STS/EACTS Latin America Cardiovascular Surgery Conference
September 21-22, 2017 | Cartagena, Colombia

info@cardiovascularsurgeryconference.org
www.CardiovascularSurgeryConference.org

Clinical Outcomes of Young Patients Undergoing Endovascular or Open Repair for Abdominal Aortic Aneurysms A Systematic Review And Meta-Analysis

The Society of Thoracic Surgeons

EACTS
European Association For Cardio-Thoracic Surgery

FIRST FACULTY OF MEDICINE
Charles University

Cleveland Clinic

JAGIELLONIAN UNIVERSITY
MEDICAL COLLEGE

NO CONFLICT OF INTEREST TO DECLARE

***Wan Chin Hsieh**
*Chung Dann Kan
Chong Chao Hsieh
Mohamed Omara
Brandon Michael Henry
Lazar B. Davidovic

Introduction

Abdominal aortic aneurysm (AAA) is typically treated via **open repair** (OPEN) surgery or via **endovascular aortic repair** (EVAR).

Younger patients (**age: 40-65 years**) with AAA undergoing EVAR have a longer follow-up and a higher incidence of reoperation.

As findings on their clinical outcomes are debatable, this study aims to **quantify the extent of clinical benefit of OPEN and EVAR** in such patients, providing evidence-based insights to improve their outcome.

Methodology

Systematic review and meta-analysis of full papers published **from 2000 to 2017** → Twenty-one (**N=21**) **studies** included;

Patient population of interest: **250,837 younger subjects** (**age: 40 – 65 years**) with asymptomatic AAA undergoing either EVAR (N= 149,051) or OPEN (N=101,786);

Databases: PubMed, EMBASE, Scopus, Science Direct, Web of Science, The Cochrane Library and CNKI;

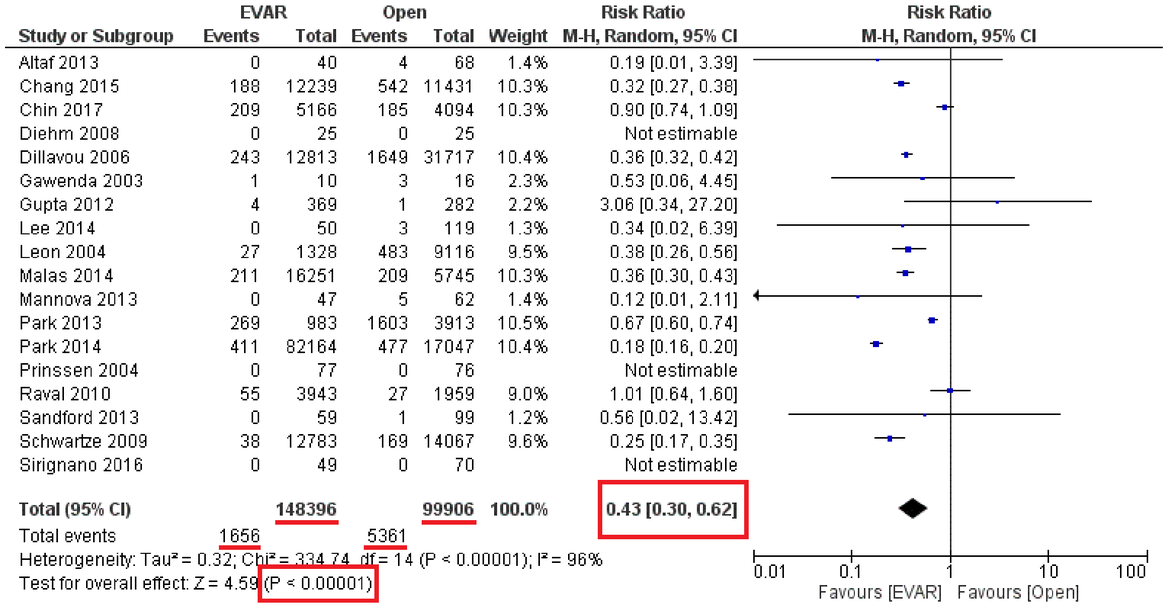
Key search terms: “Asymptomatic AAA”, “EVAR/OPEN elective surgery”, “younger patients”, “middle-aged patients”, “less/younger than 65 years old”;

Endpoints: In-hospital mortality, long-term mortality, post-operative renal failure and reintervention;

Statistical software used: “Review Manager (REVMAN) 5.3 Copenhagen” (The Nordic Cochrane Centre, The Cochrane Collaboration, 2014);

Risk ratios were pooled using the **DerSimonian and Laird random-effects model** and **two-sided p-values <0.05** were considered significant.

