

On-line Table 1: Search syntax

PubMed Search Accessed on August 28, 2017 (1445 Articles)	EMBASE Search Accessed on August 28, 2017 (1049 Articles)	MEDLINE Search Accessed on August 28, 2017 (199 Articles)
((intracranial giant aneurysms OR very large intracranial aneurysms) AND endovascular treatment) AND ("1990/01/01"(Date - Publication): "3000"(Date - Publication))	('giant':ab,ti OR 'very large intracranial aneurysm':ab,ti) AND 'endovascular treatment':ab,ti AND (1990–2017)/py	((giant or very large intracranial aneurysms) and endovascular treatment).ab.
((giant(Title/Abstract) OR very large intracranial aneurysms(Title/Abstract))) AND coiling(Title/Abstract) AND ("1990/01/01"(Date - Publication): "3000"(Date - Publication))	('giant':ab,ti OR 'very large intracranial aneurysm':ab,ti) AND 'coiling':ab,ti AND (1990–2017)/py	((giant or very large intracranial aneurysms) and coiling).ab.
((giant(Title/Abstract) OR very large intracranial aneurysms(Title/Abstract))) AND flow diversion(Title/Abstract) AND ("1990/01/01"(Date - Publication): "3000"(Date - Publication))	('giant':ab,ti OR 'very large intracranial aneurysm':ab,ti) AND 'flow diversion':ab,ti AND (1990–2017)/py	((giant or very large intracranial aneurysms) and flow diversion).ab.
((giant(Title/Abstract) OR very large intracranial aneurysms(Title/Abstract))) AND parent artery occlusion(Title/Abstract) AND ("1990/01/01"(Date - Publication): "3000"(Date - Publication))	('giant':ab,ti OR 'very large intracranial aneurysm':ab,ti) AND 'parent artery occlusion':ab,ti AND (1990–2017)/py	((giant or very large intracranial aneurysms) and parent artery occlusion).ab.

