

Author	Median year of data collection	Country	Study design	Number at risk at T0	Median/mean follow-up (months)	Juxtarenal/pararenal/short-necked aneurysms	Suprarenal/limited type IV TAAA	Zenith fenestrated graft	Anaconda fenestrated graft	Target vessels per patient	Outcomes reported (complete data)
Zuccon 2022 <sup>35</sup>	2019	Sweden	Retrospective	56	14	-	-	56 (100)	0	2.96	S, R
Bordet 2023 <sup>36</sup>	2018.5	France	Retrospective	18	36	18 (100)	0	-	-	-	S, M
Dossabhoy 2022 <sup>37</sup>	2016.5	USA	Retrospective	158	34	158	0	158 (100)	0	2.80	S, R
Katsargyris 2023 <sup>38</sup>	2015	Germany	Retrospective	349	49.3	287	62	349 (100)	0	3.50	S, R, TVP
Sénémaud 2021 <sup>39</sup>	2015	France	Retrospective	78	28	66 (84.6)	12 (15.4)	78 (100)	0	3.09	S, R, TVP
Teter 2022 <sup>23</sup>	2015	Argentina	Prospective	30	30.3	-	-	30 (100)	0	-	M
Pini 2020 <sup>40</sup>	2015	Italy	Prospective	127	21	98 (77.2)	13 (10.2)	0	127 (100)	2.69	S, R, M
De Niet 2020 <sup>41</sup>	2014	International	Retrospective	335	14.4	289 (86.3)	27 (8.1)	0	335 (100)	2.75	S, R, TVP, M
Chinsakchai 2019 <sup>42</sup>	2013.5	Thailand	Retrospective	20	36.7	20 (100)	0	20 (100)	0	2.45	S, R
Gargiulo 2020 <sup>43</sup>	2013.5	Italy	Prospective	98	36	98 (100)	0	98 (100)	0	3.67	S, R
Van der Riet 2021 <sup>44</sup>	2013.5	Germany/ Netherlands	Retrospective	194	24.6	177 (91.2)	0	187 (96.4)	7 (3.6)	2.36	S
Blankensteijn 2017 <sup>45</sup>	2013	Netherlands	Prospective	60	16.4	60 (100)	0	0	60 (100)	2.33	S, R
Kotelis 2016 <sup>46</sup>	2013	Germany	Retrospective	39	33	23 (59.0)	16 (41.0)	0	39 (100)	2.46	S, R
Midy 2017 <sup>47</sup>	2012.5	France	Prospective	86	24	-	-	0	86 (100)	3.40	S, R, TVP
Verhoeven 2016 <sup>48</sup>	2012	Germany	Prospective	281	21	-	-	281 (100)	0	3.19	S, R, TVP
Gallitto 2021 <sup>49</sup>	2012	Italy	Retrospective	147	37	118 (80.3)	29 (19.7)	147 (100)	0	3.62	S, R
Colgan 2018 <sup>50</sup>	2012	UK	Retrospective	98	12	-	-	0	98 (100)	3.08	S, R, TVP, M
Yazar 2020 <sup>51</sup>	2011	Netherlands/ Germany	Prospective	96	12	76 (79.2)	5 (5.2)	93 (96.9)	3 (3.1)	2.46	S
Fiorucci 2019 <sup>52</sup>	2010.5	Italy/ Germany	Prospective	92	26	92 (100)	0	92 (100)	0	2.66	S, R
Gallitto 2019 <sup>53</sup>	2010.5	Italy	Retrospective	20	25	20 (100)	0	20 (100)	0	3.35	S, M
Oikonomou 2017 <sup>54</sup>	2010	Germany	Retrospective	141	33	-	-	133 (94.3)	8 (5.7)	3.64	S, R
Soler 2019 <sup>25</sup>	2010	France	Retrospective	57	36	57 (100)	0	57 (100)	0	3.40	S

