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Original research

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ABSTRACT

Background Endovascular treatment (EVT) is standard of care in anterior circulation large vessel occlusions. In posterior circulation occlusions, data on EVT in isolated posterior cerebral artery (PCA) occlusions are limited, although PCA occlusions can cause severe neurological deficit.

Objective To describe in a prospective study the clinical manifestations, outcomes, and safety of EVT in isolated PCA occlusions.

Methods We used data (2014–2017) from the MR CLEAN Registry, a nationwide, prospective cohort of EVT-treated patients in the Netherlands. We included patients with acute ischemic stroke (AIS) due to an isolated PCA occlusion on CT angiography. Patients with concurrent occlusion of the basilar artery were excluded. Outcomes included change in National Institutes of Health Stroke Scale (ΔNIHSS) score, modified Rankin Scale (mRS) score 0–3 after 90 days, mortality, expanded Thrombolysis in Cerebral Infarction (eTICI), and periprocedural complications.

Results Twenty (12%) of 162 patients with posterior circulation occlusions had an isolated PCA occlusion. Median age was 72 years; 13 (65%) were women. Median baseline NIHSS score was 13 (IQR 5–21). Six (30%) patients were comatose. Twelve patients (60%) received IVT. Median ΔNIHSS was −4 (IQR −11–+1). At follow-up, nine patients (45%) had mRS score 0–3. Seven (35%) died. eTICI 2b-3 was achieved in 13 patients (65%). Nine patients (45%) had periprocedural complications. No symptomatic intracranial hemorrhages (sICH) occurred.

Conclusions EVT should be considered in selected patients with AIS with an isolated PCA occlusion, presenting with moderate–severe neurological deficits, as EVT was technically feasible in most of our patients and about half had good clinical outcome. In case of lower NIHSS score, a more conservative approach seems warranted, since periprocedural complications are not uncommon. Nonetheless, EVT seems reasonably safe considering the absence of sICH in our study.

INTRODUCTION

Endovascular treatment (EVT) is standard of care for patients with acute ischemic stroke caused by proximal large vessel occlusion of the anterior circulation.[1] EVT of the posterior cerebral artery (PCA) has not been proved to be effective. Patients with isolated PCA occlusions have a lower mortality than those with basilar artery occlusions,[2 3] but isolated PCA occlusions may cause substantial disability, including disturbances in cognition, behavior, and visual fields deficits.[4–6] Moreover, coma has been reported in the case of an occlusion of proximal perforators or in the case of an occlusion of the artery of Percheron configuration, an anatomical variant in which both thalami and the mesencephalon are supplied by a branch of the PCA.[7–9]

A recent multicenter case–control study in patients with severe neurological deficits and with P2 and P3 segment occlusions found better outcomes following EVT than following standard medical therapy.[10] Other studies focusing on EVT in patients with a PCA occlusion were mostly single center and retrospective. A recent systematic review describes a cohort of 43 patients with a PCA occlusion, where EVT was found to be safe. However, in that study, only early outcomes were described (modified Rankin Scale (mRS) score at discharge), the majority (67%) achieving functional independence.[11]

Although these studies provide more insight into treatment options for PCA occlusions, the dilemma in daily clinical practice remains whether or not to treat patients with an isolated PCA occlusion with EVT. The aim of our study was to describe clinical manifestations, outcomes, and safety of EVT in isolated PCA occlusions.

METHODS

Data availability statement

The data of the study cannot be made available to other researchers, as Dutch law prohibits data sharing when no patient approval was obtained for sharing coded data. However, syntax or output files of the statistical analyses may be made available for academic purposes on reasonable request.

Study design and patients

We used data from the MR CLEAN Registry, a nationwide, multicenter, prospective registry, which included consecutive patients treated with EVT in the Netherlands from 2014 until 2019. Details on design and procedures have been described previously.[12] Inclusion criteria for the MR CLEAN Registry were:

1. Clinical diagnosis of acute ischemic stroke.

2. Intracranial occlusion of the distal intracranial carotid artery, the anterior (A1/A2), middle (M1/M2) cerebral artery, or posterior cerebral artery (vertebral artery/basilar artery/P1/P2), demonstrated with CT angiography (CTA) or MR angiography, and with digital subtraction angiography (DSA).
3. Treatment with intra-arterial therapy, defined as: puncture of the groin.

All patients first underwent a CT scan without contrast enhancement as part of standard national procedures to rule out intracranial hemorrhage, followed by CTA to judge whether or not there was a treatable intracranial occlusion. We included patients with an isolated PCA occlusion in the current study, as confirmed on CTA, in patients treated between March 2014 and November 2017. We defined the P1 segment as the part of the PCA from the basilar top to the posterior communicating artery, P2 segment from the posterior communicating artery around the midbrain, and P3 segment as the part that runs through the quadrigeminal cistern.[13] Patients with a concurrent occlusion of the basilar artery were excluded.

We collected baseline clinical data, including score on the Glasgow Coma Scale and the National Institutes of Health Stroke Scale (NIHSS).

Eligibility for EVT was at the discretion of the treating physicians in each hospital and was subject to local and national guidelines. Neurological deficits at time of admission had to correspond to the functional neuroanatomy of the occlusion in order to be included in our study. The method of intervention used was at the discretion of the interventional radiologist. There was no time limit for undergoing EVT.

Data collection

CTA and DSA scans were assessed by an interventional neuroradiologist (BJE). CTA scans were scored on location of occlusion and on anatomical variations. DSA scans were scored on location of occlusion and on reperfusion, using the expanded Thrombolysis in Cerebral Infarction (eTICI) scale, with variation from grade 0 (no reperfusion) to grade 3 (complete reperfusion).[14 15] When the post-treatment angiogram was incomplete (for example, when the lateral view was missing), a maximum eTICI score of 2a could be assigned.[16]

DSA scans were also scored for periprocedural complications. Complications were defined as embolus to new territory, embolus to distal territory, periprocedural dissection, and periprocedural perforation. Other possible complications were symptomatic intracranial hemorrhage, defined as a ≥4-point increase on the NIHSS and intracranial hemorrhage on follow-up non-contrast enhanced CT according to the Heidelberg Bleeding criteria,[17] pneumonia treated with antibiotic regimen, and access site complications such as aneurysma spurium. All centers were obliged to register (serious) adverse events and additionally, we checked all discharge letters on the occurrence of complications. As an adverse event committee of this registry had already checked all discharge letters on complications, this was a dual abstraction. In case of any discrepancy, a third adjudicator could be consulted (JMC).

