better survival rate. Although this study is limited by the small number of patients, the outcomes of EVAR surveillance of this population based study are similar to contemporary data. This study emphasises the importance of EVAR surveillance but also continues to stress the need to implement measures to improve EVAR surveillance rates.

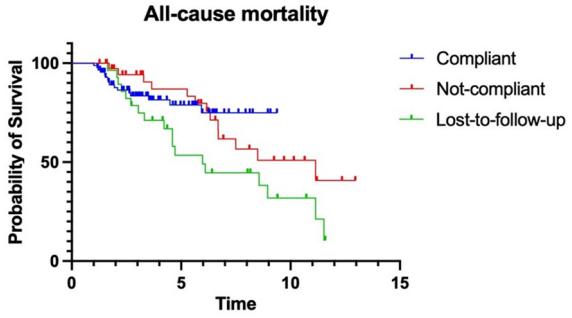

Figure 1: Kaplan-Meier curve comparing all-cause mortality and survival probability between groups.

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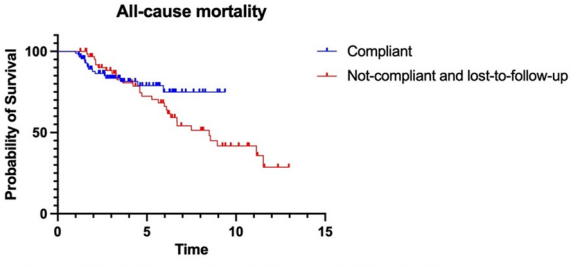

Figure 2: Kaplan-Meier curve comparing all-cause mortality and survival probability between compliant and combined non-compliant/lost-to-follow-up groups.

2. Grima MJ, Karthikesalingam A, Holt PJ. Multicentre Post-EVAR Surveillance Evaluation Study (EVAR-SCREEN). *Eur J Vasc Endovasc Surg* 2019;**57**:521–6.

Abstract P-012

Mid and Long-Term Outcomes of Ultra-Low-Profile Endografts For Endovascular Abdominal Aneurysm Repair

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Objective: Despite continuous advancement in endovascular technologies, challenging aortic anatomy, including hostile proximal aortic necks, anatomically smaller iliac arteries, iliac occlusive disease, iliac artery stenosis, and difficult access vessels still limit the applicability of endovascular aortic aneurysm exclusion (EVAR), with conventional devices, in patients affected by abdominal aortic aneurysm (AAA). The advent of ultra low profile (ULP) endograft with a 14 F outer diameter has allowed the feasibility of EVAR of infrarenal AAA in patients who have previously been excluded because of challenging aortic anatomies and small and tortuous access vessels. Among the devices now available, the ULP endografts Ovation (Endologix, Santa Rosa, CA, USA) and INCRAFT (Cordis Corp., Milpitas, CA, USA) have been shown as safe and effective in patients with heavily calcific external and common iliac axes, or with aorto-iliac occlusive disease. The purpose of this study was to compare the long term follow up of these two endoprosthesis.

Methods: This was a single centre, retrospective evaluation of 102 patients who underwent elective EVAR with ULP endograft (Cordis INCRAFT and Endologix Ovation) between 2012 and 2019. The selection of EVAR graft considered the anatomical characteristics of the aortic neck and of the iliac arteries, the presence of thrombus or calcification, and the small and tortuous iliac vessels or iliac occlusive disease or iliac artery stenosis. Follow up data were analysed to evaluate success, survival, complications, and device related events, both at 30 days and in the long term. The success was defined as successful access, delivery, and implant of the endograft with absence of immediate surgical conversion, mortality, endoleak, or graft limb occlusion. Post-operative surveillance protocol included a duplex ultrasonography (DUS) scan at discharge, at one, six, and 12 months, and annually thereafter. A CTA was performed at one month and in case of non-diagnostic DUS scan or if either graft thrombosis or endoleak was suspected at DUS scan.