Banno 2014 <sup>55</sup>	2009.5	France	Prospective	80	14	80 (100)	0	64 (80)	7 (8.8)	2.43	S, R, TVP
Roy 2017 <sup>17</sup>	2009	UK	Retrospective	173	34	173 (100)	0	173 (100)	0	3.29	S, R, M
Nessvi 2014 <sup>56</sup>	2009	Sweden	Prospective	81	40	81 (100)	0	81 (100)	0	2.12	S
Sveinsson 2022 <sup>28</sup>	2009	Sweden	Retrospective	94	89	94 (100)	0	94 (100)	0	2.98	S, R, TVP
Henstra 2020 <sup>57</sup>	2008.5	Netherlands	Retrospective	272	26	259 (95.2)	13 (4.8)	255 (94.7)	17 (6.3)	2.28	S, R, TVP
Oderich 2021 <sup>58</sup>	2008.5	USA	Prospective	67	59.8	67 (100)	0	67 (100)	0	2.66	S, R, TVP, M
Perot 2013 <sup>59</sup>	2008	France	Retrospective	115	24	97 (84.3)	18 (15.7)	115 (100)	0	-	S, R, M
Hertault 2014 <sup>60</sup>	2007	Sweden/ France	Prospective	283	25	283 (100)	0	283 (100)	0	3.0	S
Shahverdyan 2015 <sup>61</sup>	2006.5	Germany	Prospective	35	25	35 (100)	0	9 (25.7)	26 (74.3)	2.43	S
Grimme 2014 <sup>62</sup>	2006	Germany	Retrospective	138	13	-	-	138 (100)	0	2.843	S, TVP
Greenberg 2009 <sup>63</sup>	2005.5	USA	Prospective	30	12	30 (100)	0	30 (100)	0	2.57	M
Verhoeven 2010 <sup>64</sup>	2005	Germany	Retrospective	100	24	100 (100)	0	100 (100)	0	2.75	S, TVP
Kristmundsson 2014 <sup>65</sup>	2004.5	Sweden	Prospective	54	67	49 (90.7)	0	54 (100)	0	2.48	S, R, TVP, M
O'Neill 2006 <sup>66</sup>	2003	USA	Prospective	119	48.1	119 (100)	-	119 (100)	0	2.54	M
Mastracci 2010 <sup>67</sup>	2001.5	USA	Prospective	150	19	150 (100)	0	150 (100)	0	-	S

Supplementary table 1. Individual study data for all studies reporting long-term outcomes for custom-made fenestrated endovascular aneurysm repair (FEVAR) of complex abdominal aortic aneurysms (AAA).

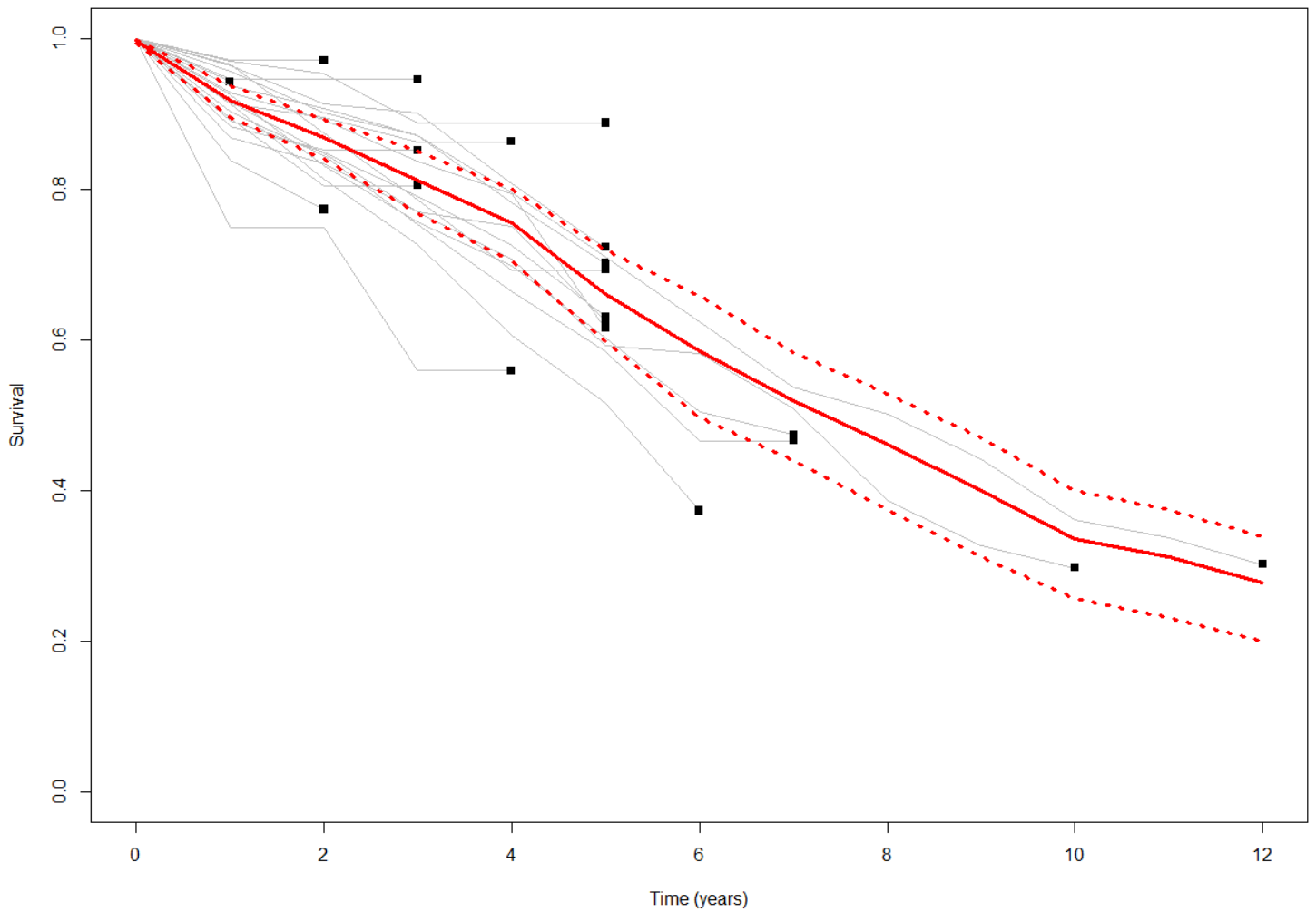
*Abbreviations: Survival (S); Reintervention (R); Target Vessel Patency (TVP); Morphology (M).*