Outcome measures

Clinical outcomes were difference in NIHSS score 24 hours after EVT compared with NIHSS score at admission (ΔNIHSS), functional status at 90 days measured on the mRS at 90 days, and favorable functional outcome, defined as a mRS score of 0–3. Radiological outcomes were good reperfusion defined as eTICI 2b-3, and number of passes. Safety outcomes were periprocedural complications (including pneumonia and access site complications), and mortality at 90 days.

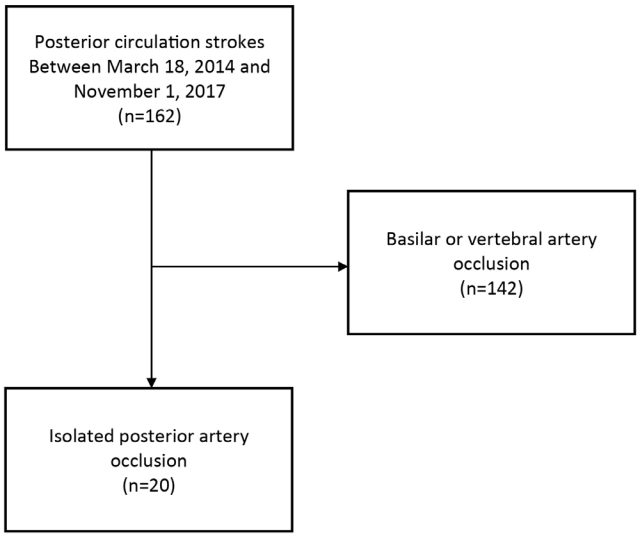

Figure 1 Study population.

Statistical analyses

Descriptive statistical analyses were carried out with SPSS (IBM SPSS Statistics, version 26, release 26.0.0.1, 64-bit edition). Continuous variables were described using median and interquartile range (IQR 25%–75%).

Ethical approval

A central medical ethics committee evaluated the study protocol of the MR CLEAN Registry and granted permission to carry out the study as a registry (Erasmus Medical Centre in Rotterdam, MEC-2014–235).

RESULTS

One hundred and sixty-two patients with a posterior circulation large vessel occlusion were included in the MR CLEAN Registry from 2014 to 2017, out of a total of 3637 treated patients for large vessel occlusion either in the anterior or posterior circulation (figure 1). Twenty patients (12%) had an isolated PCA occlusion (17 P1, 2 P2, 1 P3). One patient (5%) had an artery of Percheron (figure 2). Median age was 72 years old (IQR 63–81) and the majority of patients were female (65%). Patients had severe strokes with a median NIHSS score of 13 (IQR 5–21) and 30% were comatose at admission. Twelve (60%) patients were treated with intravenous administration of recombinant tissue plasminogen activator. A minority of patients underwent EVT with general anesthesia (26%) (tables 1 and 2).

Clinical and radiological outcomes

Median follow-up NIHSS score after 24–48 hours was 6 (IQR 2–14). Median change in NIHSS score from baseline to follow-up was −4 (IQR −11–+1). Nine patients (45%) had a good functional outcome with mRS of 0–3 at 90 days (table 2). One patient had migration of the thrombus from the P1 segment on CTA to the P2 segment on DSA. The majority of patients were treated with stent retriever at first attempt (17 patients (85%)). Thirteen patients (65%) had successful reperfusion (table 2). Of six comatose patients, two died (eTICI 2a and 2c); the other four patients had a mRS score of 0–3 and an eTICI of 3. The deceased

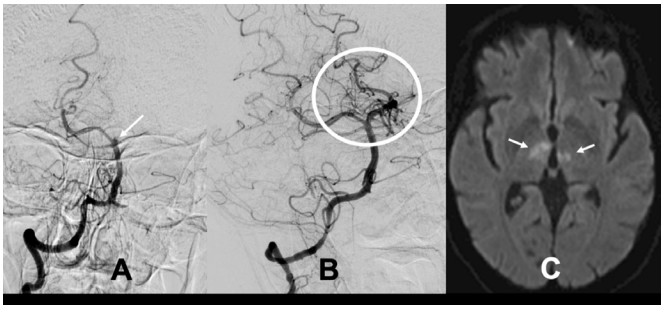

Figure 2 Patient 16 was admitted with a Glasgow Coma Scale score of 7 (E1M5V1). The patient had a National Institutes of Health Scale Score of 35 with loss of consciousness, a divergent deviation of the eyes, anisocoria of the pupils without pupillary light reflex, without any paresis of the extremities. (A) First intracranial angiogram with injection of the right vertebral artery showing a P1 occlusion (arrow) of the posterior cerebral artery on the left. (B) Final angiogram with injection of the right vertebral artery after thrombectomy with stent retriever showing recanalization of the posterior cerebral artery on the left with extensive filling of perforators (white circle) not visible before treatment. (C) Follow-up diffusion weighted imaging with a slice of the b1000 images at the level of the thalami showing bilateral ischemia (arrows). At follow-up, the patient was unable to resume their work, but was functionally independent and had no other neurological deficits. At 90 days after admission, patient had an modified Rankin Scale score of 1.

comatose patients died because of an obstructive hydrocephalus with extensive cerebellar ischemia, and a previous cerebellar hematoma, respectively.

Safety outcomes

At follow-up, seven patients (35%) had died (table 1, online supplemental material). No patient had a symptomatic intracranial hemorrhage. Three patients (15%) had a postprocedural aspiration pneumonia treated with an antibiotic regimen (table 1, online supplemental material). Seven periprocedural complications occurred in six patients (30%); six complications were emboli to distal (n=4) or new (n=2) territories (figure 3). One patient had both a vertebral iatrogenic dissection and an embolus to new territory. No access site complications, such as aneurysma spurium, were observed. For details on complications in patients, see online supplemental table 1.

