On-line Table 1: Search syntax

PubMed Search Accessed on August 20, 2019 (213 Articles)	EMBASE Search Accessed on August 20, 2019 (103 Articles)	Scopus Search Accessed on August 20, 2019 (547 Articles)
(((((fusiform OR dissecting)) AND aneurysms [Title/Abstract]) AND (flow-diverter [Title/Abstract] OR pipeline[Title/ Abstract]))) OR ((((fusiform OR dissecting)) AND aneurysms[Title/Abstract]) AND flow diversion[Title/Abstract])	(fusiform OR dissecting) AND 'intracranial aneurysms':ab,ti AND 'flow diverter':ab,ti OR ((fusiform OR dissecting) AND 'intracranial aneurysms':ab,ti AND 'flow diversion':ab,ti)	(dissecting OR fusiform) AND intracranial AND aneurysms AND flow AND diversion AND (LIMIT-TO (DOCTYPE, "ar")) AND LIMIT-TO (SUBJAREA , "MEDI") OR LIMIT-TO (SUBJAREA , "NEUR")) AND (LIMIT-TO (LANGUAGE , "English"))

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

Study Name	Design	No. of Fusiform Dissecting Aneurysms Treated with FD	Successful Stent Deployment	Overall Complete/ Near-Complete Occlusion	Overall Rate of Treatment-Related Complications	Description of Complication	Antiplatelet Therapy (Loading Dose/ Maintenance Dose)
Studies reporting anterior circulation fusiform/dissecting aneurysms							
Mohlenbruch et al, 2017[23]	P MC	6 F + 2 D	8/8	8/8	2/8	2/8 Symptomatic arterial slow flow of covered M2	ASA 100–300 mg/day + CP 75 mg/day 5 days before/ASA 100 mg/day + CP 75 mg/day for 3–6 mo, then ASA, 100 mg/day
Topcuoglu et al, 2016[13]	R	12 F and D	12/12	11/12	2/12	1 Acute thrombosis of covered M2 + 1 M2 occlusion	ASA 300 mg/day + CP 75 mg/day 5–10 days before/ASA 300 mg/day + CP 75mg/day for 6 mo, then ASA 100 mg/day
Zanaty et al, 2014[14]	R	10 F	10/10	6/10	3/10	2 Ischemic events after clopidogrel (Plavix) discontinuation + 1 M3 occlusion	ASA 81 mg/day + CP 75 mg/day 10 days before/ASA 81 mg/day + CP 75 mg/day for 6 mo, then ASA 100 mg/day
Pistocchi et al, 2012[12]	R	6 F	6/6	2/3 (Available at FU)	1/6	1 Intraprocedural arterial perforation	ASA 250 mg/day + CP 75 mg/day/ ASA 250 mg/day + CP 75mg/day for 6 mo
Lubicz et al, 2011[11]	R	7 F	7/7	7/8	1/7	1 SAH	ASA 300 mg + CP 5 days before/ASA 160 mg/day + CP 75 mg/day for 6 mo
Bhogal et al, 2018 (MCA)[15]	R	3 F + 1 D	4/4	NA	0/4		ASA 100 mg/day + CP 75 mg/day/ ASA 100 mg/day + CP 75 mg/day for 1 yr, then ASA 100 mg/day
Brinjikji et al, 2016 (AC)[16]	R	14 F	14/14	NA	2/14	NA	NA
Lin et al, 2016[10]	R	15 F + 4 D	19/20	17/20	2/20	1 Ischemic lesion +1 in-stent delayed occlusion	ASA 300 mg/day + CP 75 mg/day 5 days before/NA
Studies reporting posterior circulation fusiform/dissecting aneurysms							
Bender et al, 2019[17]	R	16 F + 14 D	29/30	NA	6/30	1 Cranial nerve III palsy +3 perforator infarcts +1 parent artery occlusion +1 TIA	ASA 325 mg/day + CP 75 mg/day 7 days before/dual AT for 6 mo
Bhogal et al, 2017 (VB)[18]	R	24 F	24/24	23/24	NA	NA	ASA 325 mg/day + CP 75 mg/day 7 days before ASA 100 mg/day + CP 75 mg/day for 1 yr, then ASA 100 mg/day