On-line Table 2: Summary of studies included in the meta-analysis

Study Name	Design	No. of An Treated	No. of Unrupt/ Rupt	RC Treatment/ DC	Coiling/ SAC vs FD	BTO before DC Treatment (Negative/ Positive)	Complications (RC/DC)	An Occlusion (RC/DC)	Mean Radiologic/ Clinical Follow-Up (mo)	Quality of Studies (NOS)
Adeeb et al, 2017 ¹	R	50	50/0	50/0	0/50	—	16/—	30/— ^a	13/13	6
Peschillo et al, 2017 ¹⁰	R	18	18/0	18/0	0/18	—	4/—	NA	12/12	7
John et al, 2016 ²³	R	12	12/0	12/0	0/12	—	0/—	9/— ^a	60/29	6
Johnson et al, 2015 ²⁴	P	13	NA	13/0	NA	—	6/—	NA	6/6	5
Zhang et al, 2015 ²⁵	R	30	27/3	19/11	19/0	11 (11/0)	7/2	7/11	9/28	7
Kallmes et al, 2015 ¹³	P	62	62/0	62/0	0/62	—	15/—	NA	NA	6
Strauss and Maimon, 2016 ¹⁶	ProDB	14	14/0	14/0	0/14	—	7/—	5/—	NA	5
Labeyrie et al, 2015 ²⁶	R	27	NA	0/27	—	27 (27/0)	—/7	NA	36/36	5
Wang et al, 2015 ²⁷	R	33	NA	20/13	NA	13 (13/0)	NA	17/13	NA	5
Dumont et al, 2014 ²⁸	R	26	21/5	22/4	6/13	4 (4/0)	11/3	NA	18/18	7
Derrey et al, 2015 ²⁹	ProDB	48	34/14	29/19	NA	NA	NA	15/19	60/60	4
Cinar et al, 2013 ³⁰	R	17	17/0	17/0	0/17	—	4	12/— ^a	6/12	5
van Oel et al, 2013 ¹⁷	R	10	9/1	10/0	9/1	—	4	7/— ^a	12/24	6
Hassan et al, 2013 ¹⁴	R	13	13/0	0/13	—	13 (13/0)	—/0	NA	NA	4
Yu et al, 2012 ³¹	P	11	NA	13/0	0/11	—	NA	NA	18/18	4
Saatci et al, 2012 ¹⁵	R	30	NA	30/0	0/30	—	NA	27/—	12/NA	5
Gao et al, 2012 ³	R	31	NA	31/0	31/0	—	9/—	18/—	38/38	5
Limaye et al, 2012 ³²	R	22	19/3	4/18	2/2	18 (18/0)	2/7	NA	12/60	6
Matouk et al, 2012 ³³	ProDB	19	19/0	0/19	—	19 (19/0)	10/—	13/—	142/142	6
Clarençon et al, 2011 ⁴	R	19	19/0	0/19	—	19 (19/0)	1/—	14/— ^a	52/52	7
Hauck et al, 2009 ³⁴	R	15	15/0	15/0	15/0	—	3/—	7/—	27/27	6
Lv et al, 2009 ³⁵	R	33	24/9	4/29	4/0	29 (29/0)	1/1	1/28	14/14	7
Suzuki et al, 2009 ³⁶	R	12	12/0	8/4	8/0	NA	2/1	8/4	NA	5
Jahromi et al, 2008 ⁵	ProDB	38	28/10	30/8	21/0	8 (8/0)	18/3	22/8	24/25	8
Standhardt et al, 2008 ³⁷	R	19	NA	19/0	19/0	—	NA	13	36/NA	5
Li et al, 2007 ³⁸	R	20	19/1	11/9	10/0	9 (9/0)	4/0	7/9	41/40	7
Suzuki et al, 2007 ³⁹	R	12	12	8/4	8/0	4 (4/0)	2/1	8/4	NA	6
Deshaies et al, 2007 ⁴⁰	ProDB	10	NA	10/0	10/0	—	4	5 ^a	NA	5
Heran et al, 2007 ⁴¹	ProDB	10	10/0	10/0	10/0	—	5/—	7/—	30/30	6
Cekirge et al, 2006 ⁴²	R	21	NA	21/0	21/0	—	4/— ^b	13/—	NA	5
Lubicz et al, 2004 ²¹	R	13	9/4	0/13	—	6 (6/0) ^c	—/5	—/9 ^a	27/27	7
Murayama et al, 2003 ⁴³	R	73	NA	73/0	73/0	—	NA	66/—	12/NA	4
Sluzewski et al, 2003 ⁴⁴	R	29	9/20	29/0	29/0	—	8/—	14/— ^c	6/50	7
Ross et al, 2000 ⁴⁵	R	19	NA	10/9	10/0	9 (9/0)	NA/2	1/9	26/26	5
Kim and Choi, 2000 ⁴⁶	R	10	NA	10/0	10/0	—	NA	5/—	NA	4
Tateshima et al, 2000 ⁴⁷	R	10	NA	10/0	10/0	—	NA	6/—	NA	4
Morishima et al, 1998 ⁴⁸	R	16	16/0	10/6	10/0	6 (6/0) ^d	2/0	9/6	17/17	6
Viñuela et al, 1997 ⁴⁹	R	19	NA	19/0	19/0	—	NA	9/—	NA	4
Guglielmi et al, 1992 ⁵⁰	R	10	7/3	10/0	10/0	—	1/—	4/— ^a	6/6	6

Note:—An indicates aneurysm(s); Unrupt, unruptured, Rupt, ruptured; Pro DB, prospectively maintained database; R, retrospective; RC, reconstructive; DC, deconstructive; FD, flow diversion; BTO, balloon test occlusion; NOS, Newcastle-Ottawa Scale; P, prospective study; NA, not available.