DISCUSSION

In our series, 20/162 (12%) patients with a posterior circulation stroke who underwent EVT had an isolated occlusion of the PCA. EVT was technically feasible in all patients. Despite EVT, death occurred in seven (35%) patients. The proportion of patients with a functional outcome of mRS score 0–3 in our study population was 45%. However, we observed seven emboli to distal (20%) or new territories (10%) in six patients, and a concurrent iatrogenic vertebral dissection in one patient. With three patients with pneumonia added to this total, in total, 45% had a periprocedural complication. No access site complications or intracranial hemorrhages were seen.

Several studies have found that EVT in PCA occlusions is technically feasible, and some studies describe good clinical outcomes.[3 10 11 18–21] Nonetheless, mortality proportions in available literature range from 3.5% to 33.7%.[3 11 21] In EVT of PCA occlusions, both symptomatic and asymptomatic intracranial hemorrhages have been described as a complication along with iatrogenic dissection, perforation, and distal embolization.[10 11 20 21] A higher occurrence of distal embolization has been observed in EVT of patients with PCA.[19] n our study, there is a potential underestimation of the radiological success of EVT because if the postprocedural angiogram was incomplete (for example, if lateral view was missing), eTICI 2a was scored. This may explain the relatively low successful

Table 1 Baseline characteristics

	Isolated posterior cerebral artery occlusion n=20	
Clinical baseline characteristics		
Age (years), median (IQR)	72 (63–81)	
Female, n (%)	13 (65)	
Systolic blood pressure (mm Hg), mean ±SD	160 (27)	
Diastolic blood pressure (mm Hg), mean ±SD	83 (14)	
NIHSS, median (IQR)	13 (5–21)	
IVT, n (%)	12 (60)	
Anesthetic management: general anesthesia (%)	5/19 (26)*	
GCS score, median (IQR)	14 (7–15)	
GCS ≤8 (coma), n (%)	6 (30)	
Pre-stroke mRS score, n (%)		
0	10 (50)	
1	3 (15)	
≥2	7 (35)	
Medical history, n (%)		
Previous stroke/TIA	6 (30)	
Atrial fibrillation	7 (35)	
Diabetes mellitus	3 (15)	
Hypertension	14 (70)	
Hypercholesterolemia	9 (45)	
Coronary artery disease	3 (15)	
Peripheral artery disease	4 (20)	
Smoking	5/17 (29)†	
Prior medication use, n (%)		
Antiplatelet therapy‡	6 (30)	
Antihypertensive agents	13 (65)	
Vitamin K antagonists, novel/non-vitamin K anticoagulants, heparin	4 (20)	
Statins	8 (40)	
Process measures (min) median (IQR)		
Door to needle time IVT§	34 (22–45)	
Door to groin¶	93 (70–162)	
Onset to groin	216 (181–260)	
Onset to reperfusion	288 (229–351)	
Duration procedure**	69 (47–108)	
Location of occlusion PCA, n (%)	**CTA**	**DSA**
P1	17 (85)	16 (80)
P2	2 (10)	3 (15)
P3	1 (5)	1 (5)

*Missing data: 1.
†Missing data: 3.
‡For example, acetylsalicyl acid, clopidogrel, dipyridamole, ticagrelor.
§In 12 patients who were treated with IVT.
¶For one in-hospital patient with a stroke; onset time=door time.
**Missing data: 2.
CTA, CT angiography; DSA, digital subtraction angiography; GCS, Glasgow Coma Scale; IVT, intravenous thrombolysis; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale; PCA, posterior cerebral artery; TIA, transient ischemic attack.

Table 2 Outcomes

Clinical outcomes		
Follow-up NIHSS score after 24–48 hours, median (IQR)		6 (2–14)
Change in NIHSS score from baseline to follow-up (ΔNIHSS), median (IQR)		−4 (−11–+1)
mRS score at 90 days	0	1 (5)
	1	1 (5)
	2	3 (15)
	3	4 (20)
	4	2 (10)
	5	2 (10)
	6	7 (35)
mRS score 0–3 at 90 days		9 (45)
mRS score 0–2 at 90 days		5 (25)
Radiological outcomes		
Type of sedation	General anesthesia	5 (25)
	Conscious sedation	3 (15)
	Local anesthesia	12 (60)
Number of passes, n (%)*	0	1 (5)
	1	9 (45)
	2	2 (10)
	3	3 (15)
	4	4 (20)
	10	1 (5)
Stent retriever used at first attempt		17 (85)
Type stent retriever	TREVO	11/17 (65)
	Solitaire	5/17 (29)
	Revive	1 (5)
Aspiration used at first attempt		2 (10)
Intra-arterial thrombolysis used at first attempt		1 (5)
eTICI	0	2 (10)
	1	0 (0)
	2a†	5 (25)
	2b	1 (5)
	2c	2 (10)
	3	10 (50)
Favorable eTICI (2b-3)		13 (65)
Safety outcomes		
Periprocedural complications‡		9 (45)
Embolus to new territory		2 (10)
Embolus to distal territory		4 (20)
Periprocedural dissection		1 (5)
Periprocedural perforation		0 (0)
No periprocedural complications		14 (70)
Symptomatic intracranial hemorrhage		0 (0)
Pneumonia		3 (15)
Access site complications (eg, aneurysma spurium)		0 (0)

*According to intervention form.
†Four patients scored eTICI 2a owing to missing lateral view. One patient scored eTICI 2a without missing views.
‡One patient had two complications: embolus to new territory (from P1 to basilar artery), and vertebral iatrogenic dissection during the procedure.
eTICI, expanded Thrombolysis in Cerebral Infarction; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale.

reperfusion percentages (eTICI 2b-3) of 65%, whereas this ranges from 81% to 100% in other studies.[10 11 20] An inherent difficulty of the reperfusion scales of the posterior circulation is collateral contribution through the circle of Willis,