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On-line Table 2: Continued

Study Name	Design	No. of Fusiform Dissecting Aneurysms Treated with FD	Successful Stent Deployment	Overall Complete/ Near-Complete Occlusion	Overall Rate of Treatment-Related Complications	Description of Complication	Antiplatelet Therapy (Loading Dose/ Maintenance Dose)
Wallace et al, (P1–P2) 2018[21]	R	4 F	4/4	4/4	2/4	1 Symptomatic slow flow of covered P1 + 1 delayed in-stent occlusion after clopidogrel (Plavix) discontinuation	CP 10 days before/NA
Wallace et al, (PICA) 2018[22]	R	3 F	3/3	1/3	0/3		CP + ASA 7 days before/CP + ASA
Bhogal et al, (PC) 2018[15]	R	4 F	4/4	NA	0/4		CP 75 mg/day + ASA 100 mg/day 5 days before/ASA 100 mg/day + CP 75 mg/day
Brinjikji et al, (PC) 2016[16]	R	11 F	11/11	NA	2/11	2 Ischemic events during follow-up	NA
Griessenauer et al, 2018[4]	R	53 F + 29 D (56 unruptured)	NA	41/56	14/56	NA	CP 75 mg/day + ASA 325 mg/day 3–7 days before/dual AT
Munich et al, 2014[19]	R	12F	12/12	9/10	3/12	3 Delayed ischemic events	CP 75mg/day + ASA 325 mg/day 3–7 days before/dual AT

Note:—R indicates retrospective study; P MC, prospective multicentric study; CP, clopidogrel; ASA, acetylsalicylic acid; NA, not available; F, fusiform; D, dissecting; FU, follow-up; VB, vertebrobasilar; AT, antiplatelet therapy.

On-line Table 3: Quality measure of included studies by the modified Newcastle-Ottawa Quality Assessment Scale[a]

Study Name	Selection				Comparability		Outcome/Exposure			Total
	1)	2)	3)	4)	a) (Not Tested)	b)	1)	2)	3)	
AC location, retrospective design (score 0–8)										
Topcuoglu et al, 2016[13]	*	*				*	*		*	5
Zanaty et al, 2014[14]	*	*				*	*		*	5
Lin et al, 2016[10]	*	*				*	*		*	5
Pistocchi et al, 2012[12]	*	*				*	*		*	5
Lubicz et al, 2011[11]	*	*					*		*	4
Bhogal et al, (MCA) 2018[15]	*	*				*	*		*	5
Brinjikji et al, 2016 (AC)[16]	*	*					*		*	4
AC location, prospective design (score 0–8)										
Mohlenbruch et al, 2017[23]	*		*	*		*	*	*	*	7
PC location, retrospective design (score 0–8)										
Bender et al, 2019[17]	*	*				*	*		*	5
Bhogal et al, 2017[18]	*	*					*		*	4
Wallace et al, (P1–P2) 2018[21]	*	*				*	*		*	5
Wallace et al, (PICA) 2018[22]	*	*					*		*	4
Bhogal et al, (PC) 2018[15]	*	*					*		*	4
Brinjikji et al, (PC) 2016[16]	*	*				*	*		*	5
Griessenauer et al, 2018[4]	*	*				*	*		*	4
Munich et al, 2014[19]	*	*				*	*		*	5
Natarajan et al, 2016[20]	*	*					*		*	4

[a] Modified Newcastle-Ottawa Quality Assessment Scale For Retrospective Studies (Score 0–8; studies with ≥5 asterisks were considered high-quality).

Selection

1. Is the case definition adequate?
   a. Yes, with independent validation*
   b. Yes, eg, record linkage or based on self-reports
   c. No description
2. Representativeness of the cases
   a. Consecutive or obviously representative series of cases*
   b. Potential for selection biases or not stated
3. Selection of controls
   a. Community controls*
   b. Hospital controls
   c. No description
4. Definition of controls
   a. No history of disease (end point)*
   b. No description of source

Comparability

1. Comparability of cases and controls on the basis of the design or analysis
   a. Study controls for (select the most important factor)*
   b. Study controls for any additional factor.* (These criteria could be modified to indicate specific control for a second important factor)

Note: Comparability (point a) was not tested because of the design of the reported studies.
Comparability (point b) was tested comparing subgroups of analysis: One point was attributed if the study reported the analysis of the subgroups.

Exposure

1. Ascertainment of exposure
   a. Secure record (eg surgical records)*
   b. Structured interview when blind to case/control status*
   c. Interview not blinded to case/control status
   d. Written self-report or medical record only
   e. No description
2. Same method of ascertainment for cases and controls
   a. Yes*
   b. No
3. Nonresponse rate
   a. Less than 20%*
   b. Nonrespondents described
   c. Rate different and no designation

Modified Newcastle-Ottawa Quality Assessment Scale For Retrospective Studies.