Results (N=21)

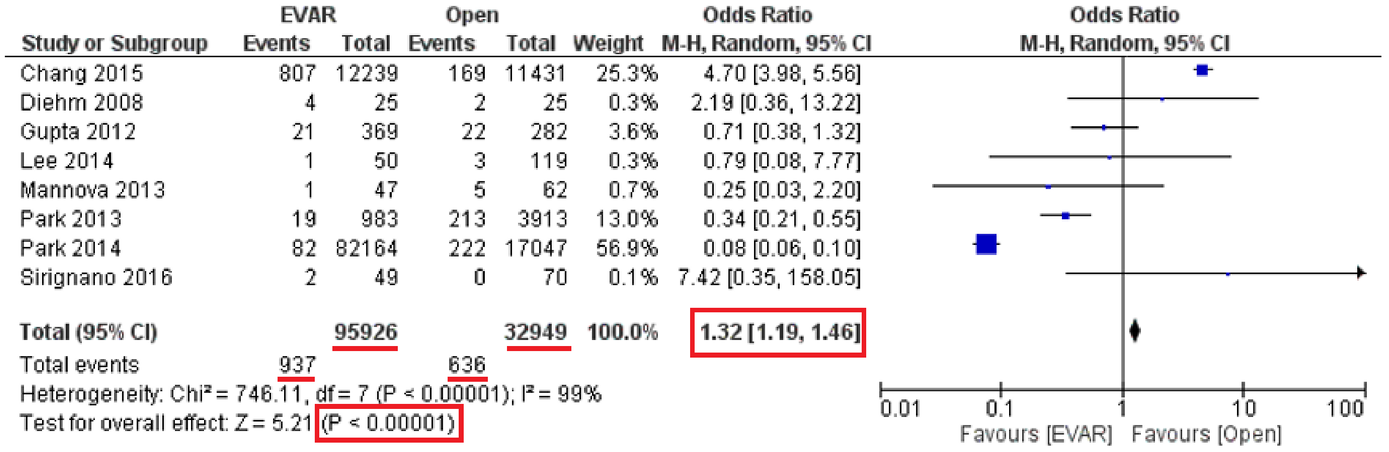


Study or Subgroup	EVAR Events	EVAR Total	Open Events	Open Total	Weight	Risk Ratio M-H, Random, 95% CI
Altaf 2013	0	40	4	68	1.4%	0.19 [0.01, 3.39]
Chang 2015	188	12239	542	11431	10.3%	0.32 [0.27, 0.38]
Chin 2017	209	5166	185	4094	10.3%	0.90 [0.74, 1.09]
Diehm 2008	0	25	0	25		Not estimable
Dillavou 2006	243	12813	1649	31717	10.4%	0.36 [0.32, 0.42]
Gawenda 2003	1	10	3	16	2.3%	0.53 [0.06, 4.45]
Gupta 2012	4	369	1	282	2.2%	3.06 [0.34, 27.20]
Lee 2014	0	50	3	119	1.3%	0.34 [0.02, 6.39]
Leon 2004	27	1328	483	9116	9.5%	0.38 [0.26, 0.56]
Malas 2014	211	16251	209	5745	10.3%	0.36 [0.30, 0.43]
Mannova 2013	0	47	5	62	1.4%	0.12 [0.01, 2.11]
Park 2013	269	983	1603	3913	10.5%	0.67 [0.60, 0.74]
Park 2014	411	82164	477	17047	10.4%	0.18 [0.16, 0.20]
Prinssen 2004	0	77	0	76		Not estimable
Raval 2010	55	3943	27	1959	9.0%	1.01 [0.64, 1.60]
Sandford 2013	0	59	1	99	1.2%	0.56 [0.02, 13.42]
Schwartze 2009	38	12783	169	14067	9.6%	0.25 [0.17, 0.35]
Sirignano 2016	0	49	0	70		Not estimable
Total (95% CI)		**148396**		**99906**	**100.0%**	**0.43 [0.30, 0.62]**
Total events	1656		5361			

Heterogeneity: Tau² = 0.32; Chi² = 334.74, df = 14 (P < 0.00001); I² = 96%
Test for overall effect: Z = 4.59 (P < 0.00001)

Risk Ratio M-H, Random, 95% CI
0.01 0.1 1 10 100
Favours [EVAR] Favours [Open]

Figure 1. 30-day mortality.