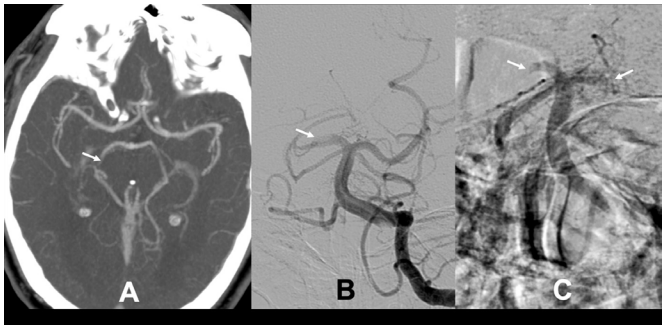

Figure 3 Patient 3 was admitted with a Glasgow Coma Scale score of 15 (E4M6V5). The patient had a National Institutes of Health Scale Score of 4, with hemianopia, limb ataxia, and dysarthria. (A) A maximum intensity projection of late arterial CT angiography showing a proximal P2 occlusion of the right posterior cerebral artery (arrow). (B) First intracranial angiogram with injection of the left vertebral artery showing a P2 occlusion (arrow) of the posterior cerebral artery on the right. (C) Final angiogram with injection of the left vertebral artery after thrombectomy with stent retriever, showing bilateral occlusion (arrows) of the posterior cerebral artery caused by embolization to new territory during thrombectomy. Attempts to treat the occlusion of the posterior cerebral artery occlusion were not successful and during the procedure, the patient deteriorated clinically with a loss of consciousness, hypertension, and a decrease of the oxygen saturation, warranting intubation. During admission the patient developed a pneumonia which was treated with antibiotics. At 90 days after admission, the patient had an modified Rankin Scale score of 4.

hampering accurate assessment of (re)perfusion and reducing interobserver agreement.[15]

The TOPMOST study reported 11% mortality at 90 days after EVT in their cohort of 143 EVT-treated patients with P2 and P3 occlusions.[10] We observed a higher mortality rate and a worse functional outcome. This may be explained by the inclusion of P1 occlusions, a higher baseline NIHSS score, lower reperfusion scores, more use of local anesthesia instead of general anesthesia, and higher age in our study. For example, median baseline NIHSS score in the EVT-treated group in TOPMOST was 7 (IQR 4–11), while median baseline NIHSS score in our series was 13 (IQR 5–21). On the other hand, symptomatic intracranial hemorrhage did not occur in our study population. We did observe a relatively high prevalence of distal embolization in the posterior circulation. This could be due to the relatively low percentage of general anesthesia used in our study population in comparison with TOPMOST (25% vs 43%, respectively), since EVT of medium vessel occlusions is likely to be more susceptible to patient movement than large vessel occlusions. Another explanation could be the lack of flow arrest during EVT in the posterior circulation, due to more extensive collateral flow compared with the anterior circulation.[19] Additionally, assessing complications with an independent core laboratory assessor limits reporting bias compared with self-reported complications (complications reported by the operators/treating physicians).[22 23]

Our study has limitations. First, our study was small and we were not able to include a control arm of best medical therapy.

We used data from the MR CLEAN Registry, in which only patients in whom treatment was initiated—that is, the groin was punctured, were registered. A screening log for patients who would have been eligible for EVT of an isolated PCA occlusion was not kept. It is possible that younger patients, or patients with more severe symptoms were treated

preferentially. However, the median age in our study is similar to the median age in other studies[10] and also, baseline NIHSS score was higher in our study.

Moreover, it is likely that there is confounding by indication depending on the treating physicians. EVT of isolated PCA occlusions is not standard in any of the participating centers of this study. However, in a registry approach with a medical arm confounding by indication is likely to persist, since the medical arm is likely to contain more patients with mild symptoms, high age, or frailty and fewer comorbidities that preclude IVT. Unless patients are randomized before treatment, confounding by indication will occur. Therefore, we focused on the technical feasibility and periprocedural aspects. With 20 cases in 3 years, our study underlines that EVT in patients with PCA occlusions was uncommon in our nationwide registry during this period, but still accounted for 12% of all large vessel occlusion strokes in the posterior circulation in our population.

CONCLUSION

EVT should be considered in selected patients with acute ischemic stroke with an isolated PCA occlusion, if they present with moderate-severe neurological deficits, as EVT was technically feasible in most of our patients and about half had a good clinical outcome. In case of lower NIHSS score, a more conservative approach seems warranted, since periprocedural complications are not uncommon. Nonetheless, EVT seems reasonably safe considering absence of symptomatic intracranial hemorrhages in our study.

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Contributors AvdL, DWJD, CBLMM, and YBWEMR designed the study and participated in the data collection and monitoring of the MR CLEAN Registry. JB and MJHLM monitored data collection for the MR CLEAN Registry as study coordinators. JB and BJE wrote the statistical analysis plan and developed this study. BJE assessed the imaging. JB and BJE cleaned and analyzed the data, and JB wrote the first draft. BJE, and JMC drafted and revised the manuscript. BJE and JMC supervised this study. SE, GJLaN, ACGMvE, AvdL, DWJD, CBLMM, and YBWEMR critically revised the draft manuscript. BJE and JB are responsible as guarantor for this study. All authors participated in patient enrolment and data acquisition, critically reviewed the manuscript, and approved the final version.

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Patient consent for publication Not applicable.

Ethics approval The MR CLEAN (Multicenter Randomized Clinical Trial of Endovascular Treatment for Acute Ischemic Stroke in the Netherlands) Registry was approved by the ethics committee of the Erasmus University MC, Rotterdam, the Netherlands (MEC-2014-235). With this approval, it was approved by the research board of each participating center. At UMC Utrecht, approval to participate in the study has been obtained from their own research board and ethics committee.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data may be obtained from a third party and are not publicly available. The data of the study cannot be made available to other researchers, as Dutch law prohibits data sharing when no patient approval was obtained for sharing coded data. However, syntax or output files of the statistical analyses may be made available for academic purposes upon reasonable request.