*N.B. Almost all studies marked as 'prospective' in fact reported the retrospective analysis of prospectively collected data.*



Nessvi 2014	Moderate	Low	Low	Low	Low	Low	Low	Moderate
Sveinsson 2022	Low	Low	Low	Low	Low	Low	Low	Low
Henstra 2020	Low	Low	Low	Low	Low	Low	Low	Low
Oderich 2021	Low	Low	Low	Low	Low	Low	Low	Low
Perot 2013	Low	Low	Low	Low	Low	Low	Low	Low
Hertault 2014	Low	Low	Low	Low	Low	Low	Low	Low
Shahverdyan 2015	Moderate	Low	Low	Low	Low	Low	Low	Moderate
Grimme 2014	Low	Low	Low	Low	Low	Low	Low	Low
Greenberg 2009	Low	Low	Low	Low	Low	Low	Low	Low
Verhoeven 2010	Low	Low	Low	Low	Low	Low	Low	Low
Kristmundsson 2014	Low	Low	Low	Low	Low	Low	Low	Low
O'Neill 2006	Low	Low	Low	Low	Low	Low	Low	Low
Mastracci 2010	Low	Low	Low	Low	Low	Low	Low	Low

Supplementary table 2. ROBINS-I risk of bias assessment for all studies reporting long-term outcomes for custom-made fenestrated endovascular aneurysm repair (FEVAR) of complex abdominal aortic aneurysms (AAA).