^a Adeeb et al, 2017: 39 patients available; John et al, 2016: 10 patients available; Cinar et al, 2013: 14 patients available; van Oel et al, 2013: 8 patients available; Clarençon et al, 2011: 15 patients available; Deshaies et al, 2007: 9 patients available; Lubicz et al, 2004: 12 patients available; Guglielmi et al, 1992: 6 patients available.

^b Cekirge et al, 2006: reported only the rate of permanent complications.

^c Lubicz et al, 2004: 7 patients with giant aneurysms on the nondominant vertebral artery underwent only 4-vessel angiography and the Allcock test; Sluzewski et al, 2003: 28 patients available.

^d Morishima et al, 1998: in 2 patients, a protective bypass was performed.

On-line Table 3: Patient population and characteristics of very large/giant intracranial aneurysms

Variables	Raw Numbers (%)	No. of Articles	95% CI
Population characteristics			
No. of patients	894	39	
Mean age (yr)	53.3 (27–70)	20	
M/F	142:750 = 0.17	21	
Aneurysm characteristics and presenting symptoms			
Aneurysm morphology			
Saccular	108/191 = 56.5%	8	49–63
Fusiform	83/191 = 43.5%		36–50
No. of very large/giant thrombotic aneurysms	43/112 = 38%	5	30–47.6
No. of unruptured vs ruptured	479/543 = 88%	19	85–90
	vs		
	64/543 = 12%		12–38
Aneurysm location			
Anterior circulation	314/455 (69%)	22	64.2–73.2
Posterior circulation	141/455 (31%)		26.7–35.7
Mean aneurysm size	30 mm (median, 29 mm)	15	
Aneurysm presenting symptoms			
Mass effect	209/350 = 59.5%	16	54.5–64.7
Headache	36/350 = 10%		7.5–13
SAH	57/350 = 16%		12.7–20.5
Ischemic	19/350 = 5.5%		3.4–8.3
Incidental	29/350 = 8.5%		5.8–11.5
Treatment of very large/giant intracranial aneurysms			
No. of reconstructive treatments	673/894 = 75%	34	72–78
No. of deconstructive treatments	221/894 = 25%	16	22–27
Unruptured aneurysms			
Overall reconstructive treatments	336/479 = 70%	19	65–74
Coiling/SAC	147/336 = 44%		38–49
Flow diversion	189/336 = 56%		50–61
Overall deconstructive treatments	147/479 = 30%	8	26–34
Ruptured aneurysms			
Overall reconstructive treatments with coiling/SAC	48/64 = 75%	8	63.6–84
Overall deconstructive treatments	16/64 = 25%	6	15.6–36
Radiologic follow-up (mo)	Mean, 26 (range, 6–66) Median, 21; IQR, 12–38	27	
Clinical follow-up (mo)	Mean, 34 (range, 6–20) Median, 28; IQR, 17–41	24	

Note:—VB indicates vertebrobasilar system.

On-line Table 4: Treatment-related complications and clinical outcome after reconstructive and deconstructive treatments