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REFERENCES

1 Goyal M, Menon BK, van Zwam WH, *et al*. Endovascular thrombectomy after large-vessel ischaemic stroke: a meta-analysis of individual patient data from five randomised trials (HERMES). *Lancet* 2016;387:1723–31.
2 Grossberg JA, Rebello LC, Haussen DC, *et al*. Beyond large vessel occlusion strokes: distal occlusion thrombectomy. *Stroke* 2018;49:1662–8.
3 Weber R, Minnerup J, Nordmeyer H, *et al*. Thrombectomy in posterior circulation stroke: differences in procedures and outcome compared to anterior circulation stroke in the prospective multicentre REVASK registry. *Eur J Neurol* 2019;26:299–305.
4 Brandt T, Steinke W, Thie A, *et al*. Posterior cerebral artery territory infarcts: clinical features, infarct topography, causes and outcome. Multicenter results and a review of the literature. *Cerebrovasc Dis* 2000;10:170–82.
5 Yamamoto Y, Georgiadis AL, Chang HM, *et al*. Posterior cerebral artery territory infarcts in the New England medical center posterior circulation registry. *Arch Neurol* 1999;56:824–32.
6 Ng YS, Stein J, Salles SS, *et al*. Clinical characteristics and rehabilitation outcomes of patients with posterior cerebral artery stroke. *Arch Phys Med Rehabil* 2005;86:2138–43.
7 van den Wijngaard IR, Jellema K, Wermer H. Het Percheron-infarct. *Tijdschr Neurol Neurochir* 2015;116:10–17.
8 Wong ML, Edlow JA. Artery of Percheron stroke. *J Emerg Med* 2018;55:114–7.
9 Stamm BJ, Lineback CM, Skolarus LE, *et al*. Artery of Percheron infarct: 12 cases and their complex clinical courses. *Neurohospitalist* 2018;8:141–5.
10 Meyer L, Stracke CP, Jungi N, *et al*. Thrombectomy for primary distal posterior cerebral artery occlusion stroke: the TOPMOST study. *JAMA Neurol* 2021;78:434–44.
11 Meyer L, Papanagiotou P, Politi M, *et al*. Feasibility and safety of thrombectomy for isolated occlusions of the posterior cerebral artery: a multicenter experience and systematic literature review. *J Neurointerv Surg* 2021;13:217–20.
12 Jansen IGH, Mulder MJHL, Goldhoorn R-JB, *et al*. Endovascular treatment for acute ischaemic stroke in routine clinical practice: prospective, observational cohort study (MR CLEAN Registry). *BMJ* 2018;360:k949.
13 Javed K, Reddy V, Das JM. Neuroanatomy, posterior cerebral arteries. In: *StatPearls*. Treasure Island, FL: StatPearls Publishing, 2020. https://pubmed.ncbi.nlm.nih.gov/30860709/
14 Zaidat OO, Yoo AJ, Khatri P, *et al*. Recommendations on angiographic revascularization grading standards for acute ischemic stroke: a consensus statement. *Stroke* 2013;44:2650–63.
15 Jung C, Yoon W, Ahn SJ, *et al*. The revascularization scales dilemma: is it right to apply the treatment in cerebral ischemia scale in posterior circulation stroke? *AJNR Am J Neuroradiol* 2016;37:285–9.
16 Gerber JC, Miaux YJ, von Kummer R. Scoring flow restoration in cerebral angiograms after endovascular revascularization in acute ischemic stroke patients. *Neuroradiology* 2015;57:227–40.
17 von Kummer R, Broderick JP, Campbell BCV, *et al*. The Heidelberg bleeding classification: classification of bleeding events after ischemic stroke and reperfusion therapy. *Stroke* 2015;46:2981–6.
18 Mokin M, Sonig A, Sivakanthan S, *et al*. Clinical and procedural predictors of outcomes from the endovascular treatment of posterior circulation strokes. *Stroke* 2016;47:782–8.
19 Yeo LLL, Holmberg A, Mpotsaris A, *et al*. Posterior circulation occlusions may be associated with distal emboli during thrombectomy : factors for distal embolization and a review of the literature. *Clin Neuroradiol* 2019;29:425–33.
20 Clarençon F, Baronnet F, Shotar E, *et al*. Should posterior cerebral artery occlusions be recanalized? Insights from the Trevo registry. *Eur J Neurol* 2020;27:787–92.
21 Strambo D, Bartolini B, Beaud V, *et al*. Thrombectomy and thrombolysis of isolated posterior cerebral artery occlusion. *Stroke* 2020;51:254–61.
22 Rezek I, Lingineni RK, Sneade M, *et al*. Differences in the angiographic evaluation of coiled cerebral aneurysms between a core laboratory reader and operators: results of the Cerecyte coil trial. *AJNR Am J Neuroradiol* 2014;35:124–7.
23 Rezek I, Mousan G, Wang Z, *et al*. Effect of core laboratory and multiple-reader interpretation of angiographic images on follow-up outcomes of coiled cerebral aneurysms: a systematic review and meta-analysis. *AJNR Am J Neuroradiol* 2013;34:1380–4.

Supplementary data – Table 1

No	Sex	Age	Medical history	IVT	GCS	Baseline NIHSS	FU NIHSS 24-48 hours	ΔNIHSS	Occlusion location CTA	Occlusion location DSA	eTICI	mRS at 90 days	Deceased?	Peri-procedural complication?	Remarks
1	In their 60s	Previous stroke Hypertension Hypercholesterolemia	Yes	6	40	8	-32	P1 right	P1 right	3	3	No	No	None	
2	In their 80s	Previous stroke Hypertension Smoking	Yes	7	22	1	-21	P1 right	P1 right	3	3	No	No	None	
3	In their 70s	Coronary artery disease Peripheral artery disease Hypertension Atrial fibrillation Hypercholesterolemia	No	15	4	5	+1	P2 right	P2 right	0	4	No	Yes: ENT (P1 both sides)	Pneumonia	
4	In their 70s	Pulmonary embolism Peripheral artery disease Hypertension Atrial fibrillation	No	14	14	21	+7	P1 left	P1 left	0	6	Yes	No	Cause of death (known and recent) pulmonary embolism with clinical deterioration, leading to death	
5	In their 80s	Diabetes mellitus Hypertension Hypercholesterolemia	Yes	12	13	24	+11	P1 right	P1 right	2B	6	Yes	Yes: ENT and dissection (ENT: to basilar artery. Dissection: in vertebral artery)	Aspiration pneumonia and urinary tract infection with clinical deterioration, leading to death	
6	In their 60s	Hypertension Atrial fibrillation	Yes	15	7	2	-5	P1 right	P2 right	2C	0	No	Yes: EDT (distal cortical branch)	None	
7	In their 80s	Previous stroke Hypertension Atrial fibrillation	Yes	13	18	13	-5	P1 left	P1 left	2B	6	Yes	Yes: EDT	None No additional	