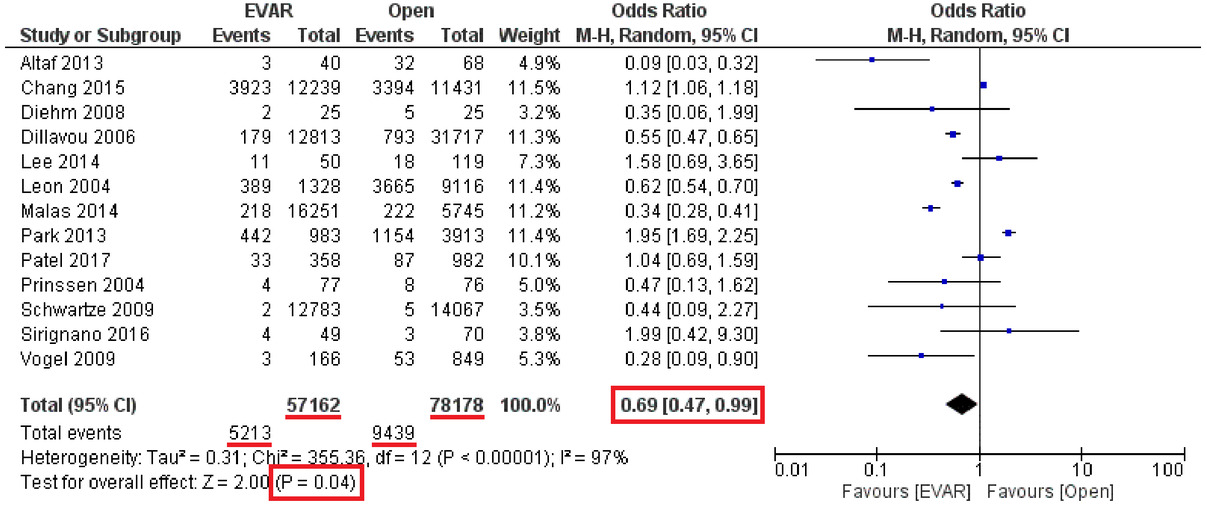


Study or Subgroup	EVAR Events	EVAR Total	Open Events	Open Total	Weight	Odds Ratio M-H, Random, 95% CI
Chang 2015	807	12239	169	11431	25.3%	4.70 [3.98, 5.56]
Diehm 2008	4	25	2	25	0.3%	2.19 [0.36, 13.22]
Gupta 2012	21	369	22	282	3.6%	0.71 [0.38, 1.32]
Lee 2014	1	50	3	119	0.3%	0.79 [0.08, 7.77]
Mannova 2013	1	47	5	62	0.7%	0.25 [0.03, 2.20]
Park 2013	19	983	213	3913	13.0%	0.34 [0.21, 0.55]
Park 2014	82	82164	222	17047	56.9%	0.08 [0.06, 0.10]
Sirignano 2016	2	49	0	70	0.1%	7.42 [0.35, 158.05]
Total (95% CI)		**95926**		**32949**	**100.0%**	**1.32 [1.19, 1.46]**
Total events	937		636			

Heterogeneity: Chi² = 746.11, df = 7 (P < 0.00001); I² = 99%
Test for overall effect: Z = 5.21 (P < 0.00001)

Odds Ratio M-H, Random, 95% CI
0.01 0.1 1 10 100
Favours [EVAR] Favours [Open]

Figure 2. Incidence of reintervention.

