DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE



Is preventive IMA coiling efficient (in EVAR)?

J Sobocinski, P Petit, Th Mesnard, L Pruvot, A De Préville, R Azzaoui Vascular Surgery, CHU Lille, France CI-2021





Disclosures

- CookMedical: speaker fees, research grant, travel expenses, proctoring
- AbbottVascular: speaker fees, research grant, consulting
- GEHC: speaker fees, research grant, consulting, travel expenses



EVAR & Tye 2 Endoleak (T2EL)

- T2EL Incidence after EVAR: 5.5 16.5%
- Involving: IMA, lumbar / Acc renal Art
- Concomitant sac growth: 5 25%

THE 24[™] INTERNATIONAL EXPERTS SYMPOSIUM

IN AORTIC ENDOGRAFTING

• Not directly resulting in aortic rupture : 1%

But expose to Type 1 or 3 endoleaks





DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE

DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE



Months after EVAR

Clinical Research, Basic Science

Risk Analysis of Aneurysm Sac Enlargement Caused by Type II Endoleak after Endovascular Aortic Repair

Toru Ide,¹ Kenta Masada,¹ Toru Kuratani,² Ryoto Sakaniwa,³ Kazuo Shimamura,² Keiwa Kin,¹ Yoshiki Watanabe,⁴ Ryota Matsumoto,¹ and Yoshiki Sawa,¹ Osaka, Japan, Hyogo, Japan AVS 2021



DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE

Post EVAR T2EL management is disappointing!

Outcomes of translumbar embolization of type II endoleaks following endovascular abdominal aortic aneurysm repair

John F. Charitable, MD, Peter I. Patalano, MD, Karan Garg, MD, Thomas S. Maldonado, MD, Glenn R. Jacobowitz, MD, Caron B. Rockman, MD, Frank J. Veith, MD, *and* Neal S. Cayne, MD, *New York, NY*

ABSTRACT

Objective: Presence of an endoleak can compromise aneurysm exclusion after endovascular abdominal aortic aneurysm repair (EVAR). Type II endoleaks (T2Es) are most common and may cause sac expansion. We report outcomes of trans lumbar embolization (TLE) of T2Es following EVAR.

Methods: We conducted a retrospective chart review of patients with T2E after EVAR treated with TLE from 2011 to 2018 at a single academic institution. Treatment indications were the presence of persistent T2E and aneurysm growth ≥5 mm. Sac stabilization was defined as growth ≤5 mm throughout the follow-up period.

Results: Thirty consecutive patients were identified. The majority were men (n = 24), with a mean age of 74.3 years (959) confidence interval [CI], 70.9-77.6 years). The most common comorbidities were hypertension (83.3%) and coronary arten disease (54.0%). The mean maximal sac diameter at T2E discovery was 5.8 cm (95% Cl, 5.4-6.2 cm). The mean time to intervention from endoleak discovery was 33.7 \pm 28 months with a mean growth of 0.84 cm (95% Cl, 0.48-1.2 cm) during that time period. The mean follow-up time after TLE was 19.1 months (95% CI, 11.1-27.2 months). Twenty-eight patient were treated with cyanoacrylate glue (CyG) alone, and two were treated with CyG plus coil embolization (CE). There was immediate complete endoleak resolution as assessed intraoperatively, and sac stabilization in 15 cases (50.0%). Elever patients (36.7%) had evidence of persistent T2E on initial imaging after the embolization procedure; additional follow-up revealed eventual sac stabilization at a mean of 21.3 ± 7.2 months, and therefore, these patients did not require furthe intervention. In the remaining four cases (13.3%), there was persistent T2E after the initial TLE, requiring a second inter vention. Repeat TLE stabilized growth in three of these four patients after a mean of 17.6 \pm 12.9 months. One patien required open sacotomy and ligation of lumbar vessels due to continued persistence of the T2E and continued aneurysm growth. There were no ischemic complications related to the embolization procedures. Factors associated with persis tent endoleak after initial embolization were larger aneurysm diameter at the time of initial endoleak identification (P .001) and the use of antiplatelet agents (P < .02). The use of anticoagulation was not a significant risk factor for endolea recurrence or aneurysm growth after TLE.

Conclusions: TLE of T2E is a safe and effective treatment option for T2E with aneurysm growth following EVAR. Patient taking antiplatelet medication and those with larger aneurysms at the time of endoleak identification appear to be a increased risk for persistent endoleak and need for subsequent procedures following initial TLE. These patients may require more intensive monitoring and follow-up. (J Vasc Surg 2021: 1-7.)