(Score 0–8; studies with ≥5 asterisks were considered high-quality)

Selection

1. Representativeness of the exposed cohort
   a. Truly representative of the average (patients treated with a flow diverter in the acute phase) in the community*
   b. Somewhat representative of the average (patients treated with a flow diverter in the acute phase) in the community*
   c. Selected group of users, eg nurses, volunteers
   d. No description of the derivation of the cohort
2. Selection of the nonexposed cohort
   a. Drawn from the same community as the exposed cohort*
   b. Drawn from a different source
   c. No description of the derivation of the nonexposed cohort
3. Ascertainment of exposure
   a. Secure record (eg surgical records)*

b. Structured interview*
c. Written self-report
d. No description

4. Demonstration that outcome of interest was not present at start of study
   a. Yes*
   b. No

Comparability

1. Comparability of cohorts on the basis of the design or analysis
   a. Study controls for _____ (select the most important factor)*
   b. Study controls for any additional factor.* (These criteria could be modified to indicate specific control for a second important factor.)

Note: Comparability (point a) was not tested because the design of the reported studies.

Comparability (point b) was tested comparing subgroups of analysis: One point was attributed if the study reported the analysis of the subgroups.

Outcome

1. Assessment of outcome
   a. Independent blind assessment*
   b. Record linkage*
   c. Self-report
   d. No description

2. Was follow-up long enough for outcomes to occur? (Adequate follow-up was considered a follow-up longer than the median follow-up time of the reported studies)
   a. Yes (select an adequate follow-up period for outcome of interest)*
   b. No

3. Adequacy of follow-up of cohorts
   a. Complete follow-up; all subjects accounted for*
   b. Subjects lost to follow-up unlikely to introduce bias, small number lost (<20% of the original population) to follow-up or description provided of those lost*
   c. Follow-up rate (<80% of the original population) and no description of those lost
   d. No statement

(Each asterisk is a point: 5 asterisks = a score of 5)

On-line Table 4: Patient population and characteristics of nonsaccular aneurysms treated with flow diversion

Variables	Raw Numbers (%)	No. of Articles	95% CI
Population characteristics			
Overall number of nonsaccular aneurysms	213	15	
No. of AC aneurysms	81/213 = 38%	6	31–44
No. of PC aneurysms	132/213 = 62%	9	55–68
No. of fusiform aneurysms	162/213 = 76%	11	69–81
No. of dissecting aneurysms	51/213 = 24%	4	18–30
Mean/median age (yr) (general population)	52.5/58 (18–82)	15	
Overall proportion of male	75/178 = 42%	10	35–49
Aneurysm characteristics			
Overall mean aneurysm size	11 mm (median, 10; range, 5–22)	12	
Locations			
MCA	69/213 = 32.5%	15	26–38
ACA	8/213 = 3.7%		1.7–7
VB	97/213 = 45.5%		38–52
PCA	27/213 = 12.7%		8.8–17
SCA/PICA	12/213 = 5.6%		3–9.6
Treatment characteristics			
Type of FD/total of flow diverters used			
PED	185/213 = 87%		81–90
Silk[a]	10/213 = 4.5%		2–8
FRED[b]	8/213 = 3.7%	24	1.7–7
p64[c]	7/213 = 3.3%		1.4–6
SURPASS[d]	3/213 = 1.5%		0.5–5
Radiologic follow-up (mo)	Mean, 13 (range, 4–24) median, 12; IQR, 7–12	15	
Clinical follow-up (mo)	Mean, 14 (range, 6–28) median, 12; IQR, 8–15	15	