												(P2-P3, treated successfully)	information on cause of death.
8	In their 70s	None	No	12	13	3	-10	P1 left	P1 left	2B	2	No	No	Procedure through trigeminal artery
9	In their 60s	Coronary artery disease Peripheral artery disease Diabetes mellitus Hypertension Hypercholesterolemia	Yes	7	26	40	+14	P1 right	P1 right	2A*	6	Yes	No	Cause of death stroke progression with malignant edema and hydrocephalus. External ventricular drain placement. Clinical deterioration, leading to death
10	In their 80s	Previous stroke Diabetes mellitus Hypertension Hypercholesterolemia	Yes	15	11	8	-3	P3 right	P3 right	2B	6	Yes	No	None No additional information on cause of death.
11	In their 60s	Smoking	No	14	17	12	-5	P1 right	P1 right	2A*	5	No	No	None
12	In their 70s	Hypertension Hypercholesterolemia	Yes	15	10	6	-4	P1 right	P1 right	2A*	3	No	No	None
13	In their 70s	Hypertension	Yes	15	6	15	+9	P1 left	P1 left	2A*	4	No	No	Stroke progression with neurological deterioration and urinary tract infection with clinical deterioration.
14	In their 80s	Previous stroke Hypertension	Yes	15	4	2	-2	P1 left	P1 left	3	5	No	No	None
15	In their 70s	Atrial fibrillation Smoking	No	7	15	0	-15	P1 left	P1 left	3	2	No	No	None
16	In their 40s	Smoking	No	7	17	6	-11	P1 left	P1 left	3	1	No	No	Artery of Percheron

17	In their 70s	Coronary artery disease Peripheral artery disease Hypertension Atrial fibrillation Hypercholesterolemia Heart failure	No	14	5	2	-3	P1 right	P1 right	3	6	Yes	No	Also right-sided carotid occlusion; supply anterior circulation through PCOM. Heart failure with clinical deterioration. Pneumonia.
18	In their 70s	Previous stroke Hypertension Atrial fibrillation	No	7	27	14	-13	P1 right	P1 right	2C	6	Yes	Yes: EDT	None No additional information on cause of death
19	In their 40s	Hypercholesterolemia	Yes	15	5	4	-1	P1 right	P1 right	3	3	No	No	None
20	In their 40s	Hypercholesterolemia Smoking	Yes	15	2	1	-1	P2 right	P2 right	2A	2	No	Yes: EDT	None

[*] *eTICI 2A due to no lateral view available*

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	committee or advocacy group, paid or unpaid		
11	Stock or stock options	☒ **None**	
12	Receipt of equipment, materials, drugs, medical writing, gifts or other services	☒ **None**	
13	Other financial or non-financial interests	☒ **None**	

Please place an "X" next to the following statement to indicate your agreement:

☒ I certify that I have answered every question and have not altered the wording of any of the questions on this form.

ICMJE DISCLOSURE FORM

Date: 11/24/2021

Your Name: D. Dippel

Manuscript Title: **Endovascular treatment for isolated posterior cerebral artery occlusion stroke in the MR CLEAN Registry**

Manuscript Number (if known): 2021-018505

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. "Related" means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

The author's relationships/activities/interests should be defined broadly. For example, if your manuscript pertains to the epidemiology of hypertension, you should declare all relationships with manufacturers of antihypertensive medication, even if that medication is not mentioned in the manuscript.

In item #1 below, report all support for the work reported in this manuscript without time limit. For all other items, the time frame for disclosure is the past 36 months.

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
Time frame: Since the initial planning of the work			
1	All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) **No time limit for this item.**	☒ **None**	
Time frame: past 36 months			
2	Grants or contracts from any entity (if not indicated in item #1 above).	☐ **None**	
		Stryker European Operations BV	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Penumbra Inc.	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Medtronic	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Cerenovus	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Dutch Heart foundation	Unrestricted grant paid to institution (Erasmus University Medical Center)

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
		Brain foundation Netherlands	Unrestricted grant paid to institution (Erasmus University Medical Center)
		The Netherlands Organisation for Health Research and development	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Health Holland Top Sector Life Sciences & Health	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Thrombolytic Science, LLC	Unrestricted grant paid to institution (Erasmus University Medical Center)
3	Royalties or licenses	☒ **None**	
4	Consulting fees	☒ **None**	
5	Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events	☒ **None**	
6	Payment for expert testimony	☒ **None**	
7	Support for attending meetings and/or travel	☒ **None**	
8	Patents planned, issued or pending	☒ **None**	
9	Participation on a Data Safety	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	**Specifications/Comments (e.g., if payments were made to you or to your institution)**
	Monitoring Board or Advisory Board		
10	Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid	☒ **None**	
11	Stock or stock options	☒ **None**	
12	Receipt of equipment, materials, drugs, medical writing, gifts or other services	☒ **None**	
13	Other financial or non-financial interests	☒ **None**	

Please place an "X" next to the following statement to indicate your agreement:

☒ I certify that I have answered every question and have not altered the wording of any of the questions on this form.