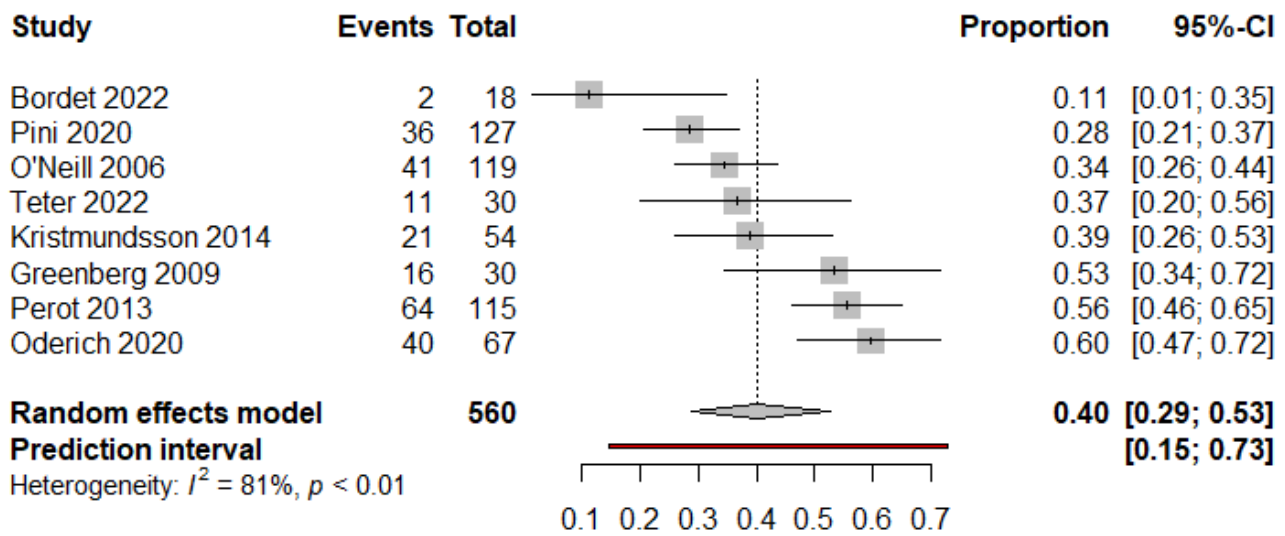


Year	0	1	2	3	4	5	6	7	8	9	10	11	12
N.studies	20	20	19	17	14	12	5	4	2	2	2	1	1
N.risk	1920	1920	1442	1078	751	542	192	133	82	68	59	39	38
Survival [95% CI]	100%	92.0% [89.8-93.9%]	87.2% [84.4-89.6%]	81.4% [77.0-85.3%]	75.7% [70.5-80.3%]	66.1% [59.6-72.1%]	58.5% [49.5-66.0%]	52.0% [44.2-58.7%]	46.1% [37.4-52.9%]	39.9% [31.1-47.0%]	33.5% [25.7-40.0%]	31.1% [23.3-37.7%]	27.7% [20.2-34.0%]

Supplementary figure 1. Pooled Kaplan Meier Estimated Survival probabilities for all studies only including juxtarenal/ pararenal/ short-necked aneurysms reporting long-term outcomes for custom-made fenestrated endovascular aneurysm repair (FEVAR) of complex abdominal aortic aneurysms (AAA).

*Grey line= individual study, black square= end of single study follow-up, red line= pooled random-effects survival probability, dashed red line= 95% confidence interval.*

*NB: Data maturity analysis (Pocock threshold= 10%) suggests maturity up to 6 years.*



**Supplementary figure 2.** Forest plot for all studies reporting 1-year incidence of aneurysm sac regression after custom-made fenestrated endovascular aneurysm repair (FEVAR) of complex abdominal aortic aneurysms (AAA).

Outcome	Sensitivity analysis	All studies
<i>Survival</i>		
1 year	91.7% [90.3-93.0]	91.6% [90.2- 92.9]
3 years	80.6% [77.8-83.2]	80.8% [78.0-83.2]
5 years	64.7% [60.4-68.9]	65.1% [60.9-69.2]
<i>Freedom from Re-intervention</i>		
1 year	90.2% [87.2-92.8]	90.2% [87.3-92.7]
3 years	81.3% [76.6-85.3]	80.9% [76.5- 84.9]
5 years	74.2% [67.3-80.2]	73.8% [67.1-79.6]
<i>Target vessel patency</i>		
1 year	97.0% [95.3-98.3]	96.6% [94.9-98.0]
3 years	95.2% [92.4-97.3]	94.5% [91.7-96.7]
5 years	94.1% [90.4-96.8]	93.1% [89.3- 96.0]
<i>Freedom from sac expansion</i>		
1 year	97.1% [89.1-100.0]	97.8% [92.4-99.9]
3 years	90.2% [80.2-95.4]	91.5% [88.8-96.7]
4 years	84.2% [70.2-92.4]	86.1% [74.6-93.0]
<i>Sac regression</i>		
1 year	42.8% [28.3-58.8]	40.2% [28.9-52.7]

Supplementary table 3. Sensitivity analyses for all long-term outcomes for custom-made fenestrated endovascular aneurysm repair (FEVAR) of complex abdominal aortic aneurysms (AAA).

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Data expressed as: Pooled probability of freedom from event [95 CI].