Results: The two groups were different in terms of aorto-iliac anatomy, as patients of in the Ovation group had a proximal aortic neck which was affected by a greater presence of thrombus (percentage of the circumference covered by thrombus: 47.4 *vs.* 12.7, $p < .001$). All of the Ovation endografts were implanted by bilateral percutaneous femoral access compared with 91.6% of the INCRAFT endografts using bilateral percutaneous femoral access. At 30 days follow up in the INCRAFT group, one patient underwent re-intervention, compared with none in the Ovation group. A significant difference was recorded in the incidence of post-implantation syndrome after the use of the INCRAFT endograft compared with the Ovation graft (14% *vs.* 0%, $p = .009$). The long term follow up mean was 54.37 $\pm$ 30.5 months for Ovation and 32.47 $\pm$ 19.4 months for INCRAFT. Endoleak was present in 20% and 13%, respectively. One patient in the Ovation group underwent endograft explant for endoleak IA. In the INCRAFT group, 10.5% of patients underwent re-intervention for embolisation, relining, thromboaspiration under the knee and Chimney technique. At follow up, the death rate from the Ovation group was 37.8% compared with 15.8% for the INCRAFT group.

Conclusion: Both ULP endografts showed good mid and long term follow up outcomes. The selection of the prosthesis is important to avoid complications. Bilateral femoral percutaneous access is the preferred technique without major complications and good results.

	Ovation (n=45)	Incraft (n=57)
Anatomical data (mm), (mean±2SD)		
Proximal aortic neck diameter	23,7 +- 2,9	22,9 +- 2,5
Proximal aortic neck length	15,4 +- 8,8	20,5 +- 11,7
Proximal aortic neck angulation (coronal axis)	36° +- 18°	34,4° +- 14,1°
% of circumference covered by thrombus (aortic neck)	47,4	12,7
Aortic bifurcation diameter (mm)	19,9 +- 4,5	24,9 +- 8,9
Access vessel anatomy		
Mean CIA diameter (mm)	13,05 +- 2,4	14,81 +- 3,6
Mean EIA diameter (mm)	6,7 +- 1,5	7,5 +- 1,8
Sac diameter (mm), median (IQR)	52,8 +- 8,3	58,8 +- 11,3

	Ovation (n=45)	Incraft (n=57)
Percutaneous Vascular access	45 (100%)	52 (91,6%)
Time of operation (min), mean±SD	98 +- 2,5	96,5 +- 72,2
Amount of contrast (mL), mean±SD	163,7 +-59,6	154 +- 61,6
Blood loss (mL), mean±SD	62,2+- 22,9	62,1 +-20,4
Procedural success	45 (100%)	57 (100%)
Accidental hypogastric artery coverage	0	0
Intraoperative complications	0	0

	Ovation (n=45)	Incraft (n=57)	p
Male sex, n (%)	39	51 (91%)	0.66
Age (years), median (IQR)	74,1 +- 7,8	74,3 +- 7,2	0.23
Comorbidities, n (%)			
Current or previous smoking	36 (80%)	45 (79,1%)	0.89
COPD	36 (80%)	28 (49,1%)	0.01
CAD	14 (31,1%)	21 (36,8%)	0.54
Hypertension	39 (86,7%)	49 (86%)	0.91
Dyslipidemia	30 (66,7%)	32 (56,1%)	0.28
Diabetes	8 (17,8%)	14 (24,6%)	0.40
Renal Failure	7 (15,6%)	9 (15,8%)	0.97

Table I. Baseline characteristics of the studied population.

	Ovation (n=45)	Incraft (n=57)	p
30-days complications			
Post-implantation syndrome	0	8 (14%)	0.009
Reintervention	0	1 (1,7%)	0.37
Major adverse events	0	0	
Long-term results			
Death	17 (37,8%)	9 (15,8%)	0.01
Major adverse events	5 (11,1%)	6 (10,5%)	0.92
Endoleak	9 (20%)	13 (22,8%)	0.73
Explant	1 (2,2%)	0	0.25
Total Reintervention	1 (2,2%)	6 (10,5%)	0.10
Occlusion	0	2 (3,5%)	0.20
Follow-up (months), median (IQR; range)	54,37 +- 30,5	32,47 +-19,4	0.06

Table 2: early and long-term outcome

Abstract P-019

Risk Factors and Outcomes for Colonic Ischaemia After Abdominal Aortic Aneurism Repair: a Single Centre Experience

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Objective: Ischaemic colitis is one of the serious causes responsible for morbidity and mortality related to abdominal aortic