Variables	Unruptured Group (Results of Meta-Analysis)	No. of Articles	P Value	Ruptured Group (Results of Meta-Analysis)	No. of Articles	P Value
Treatment-related complications						
Complication rate (reconstructive)	87/267 = 30% (22–37) (I^2 = 60%)	19		13/38 = 34% (17–50) (I^2 = 32%)	7	
vs			.05 ^a			.4
Complication rate (deconstructive)	23/112 = 16% (7–25) (I^2 = 58%)	11		8/21 = 38% (17–74) (I^2 = 65%)	6	
Permanent complication (reconstructive)	63/317 = 15% (9–21) (I^2 = 66%)	19		9/47 = 20% (7.1–34) (I^2 = 34%)	8	
vs			.01 ^a			.9
Permanent complication (deconstructive)	14/110 = 8.6% (3–14) (I^2 = 19%)	10		6/21 = 29% (10–71) (I^2 = 74%)	6	
Mortality rate (reconstructive)	28/222 = 9% (5–13) (I^2 = 29%)	16		7/38 = 18% (6–34) (I^2 = 22%)	7	
vs			.35			.9
Mortality rate (deconstructive)	11/153 = 6% (1–9) (I^2 = 0%)	9		4/21 = 19% (3.6–53) (I^2 = 61%)	6	
Type of complications						
Ischemic events (reconstructive)	54/299 = 15% (10–21) (I^2 = 42%)	18		6/37 = 18.8% (6.9–30) (I^2 = 0%)	6	
vs			.4			.3
Ischemic events (deconstructive)	14/94 = 11% (3–19) (I^2 = 46%)	9		5/15 = 33% (14–58) (I^2 = 84%)	4	
Worsening of mass effect (reconstructive)	5/278 = 1.7% (0.3–3) (I^2 = 0%)	17	.2	1/37 = 6.9% (0.5–16) (I^2 = 24%)	6	
vs						.2
Worsening of mass effect (deconstructive)	3/94 = 3.5% (0.1–7.4) (I^2 = 0%)	9		2/19 = 14% (0.5–29) (I^2 = 0%)	5	
Hemorrhagic events (reconstructive)	23/299 = 6% (3–9) (I^2 = 0%)	18	.03 ^a	5/37 = 17% (1.8–33) (I^2 = 37%)	6	
vs						.5
Hemorrhagic events (deconstructive)	1/94 = 2% (0.2–7) (I^2 = 0%)	9		1/19 = 9% (0.2–20) (I^2 = 0%)	5	
Clinical outcomes						
Overall rate of good outcome (reconstructive)	154/202 = 80% (73–86) (I^2 = 36%)	14		20/38 = 60% (41–75) (I^2 = 22%)	7	
vs			.1			.1
Overall rate of good outcome (deconstructive)	74/87 = 89% (81–96) (I^2 = 42%)	8		16/21 = 64% (36–92) (I^2 = 69%)	6	
Improvement of mass effect/compressive symptoms (reconstructive)	65/154 = 48% (33–61) (I^2 = 70%)	10		3/13 = 24% (21–47) (I^2 = 0%)	3	
vs			.02 ^a			
Improvement of mass effect/compressive symptoms (deconstructive)	35/45 = 77% (59–94) (I^2 = 68%)	6		NA		

Note:—NA indicates not applicable.

^a Significant.

On-line Table 5: Aneurysm occlusion and complication rates after reconstructive and deconstructive treatments—influence of patient and aneurysm characteristics