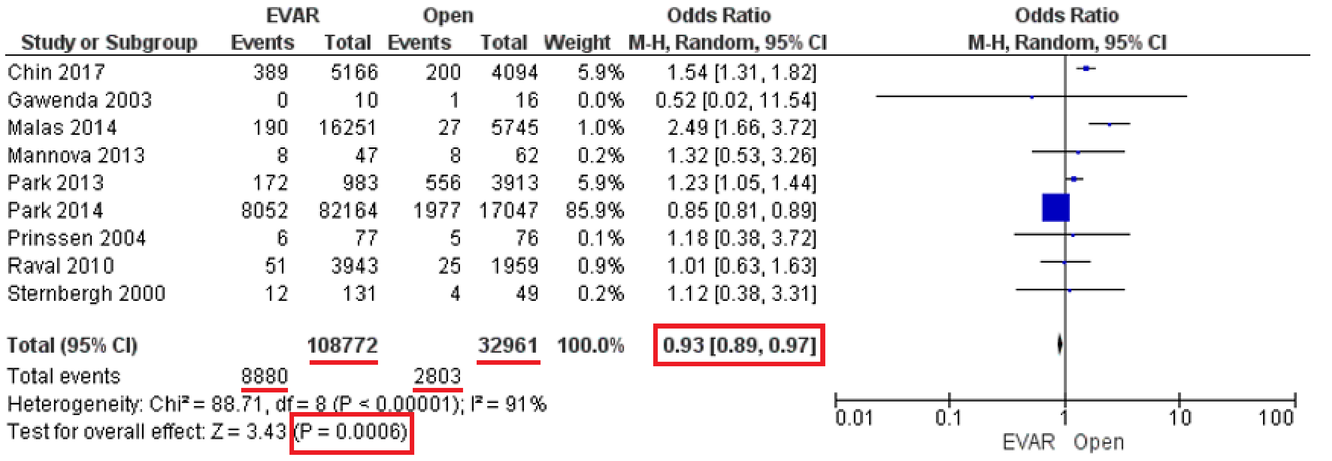


Study or Subgroup	EVAR Events	EVAR Total	Open Events	Open Total	Weight	Odds Ratio M-H, Random, 95% CI
Altaf 2013	3	40	32	68	4.9%	0.09 [0.03, 0.32]
Chang 2015	3923	12239	3394	11431	11.5%	1.12 [1.06, 1.18]
Diehm 2008	2	25	5	25	3.2%	0.35 [0.06, 1.99]
Dillavou 2006	179	12813	793	31717	11.3%	0.55 [0.47, 0.65]
Lee 2014	11	50	18	119	7.3%	1.58 [0.69, 3.65]
Leon 2004	389	1328	3665	9116	11.4%	0.62 [0.54, 0.70]
Malas 2014	218	16251	222	5745	11.2%	0.34 [0.28, 0.41]
Park 2013	442	983	1154	3913	11.4%	1.95 [1.69, 2.25]
Patel 2017	33	358	87	982	10.1%	1.04 [0.69, 1.59]
Prinssen 2004	4	77	8	76	5.0%	0.47 [0.13, 1.62]
Schwartze 2009	2	12783	5	14067	3.5%	0.44 [0.09, 2.27]
Sirignano 2016	4	49	3	70	3.8%	1.99 [0.42, 9.30]
Vogel 2009	3	166	53	849	5.3%	0.28 [0.09, 0.90]
Total (95% CI)		**57162**		**78178**	**100.0%**	**0.69 [0.47, 0.99]**
Total events	5213		9439			

Heterogeneity: Tau² = 0.31; Chi² = 355.36, df = 12 (P < 0.00001); I² = 97%
Test for overall effect: Z = 2.00 (P = 0.04)

Odds Ratio M-H, Random, 95% CI
0.01 0.1 1 10 100
Favours [EVAR] Favours [Open]

Figure 3. Long-term mortality.



Study or Subgroup	EVAR Events	EVAR Total	Open Events	Open Total	Weight	Odds Ratio M-H, Random, 95% CI
Chin 2017	389	5166	200	4094	5.9%	1.54 [1.31, 1.82]
Gawenda 2003	0	10	1	16	0.0%	0.52 [0.02, 11.54]
Malas 2014	190	16251	27	5745	1.0%	2.49 [1.66, 3.72]
Mannova 2013	8	47	8	62	0.2%	1.32 [0.53, 3.26]
Park 2013	172	983	556	3913	5.9%	1.23 [1.05, 1.44]
Park 2014	8052	82164	1977	17047	85.9%	0.85 [0.81, 0.89]
Prinssen 2004	6	77	5	76	0.1%	1.18 [0.38, 3.72]
Raval 2010	51	3943	25	1959	0.9%	1.01 [0.63, 1.63]
Sternbergh 2000	12	131	4	49	0.2%	1.12 [0.38, 3.31]
Total (95% CI)		**108772**		**32961**	**100.0%**	**0.93 [0.89, 0.97]**
Total events	8880		2803			

Heterogeneity: Chi² = 88.71, df = 8 (P < 0.00001); I² = 91%
Test for overall effect: Z = 3.43 (P = 0.0006)

Odds Ratio M-H, Random, 95% CI
0.01 0.1 1 10 100
EVAR Open

Figure 4. Incidence of renal failure.

Discussion and Conclusion

EVAR may lead to **improved short- and long-term survival** in younger patients (age: 40-65 years) with asymptomatic AAA (Figs. 1 and 3).

Furthermore, there was a **significant reduction in incidences of reintervention and renal failure in patients undergoing EVAR** as compared to those who underwent OPEN (Figs. 2 and 4).

Future work is underway to **quantify the influence of pre-operative, perioperative and post-operative factors on survival**.

STS/EACTS Latin America Cardiovascular Surgery Conference

September 21-22, 2017 | Cartagena, Colombia

info@cardiovascularsurgeryconference.org
www.CardiovascularSurgeryConference.org

Thank You

The Society of Thoracic Surgeons

EACTS
European Association For Cardio-Thoracic Surgery