ICMJE DISCLOSURE FORM

Date: 11/24/2021

Your Name: B.J. Emmer

Manuscript Title: **Endovascular treatment for isolated posterior cerebral artery occlusion stroke in the MR CLEAN Registry**

Manuscript Number (if known): 2021-018505

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. "Related" means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

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Time frame: Since the initial planning of the work			
1	All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) **No time limit for this item.**	☒ **None**	
			Click the tab key to add additional rows.
Time frame: past 36 months			
2	Grants or contracts from any entity (if not indicated in item #1 above).	☐ **None**	
		TKI-Private PPP Grant	Dutch Ministry of Economics

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
3	Royalties or licenses	☒ **None**	
4	Consulting fees	☒ **None**	
5	Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events	☒ **None**	
6	Payment for expert testimony	☒ **None**	
7	Support for attending meetings and/or travel	☒ **None**	
8	Patents planned, issued or pending	☒ **None**	
9	Participation on a Data Safety Monitoring Board or Advisory Board	☒ **None**	
10	Leadership or fiduciary role in other board, society,	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	**Specifications/Comments (e.g., if payments were made to you or to your institution)**
	committee or advocacy group, paid or unpaid		
11	Stock or stock options	☒ **None**	
12	Receipt of equipment, materials, drugs, medical writing, gifts or other services	☒ **None**	
13	Other financial or non-financial interests	☒ **None**	

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ICMJE DISCLOSURE FORM

Date: 11/24/2021

Your Name: S. Ergezen

Manuscript Title: **Endovascular treatment for isolated posterior cerebral artery occlusion stroke in the MR CLEAN Registry**

Manuscript Number (if known): 2021-018505

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. "Related" means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

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Time frame: past 36 months			
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		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
3	Royalties or licenses	☒ **None**	
4	Consulting fees	☒ **None**	
5	Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events	☒ **None**	
6	Payment for expert testimony	☒ **None**	
7	Support for attending meetings and/or travel	☒ **None**	
8	Patents planned, issued or pending	☒ **None**	
9	Participation on a Data Safety Monitoring Board or Advisory Board	☒ **None**	
10	Leadership or fiduciary role in other board, society,	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	**Specifications/Comments (e.g., if payments were made to you or to your institution)**
	committee or advocacy group, paid or unpaid		
11	Stock or stock options	☒ **None**	
12	Receipt of equipment, materials, drugs, medical writing, gifts or other services	☒ **None**	
13	Other financial or non-financial interests	☒ **None**	

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ICMJE DISCLOSURE FORM

Date: 11/24/2021

Your Name: A.C.G.M. van Es

Manuscript Title: **Endovascular treatment for isolated posterior cerebral artery occlusion stroke in the MR CLEAN Registry**

Manuscript Number (if known): 2021-018505

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. "Related" means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

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			Click the tab key to add additional rows.
Time frame: past 36 months			
2	Grants or contracts from any entity (if not indicated in item #1 above).	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
3	Royalties or licenses	☒ **None**	
4	Consulting fees	☒ **None**	
5	Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events	☒ **None**	
6	Payment for expert testimony	☒ **None**	
7	Support for attending meetings and/or travel	☒ **None**	
8	Patents planned, issued or pending	☒ **None**	
9	Participation on a Data Safety Monitoring Board or Advisory Board	☒ **None**	
10	Leadership or fiduciary role in other board, society,	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	**Specifications/Comments (e.g., if payments were made to you or to your institution)**
	committee or advocacy group, paid or unpaid		
11	Stock or stock options	☒ **None**	
12	Receipt of equipment, materials, drugs, medical writing, gifts or other services	☒ **None**	
13	Other financial or non-financial interests	☒ **None**	

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ICMJE DISCLOSURE FORM

Date: 11/24/2021

Your Name: A. van der Lugt

Manuscript Title: **Endovascular treatment for isolated posterior cerebral artery occlusion stroke in the MR CLEAN Registry**

Manuscript Number (if known): 2021-018505

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Time frame: Since the initial planning of the work			
1	All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) **No time limit for this item.**	☒ **None**	
Time frame: past 36 months			
2	Grants or contracts from any entity (if not indicated in item #1 above).	☐ **None**	
		Stryker European Operations BV	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Penumbra Inc.	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Medtronic	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Cerenovus	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Dutch Heart foundation	Unrestricted grant paid to institution (Erasmus University Medical Center)

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
		Brain foundation Netherlands	Unrestricted grant paid to institution (Erasmus University Medical Center)
		The Netherlands Organisation for Health Research and Development	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Health Holland Top Sector Life Sciences & Health	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Thrombolytic Science, LLC	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Angiocare BV	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Medac Gmbh/Lamepro	Unrestricted grant paid to institution (Erasmus University Medical Center)
		Top Medical Concentric	Unrestricted grant paid to institution (Erasmus University Medical Center)
3	Royalties or licenses	☒ **None**	
4	Consulting fees	☒ **None**	
5	Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events	☒ **None**	
6	Payment for expert testimony	☒ **None**	
7	Support for attending meetings and/or travel	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
8	Patents planned, issued or pending	☒ **None**	
9	Participation on a Data Safety Monitoring Board or Advisory Board	☒ **None**	
10	Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid	☒ **None**	
11	Stock or stock options	☒ **None**	
12	Receipt of equipment, materials, drugs, medical writing, gifts or other services	☒ **None**	
13	Other financial or non-financial interests	☒ **None**	

Please place an "X" next to the following statement to indicate your agreement:

☒ I certify that I have answered every question and have not altered the wording of any of the questions on this form.