Keywords: Endoleak; Translumbar embolization; Endovascular aortic repair; EVAR

Results of Transarterial Embolization for Treating Type 2 Endoleaks: A Single-Center Experience

Ernesto Arenas Azofra,¹ Vicente Mosquera Rey,¹ Francisco Álvarez Marcos,¹ Amer Zanabili Al-Sibbai,¹ Florentino Vega García,² and Manuel Alonso Pérez,¹ Oviedo, Asturias, Spain AVS 2020

Background: Type 2 endoleaks (T2Es) are the main cause of reintervention after endovascular repair of abdominal aortic aneurysms (EVAR). The objective of this study is to quantify success rates of T2E treatment.

Methods: This study involves a retrospective analysis of a prospectively maintained database containing data on all consecutive patients treated for a T2E between 2003 and 2017 in a single center. Technical success was defined as absence of endoleak in the final angiographic control after treatment. Clinical success was defined as absence of sac growth over 5 mm in the contrast-enhanced computed tomography performed a year thereafter. Statistics included Kaplan-Meier survival estimates.

Results: A total of 528 elective EVARs were performed in the period. Thirty-six of these (6.8%) developed a T2E requiring reintervention, a median of 37.9 months after EVAR. Twenty-five percent of the treatments were performed more than 5 years after intervention. Twenty-eight of the 36 treatments were performed via transarterial embolization. For this technique, technical success was 71.4% and clinical success was 62.5%. A subsequent reintervention was required in 35.7% of patients. In this cohort, the rate of aneurysm rupture was 10.7% (n = 3/28), open surgical conversion was needed in 2 of 28 cases (7.1%), and rate of aneurysm-related death was 14.3% (n = 4/28) over follow-up.

Conclusions: A high percentage of patients are at risk of adverse outcomes after T2E treatment. Strict imaging follow-up is still needed in this population

DECEMBER 17 & 18 2021 PULLMAN PARIS BERGY PARIS - FRANCE

Pre-emptive T2EL embolisation: An old idea...

Prevention of lumbar artery endoleaks following endovascular abdominal aortic aneurysm repair with the selective use of absorbable gelatin sponge

S. R. Walker, J. Macierewicz and B. R. Hopkinson *Queen's Medical Centre, Nottingham, UK*

Background: The aim of endovascular repair of an abdominal aortic aneurysm is to exclude the aneurysm from the systemic circulation in order to prevent aneurysm expansion and rupture. Lumbar artery (LA) endoleaks have been associated with continued expansion of the aneurysm sac and occur with a reported incidence of approximately 10 per cent. The aim of this study was to reduce the incidence of LA or inferior mesenteric artery (IMA) endoleaks.

Methods: Following deployment of an aortic uni-iliac graft an aneurysmograph was performed by injecting contrast into the aneurysm sac to look for patent aortic side branches. Patients with no visible side branches had an occluder deployed in the contralateral iliac artery. Patients with patent side branches had an absorbable gelatin sponge inserted into the aneurysm sac before occluder deployment. Patients had contrast-enhanced spiral computed tomography (CT) during follow-up at 1 week, and 3, 6 and 12 months.

Results: Fifty-four patients were studied. Eleven were excluded (two perioperative deaths, seven top endoleaks and two occluder endoleaks). Median follow-up was 2 (range 11–7) months. Of





DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE

And a long controversy...

Type II endoleaks: Predictable, preventable, and sometimes treatable?

Duncan J. Parry, MBChB, FRCSEd,^a David O. Kessel, MA, FRCP, FRCR,^b Iain Robertson, FRCP, FRCR,^b Lucy Denton, DCR(R),^b Jai V. Patel, FRCP, FRCR,^b David C. Berridge, DM, FRCSEd, FRCS,^a Ralph C. Kester, MD, ChM, FRCS,^a and David J. A. Scott, MD, FRCS, FRCSEd,^a Leeds, United Kingdom

Objective: The purpose of this study was to evaluate the effect of preoperative coil embolization of lumbar and inferior mesenteric arteries on the incidence of type II endoleak after endovascular abdominal aortic aneurysm repair. *Methods:* The subjects were consecutive patients who underwent EVAR between January 1996 and January 2001. Patent aortic side branches were identified with preprocedural spiral computed tomographic scanning and calibrated angiography. Coil embolization was performed before EVAR. Patients were followed up with plain radiographs and ultrasound and dual phase spiral computed tomographic scans. Digital subtraction angiography was performed when endoleak was suspected. The outcome measures were the incidence of type II endoleaks and changes in maximum aortic sac diameter (Dmax).

Results: Forty patients underwent EVAR, with a median duration of follow-up of 24 months (range, 3 to 48 months). Before surgery, the inferior mesenteric artery was patent in 16 patients (45%) and the lumbar arteries in 21 patients (53%). Inferior mesenteric artery embolization was successful in 13 of 16 patients (81%). Lumbar embolization was attempted in 13 patients and was successful in eight (62%). During EVAR, successful sac exclusion was achieved in 38 patients (95%).



but the debate should be extended to all the side branches...