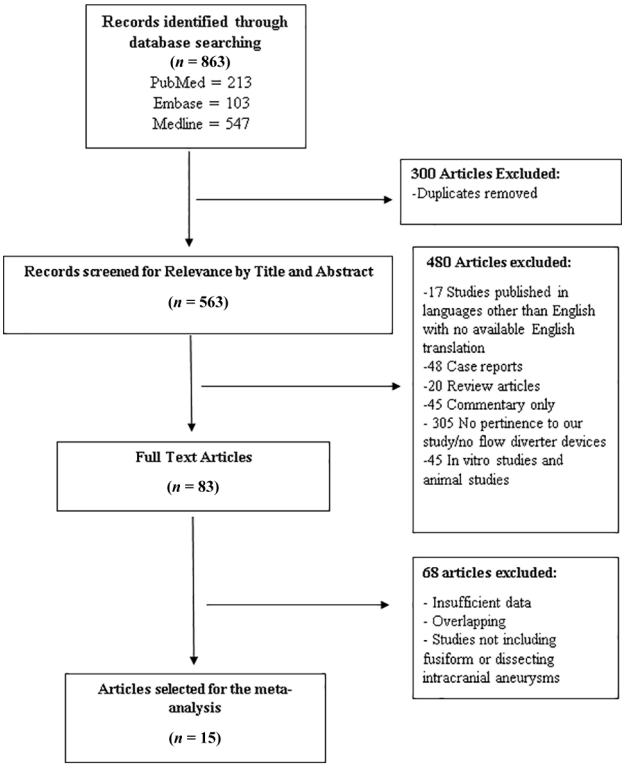
Note:—ACA indicates anterior cerebral artery; PCA, posterior cerebral artery; SCA, superior cerebellar artery; VB, vertebrobasilar.
[a] Balt Extrusion, Montmorency, France.
[b] Flow-Redirection Endoluminal Device; MicroVention, Tustin, California.
[c] phenox, Bochum, Germany.
[d] Stryker Neurovascular, Kalamazoo, Michigan.

On-line Table 5: Factors related to aneurysm occlusion and treatment-related complications after flow diversion of nonsaccular aneurysms

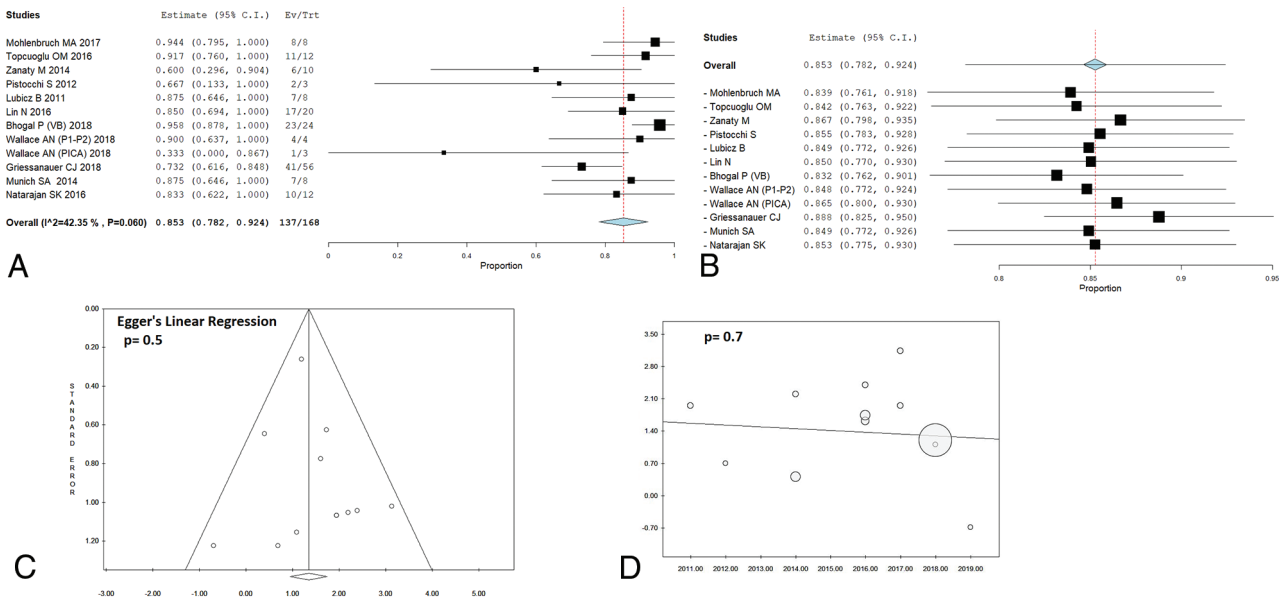
Variables	Complete/Near-Complete Occlusion	No. of Articles	*P* Value	Treatment-Related Complications	No. of Articles	*P* Value
Factors influencing occlusion and complication rate						
Aneurysm size,[a] small vs large/giant	44/53 vs 50/58 (I^2 = 0%) OR = 1.4	8	.7	4/45 vs 10/40 (0.1–1.1) (I^2 = 0%) OR = 0.3	8	.04
Mean difference of age (yr)	Complete vs incomplete occlusion (55 vs 59), mean difference = 5 (0.2–8.6) (I^2 = 78%)	6	.5	Complications vs no complications (56.5 vs 60) mean difference = 2.1 (0.5–7) (I^2 = 0%)	5	.7
Flow diverter + coils vs flow diverter alone	27/33 vs 76/96 (0.4-2.5) (I^2 = 0%) OR = 1.06	6	.8	21/82 vs 6/56 (0.7–6.5) (I^2 = 4%) OR = 2.3	6	.5
Single flow diverter vs multiple flow diverters	16/18 vs 22/26 (0.1–4) (I^2 = 0%) OR = 0.8	5	.5	2/23 vs 4/23 (0.1–3) (I^2 = 0%) OR = 0.6	5	.2