ICMJE DISCLOSURE FORM

Date: 11/24/2021

Your Name: G. Lycklama à Nijeholt

Manuscript Title: **Endovascular treatment for isolated posterior cerebral artery occlusion stroke in the MR CLEAN Registry**

Manuscript Number (if known): 2021-018505

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. "Related" means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

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Time frame: Since the initial planning of the work			
1	All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) **No time limit for this item.**	☒ **None**	
			Click the tab key to add additional rows.
Time frame: past 36 months			
2	Grants or contracts from any entity (if not indicated in item #1 above).	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
3	Royalties or licenses	☒ **None**	
4	Consulting fees	☒ **None**	
5	Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events	☒ **None**	
6	Payment for expert testimony	☒ **None**	
7	Support for attending meetings and/or travel	☒ **None**	
8	Patents planned, issued or pending	☒ **None**	
9	Participation on a Data Safety Monitoring Board or Advisory Board	☒ **None**	
10	Leadership or fiduciary role in other board, society,	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	**Specifications/Comments (e.g., if payments were made to you or to your institution)**
	committee or advocacy group, paid or unpaid		
11	Stock or stock options	☒ **None**	
12	Receipt of equipment, materials, drugs, medical writing, gifts or other services	☒ **None**	
13	Other financial or non-financial interests	☒ **None**	

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ICMJE DISCLOSURE FORM

Date: 11/24/2021

Your Name: C.M. Majoie

Manuscript Title: **Endovascular treatment for isolated posterior cerebral artery occlusion stroke in the MR CLEAN Registry**

Manuscript Number (if known): 2021-018505

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. "Related" means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

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		Name all entities with whom you have this relationship or indicate none (add rows as needed)	**Specifications/Comments (e.g., if payments were made to you or to your institution)**
Time frame: Since the initial planning of the work			
1	All support for the present manuscript (e.g., funding, provision of study materials, medical writing, article processing charges, etc.) **No time limit for this item.**	☒ **None**	
		TWIN Foundation (Applied Scientific Institute for Neuromodulation/Toegepast Wetenschappelijk Instituut voor Neuromodulatie)	Unrestricted grant paid to institution (Amsterdam UMC, location AMC)
			Click the tab key to add additional rows.
Time frame: past 36 months			
2	Grants or contracts from any entity (if not indicated in item #1 above).	☐ **None**	
		Stryker®	Unrestricted grant paid to institution (Amsterdam UMC, location AMC)
		CVON/Dutch Heart Foundation	Unrestricted grant paid to institution (Amsterdam UMC, location AMC)
		European Commission	Unrestricted grant paid to institution (Amsterdam UMC, location AMC)
		Health evaluation Netherlands	Unrestricted grant paid to institution (Amsterdam UMC, location AMC)
		Minor shareholder of Nico-Lab (a company focusing at AI use in	Personal disclosure

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
		neuroradiology)	
3	Royalties or licenses	☒ **None**	
4	Consulting fees	☒ **None**	
5	Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events	☒ **None**	
6	Payment for expert testimony	☒ **None**	
7	Support for attending meetings and/or travel	☒ **None**	
8	Patents planned, issued or pending	☒ **None**	
9	Participation on a Data Safety Monitoring Board or Advisory	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	**Specifications/Comments (e.g., if payments were made to you or to your institution)**
	Board		
10	Leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid	☒ **None**	
11	Stock or stock options	☒ **None**	
12	Receipt of equipment, materials, drugs, medical writing, gifts or other services	☒ **None**	
13	Other financial or non-financial interests	☒ **None**	

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ICMJE DISCLOSURE FORM

Date: 11/24/2021

Your Name: M.J.H.L. Mulder

Manuscript Title: **Endovascular treatment for isolated posterior cerebral artery occlusion stroke in the MR CLEAN Registry**

Manuscript Number (if known): 2021-018505

In the interest of transparency, we ask you to disclose all relationships/activities/interests listed below that are related to the content of your manuscript. "Related" means any relation with for-profit or not-for-profit third parties whose interests may be affected by the content of the manuscript. Disclosure represents a commitment to transparency and does not necessarily indicate a bias. If you are in doubt about whether to list a relationship/activity/interest, it is preferable that you do so.

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Time frame: past 36 months			
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		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
3	Royalties or licenses	☒ **None**	
4	Consulting fees	☒ **None**	
5	Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events	☒ **None**	
6	Payment for expert testimony	☒ **None**	
7	Support for attending meetings and/or travel	☒ **None**	
8	Patents planned, issued or pending	☒ **None**	
9	Participation on a Data Safety Monitoring Board or Advisory Board	☒ **None**	
10	Leadership or fiduciary role in other board, society,	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	**Specifications/Comments (e.g., if payments were made to you or to your institution)**
	committee or advocacy group, paid or unpaid		
11	Stock or stock options	☒ **None**	
12	Receipt of equipment, materials, drugs, medical writing, gifts or other services	☒ **None**	
13	Other financial or non-financial interests	☒ **None**	

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ICMJE DISCLOSURE FORM

Date: 11/24/2021

Your Name: Yvo Roos

Manuscript Title: **Endovascular treatment for isolated posterior cerebral artery occlusion stroke in the MR CLEAN Registry**

Manuscript Number (if known): 2021-018505

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		TWIN Foundation (Applied Scientific Institute for Neuromodulation/Toegepast Wetenschappelijk Instituut voor Neuromodulatie)	Unrestricted grant paid to institution (Amsterdam UMC, location AMC)
			Click the tab key to add additional rows.
Time frame: past 36 months			
2	Grants or contracts from any entity (if not indicated in item #1 above).	☐ **None**	
		Stryker	Unrestricted grant paid to institution (Amsterdam UMC, location AMC)
		Minor shareholder of Nico-Lab (a company focusing at AI use in neuroradiology)	Personal disclosure

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	Specifications/Comments (e.g., if payments were made to you or to your institution)
3	Royalties or licenses	☒ **None**	
4	Consulting fees	☒ **None**	
5	Payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events	☒ **None**	
6	Payment for expert testimony	☒ **None**	
7	Support for attending meetings and/or travel	☒ **None**	
8	Patents planned, issued or pending	☒ **None**	
9	Participation on a Data Safety Monitoring Board or Advisory Board	☒ **None**	
10	Leadership or fiduciary role in other board, society,	☒ **None**	

		Name all entities with whom you have this relationship or indicate none (add rows as needed)	**Specifications/Comments (e.g., if payments were made to you or to your institution)**
	committee or advocacy group, paid or unpaid		
11	Stock or stock options	☒ **None**	
12	Receipt of equipment, materials, drugs, medical writing, gifts or other services	☒ **None**	
13	Other financial or non-financial interests	☒ **None**	

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