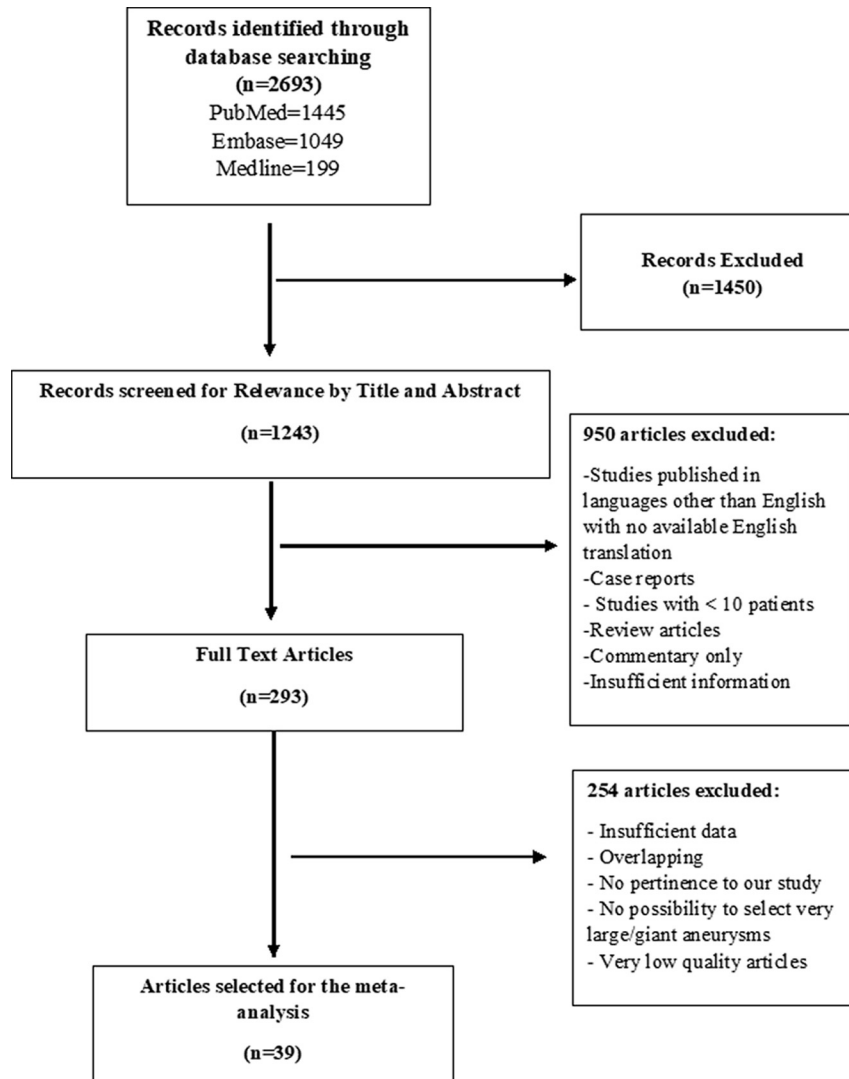
Variables	Proportion of Complete/ Near-Complete Aneurysm Occlusions	No. of Articles	P Value and/or OR	Rate of Complications	No. of Articles	P Value and/or OR
Reconstructive group						
Younger than 60 yr	82% (72–91) ($I^2 = 51\%$)	12		27% (16–40) ($I^2 = 62\%$)	11	.2
vs			.09			
Older than 60 yr	71% (60–84) ($I^2 = 36\%$)	12	OR = 1.97	38% (25–55) ($I^2 = 50\%$)	11	
Diameter between 2 and 3 cm	77.8% (66–88) ($I^2 = 59\%$)	11	.36	35% (16–60) ($I^2 = 86\%$)	8	
vs						.9
Diameter >3 cm	69.2% (54–83) ($I^2 = 53\%$)	11		36% (19–55) ($I^2 = 44\%$)	8	
Anterior circulation aneurysms	78.4% (67–89) ($I^2 = 72\%$)	11	.2	32% (26–42) ($I^2 = 0\%$)	10	
vs						.5
Posterior circulation aneurysms	66.3% (51–81) ($I^2 = 31\%$)	7		33% (22–56) ($I^2 = 61\%$)	8	
Saccular aneurysms	67% (42–90) ($I^2 = 77\%$)	5		23% (2–40) ($I^2 = 74\%$)	4	
vs			.9			
Fusiform aneurysms	64% (12–85) ($I^2 = 65\%$)	2		NA	NA	—
Deconstructive group						
Younger than 60 yr	95.9% (92–99) ($I^2 = 0\%$)	8		35% (17–52) ($I^2 = 39\%$)	9	
vs			.007 ^a			.3
Older than 60 yr	78% (64–91) ($I^2 = 0\%$)	8	OR = 2.5	24% (11–37) ($I^2 = 70\%$)	10	
Diameter between 2 and 3 cm	85% (78–95) ($I^2 = 0\%$)	7		33% (13–73) ($I^2 = 83\%$)	7	
vs			.46			.4
Diameter >3 cm	90% (81–98) ($I^2 = 0\%$)	7		27% (45–50) ($I^2 = 82\%$)	7	
Anterior circulation aneurysms	94.9% (90–99) ($I^2 = 0\%$)	8		15% (4.4–26) ($I^2 = 61\%$)	9	
vs			.11			.001 ^a
Posterior circulation aneurysms	85.9% (73–98) ($I^2 = 36\%$)	5		36% (19–52) ($I^2 = 54\%$)	9	OR = 3.6
Saccular aneurysms	89% (77–98) ($I^2 = 0\%$)	3		0/17	2	
vs						.7
Fusiform aneurysms	88% (79–98) ($I^2 = 0\%$)	3		10% (1–18) ($I^2 = 0\%$)	2	

Note:—NA indicates not applicable.