Note:—Numbers in parentesis are 95% CI.

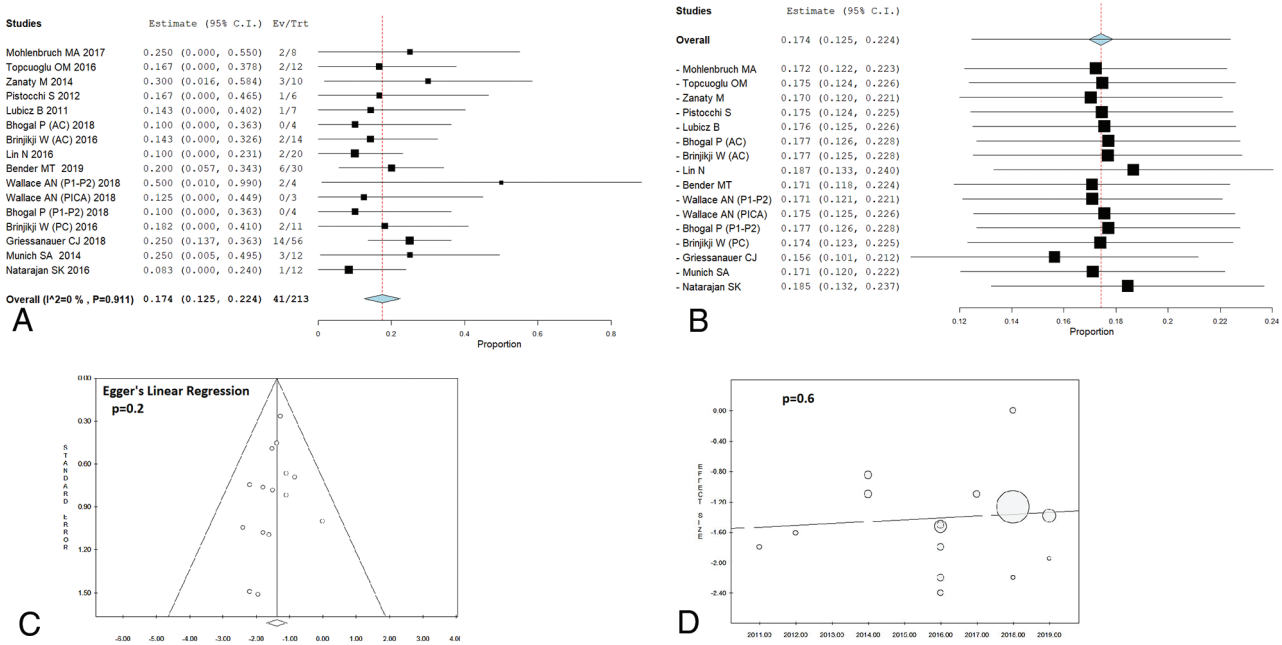
[a] Small aneurysms <10 mm; large aneurysms, ≥10 mm; giant aneurysms, ≥25 mm.



ON-LINE FIG 1. PRISMA diagram detailing the specifics of the systematic literature review.



ON-LINE FIG 2. Forest plot demonstrating the overall rate of aneurysm occlusion (*A*). Sensitivity analysis shows that no individual study significantly influenced the reported outcome (*B*). The funnel plot (the Egger linear regression) excludes publication bias (*C*). Meta-regression shows a nonsignificant variation of the effect size (*D*).



ON-LINE FIG 3. Forest plot demonstrating the overall rate of treatment–related complications (*A*). Sensitivity analysis shows that no individual study significantly influenced the reported outcome (*B*). The funnel plot (the Egger linear regression) excludes publication bias (*C*). Meta-regression shows a nonsignificant variation of the effect size *(D*).