Objectives

- ---> Better overall prognosis after EVAR
- ---> Sustainable EVAR success
 - ---> With No further sac progression
 - ---> And reduction of aortic-related reintervention(s)
- ---> With no additional morbidity



DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE

Feasibility depends on several anatomical factors

Ann Vasc Dis Vol. 13, No. 3; 2020; pp 240-247

Online September 4, 2020 doi: 10.3400/avd.oa.20-00115

🕈 Original Article

Predictive Factor of the Possibility for Aortic Side Branches Coil Embolization during Endovascular Abdominal Aortic Aneurysm Repair

Atsushi Aoki, MD, PhD,¹ Kazuto Maruta, MD, PhD,¹ Norifumi Hosaka, MD, PhD,² Tomoaki Masuda, MD, PhD,¹ Tadashi Omoto, MD, PhD,¹ and Yui Horikawa, MD¹

- Aneurysm sac diameter
- Load of thrombus within the sac
- Side branch diameter
- Trajectory of the side branch
- IMA: Distance to the first asc colonic branch





DECEMBER 17 & 18 2021 PULLMAN PARIS BERGY PARIS - FRANCE

Systematic review and meta-analysis of prophylactic aortic side branch embolization to prevent type II endoleaks

Hok Yee Harry Yu, MBBS, FRCS (Edin), FHKAM (Surg),^{a,b} David Lindström, MD, PhD, FEBVS,^a Anders Wanhainen, MD, PhD,^a Gustaf Tegler, MD,^a Baderkhan Hassan, MD, PhD,^a and Kevin Mani, MD, PhD, FEBVS,^a *Uppsala, Sweden; and Hong Kong SAR, China*

Technical success obtained from 62% to 96% With persistent isolated T2ELs from 5% to 24.5% after embolisation

Li Q J Endovasc Ther 2020 / Samura Ann Surg 2020

Technical success defined with low evidence = as angiographic occlusion of the IMA or all target side branch

Target arteries: Any side branch with diam ≥2-3mm



DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE





DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE









DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE

Openned questions: what embolic material to be used?

- No comparative data available between Coils vs. Plugs
- No embolic agents ---> migration +++







DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE

Centre Hospitalier Régional Universitaire de Lille

Impact on the aortic course

- in T2EL incidence post EVAR
 OR = 0.31 [0.17-0.57]; p < 0.001
- aortic-related reinterventions
 OR = 0.12 [0.004–0.36]; *p* < 0.001

[Axelrod 2004; Nevala 2010; Ward 2013; Burbelko 2014; Müller-Wille 2014; Manunga et al 2017; Yu JVS 2020]

• ↓ sac size over time [small cohorts...]



DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE

With no significant collateral effects

• Mortality / colonic ischemia / spinal ischemia

Low and similar to patients without embolisation strategy – 0 à 4%



• Procedural cost

Duration, radiation burden et contrast quantity = no significant increase!

[Axelrod 2004; Nevala 2010; Ward 2013; Burbelko 2014; Müller-Wille 2014; Manunga et al 2017; Yu JVS 2020; Petit 2021]



DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE

Randomised trials

Open access	Protocol
BMJ Open	Multicentre randomised controlled trial
2020	to evaluate the efficacy of pre-emptive inferior mesenteric artery embolisation during endovascular aortic aneurysm repair on aneurysm sac change: protocol of Clarify IMA study

Shigeo Ichihashi ⁽⁰⁾, ¹ Mitsuyoshi Takahara,² Naoki Fujimura,³ Satoru Nagatomi,¹ Shinichi Iwakoshi,¹ Francesco Bolstad,⁴ Kimihiko Kichikawa¹

 Randomized Controlled Trial
 > Ann Surg. 2020 Feb;271(2):238-244.

 doi: 10.1097/SLA.00000000003299.

Endovascular Aneurysm Repair With Inferior Mesenteric Artery Embolization for Preventing Type II Endoleak: A Prospective Randomized Controlled Trial

Makoto Samura ¹, Noriyasu Morikage, Ryo Otsuka, Takahiro Mizoguchi, Yuriko Takeuchi, Takashi Nagase, Takasuke Harada, Osamu Yamashita, Kotaro Suehiro, Kimikazu Hamano

Affiliations + expand PMID: 30946077 DOI: 10.1097/SLA.00000000003299 Primary endopint: ‡ T2EL incidence But not conclusive regarding the sac course

Ongoing

Primary endpoint: Aortic related reintervention







Conclusion – Preventive embolisation in EVAR

- Discussion must include all the aortic side branches
- Feasibility can be limited due to known anatomical factors
- Low morbidity
- Question remains on the "technical success" aspect
- Long-term results unknown



DECEMBER 17 & 18 2021 PULLMAN PARIS BERCY PARIS - FRANCE



Is preventive IMA coiling efficient (in EVAR)?

J Sobocinski, P Petit, Th Mesnard, L Pruvot, A De Préville, R Azzaoui Vascular Surgery, CHU Lille, France CI-2021