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**Database: Ovid MEDLINE(R) ALL <1946 to June 05, 2023>**

**Search Strategy:**

- 1** fenestrated endovascular aneurysm repair\*.tw,kw. (218)
- 2** (F-EVAR or FEVAR or fenestrated or fenestration\*).tw,kw. (12275)
- 3** Endovascular Aneurysm Repair/ and (fenestrated or fenestration\*).tw,kw. (24)
- 4** 1 or 2 or 3 (12277)
- 5** (abdominal aort\* aneurysm\* or AAA\*).tw,kw. (32355)
- 6** aortic aneurysmal disease.tw,kw. (139)
- 7** aortic aneurysm\*.tw,kw. (38068)
- 8** (endo-vascular aneurysm\* or endovascular aneurysm\*).tw,kw. (5185)
- 9** (short neck or shortneck or infrarenal or juxtarenal or pararenal or thoracoabdominal or thoraco-abdominal or suprarenal).tw,kw. (20262)
- 10** (JAAA\* or PAAA\* or TAAA\*).tw,kw. (1436)
- 11** exp Aortic Aneurysm, Abdominal/ (22309)
- 12** exp Aortic Aneurysm/ (61243)
- 13** or/5-12 (92395)
- 14** 4 and 13 (2048)
- 15** (survival or survived or mortalit\* or morbidit\* or death\* or target vessel\* or re-intervention\* or reintervention or postoperativ\* or post-operativ\* or sac).mp. (4132510)
- 16** exp Survival/ or exp Disease-Free Survival/ or exp Survival Analysis/ or exp Progression-Free Survival/ or exp Survival Rate/ or exp Graft Survival/ (536989)
- 17** exp Mortality/ (423113)
- 18** exp Postoperative Complications/ or exp Morbidity/ (1226427)
- 19** 15 or 16 or 17 or 18 (4763590)



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**Database: Embase <1974 to 2023 Week 22>**

**Search Strategy:**

- 1 fenestrated endovascular aneurysm repair\*.tw,kf. (332)
- 2 (F-EVAR or FEVAR or fenestrated or fenestration\*).tw,kf. (15860)
- 3 endovascular aneurysm repair/ (20994)
- 4 fenestration/ (6838)
- 5 3 and 4 (850)
- 6 1 or 2 or 5 (16054)
- 7 (abdominal aort\* aneurysm\* or AAA\*).tw,kf. (43814)
- 8 aortic aneurysmal disease.tw,kf. (188)
- 9 aortic aneurysm\*.tw,kf. (50214)
- 10 (endo-vascular aneurysm\* or endovascular aneurysm\*).tw,kf. (7381)
- 11 (short neck or shortneck or infrarenal or juxtarenal or pararenal or thoracoabdominal or thoraco-abdominal or suprarenal).tw,kf. (27656)
- 12 (JAAA\* or PAAA\* or TAAA\*).tw,kf. (2151)
- 13 exp abdominal aortic aneurysm/ (11893)
- 14 exp aortic aneurysm/ (30356)
- 15 "aortic aneurysm endovascular graft"/ (5852)
- 16 or/7-15 (96793)
- 17 6 and 16 (3190)
- 18 (survival or survived or mortalit\* or morbidit\* or death\* or target vessel\* or re-intervention\* or reintervention or postoperativ\* or post-operativ\* or sac).mp. (6065311)
- 19 graft survival/ or short term survival/ or disease free survival/ or recurrence free survival/ or failure free survival/ or survival/ or post treatment survival/ or survival rate/ or progression free survival/ or overall survival/ or survival analysis/ or survival prediction/ or survival time/ (1217353)
- 20 exp death/ (817332)
- 21 exp morbidity/ (435423)
- 22 exp postoperative complication/ (817020)
- 23 exp reoperation/ (103995)
- 24 or/18-23 (6377758)
- 25 17 and 24 (2541)
- 26 limit 25 to yr="1992 -Current" (2535)

**Database: Cochrane**

"fenestrated endovascular aneurysm repair\*" or F-EVAR or FEVAR or fenestrat\* in Title Abstract Keyword AND "abdominal aort\* aneurysm\*" or AAA\* or "aortic aneurysmal disease" or "aort\* aneurysm\*" or "endovascular aneurysm\*" or "endovascular aneurysm\*" or "short neck" or shortneck or infrarenal or juxtarenal or pararenal or thoracoabdominal or thoraco-abdominal or suprarenal or JAAA\* or PAAA\* or TAAA\* in Title Abstract Keyword AND survival or survived or mortalit\* or morbidit\* or death\* or "target vessel\*" or sac or re-intervention\* or reintervention or postoperativ\* or post-operativ\* in Title Abstract Keyword