^a Significant.

On-line Table 6: Outcome comparison among coiling/BAC, stent-assisted coiling, and flow diversion for the unruptured very large and giant intracranial aneurysms

Variables (Unruptured Group)	Coiling (10 Studies) (Results of Meta-Analysis)	Stent-Assisted Coiling (7 Studies) (Results of Meta-Analysis)	Flow Diversion (10 Studies) (Results of Meta-Analysis)
Treatment-related complications			
Proportion of unruptured aneurysms treated with coiling or flow diversion	131/327 = 40% (34–45)	57/327 = 16% (13–21)	139/327 = 42% (37–47)
Overall rate of treatment-related complications	16/71 = 20% (11–28) ($I^2 = 0\%$)	29/57 = 39% (24–50) ($I^2 = 31\%$)	39/139 = 29% (14–43) ($I^2 = 75\%$)
			FD alone FD + coiling
			13/44 = 32% 7/28 = 26%
			(8–50) ($I^2 = 70\%$) (4–48) ($I^2 = 54\%$)
Complications among anterior circulation	2/22 = 15% (5–29) ($I^2 = 0\%$)	16/40 = 38% (20–55) ($I^2 = 35\%$)	28/143 = 17% (9–24) ($I^2 = 26\%$)
Complications among posterior circulation	2/10 = 20% (6–40) ($I^2 = 0\%$)	9/20 = 43% (15–70) ($I^2 = 60\%$)	16/43 = 41% (15–67) ($I^2 = 82\%$)
Type of complications			
Ischemic	8/71 = 10% (3–15) ($I^2 = 0\%$)	16/49 = 32% (19–44) ($I^2 = 0\%$)	25/139 = 17% (7.6–26) ($I^2 = 55\%$)
Mass effect symptoms	4/71 = 6% (1.5–12) ($I^2 = 0\%$)	1/49 = 5.4% (0.6–11) ($I^2 = 0\%$)	4/139 = 1.6% (0.5–3.5) ($I^2 = 0\%$)
Hemorrhagic	4/71 = 5% (2–14) ($I^2 = 0\%$)	5/49 = 10% (0.5–18) ($I^2 = 32\%$)	10/139 = 7% (1.7–8) ($I^2 = 0\%$)
Angiographic outcomes			
Overall rate of complete/near-complete aneurysm occlusion	40/67 = 59% (41–78) ($I^2 = 73\%$)	34/48 = 73% (60–84) ($I^2 = 0\%$)	27/39 = 72% (45–95) ($I^2 = 77\%$)
			FD alone FD + coiling
			18/25 = 75% 10/14 = 70%
			(65–85) ($I^2 = 0\%$) (55–80) ($I^2 = 0\%$)
Early aneurysm rupture after treatment	2/59 = 6% (0.8–11) ($I^2 = 0\%$)	4/48 = 9% (0.5–18) ($I^2 = 40\%$)	FD alone FD + coiling
			3/44 = 7% 0/39
			(0.5–14) ($I^2 = 0\%$)
Late aneurysm rupture after treatment	3/60 = 7% (0.9–12) ($I^2 = 0\%$)	0/41	FD alone FD + coiling
			0/44 0/39
Good neurologic outcome	37/52 = 72% (40–85) ($I^2 = 90\%$)	40/57 = 72% (55–90) ($I^2 = 59\%$)	29/48 = 60% (26–90) ($I^2 = 84\%$)



ON-LINE FIGURE. PRISMA diagram detailing the specifics of the systematic literature review.