Supplemental table 1. Baseline clinical characteristics in R and NR groups.

Characteristics	R group (n=72)	NR group (n=116)	p value
Age, years	65 [56, 71]	65 [56, 72]	0.47
Sex, female	47 (65)	89 (77)	0.10
Medical history			
Hypertension	46 (64)	52 (45)	0.02*
Diabetes mellitus	4 (5.6)	9 (7.8)	0.77
Hyperlipidemia	14 (19)	27 (23)	0.59
Polycystic kidney disease	1 (1.4)	4 (3.4)	0.65
Prior stroke	4 (5.6)	2 (1.7)	0.21
Cerebral small vessel disease¶	39 (54)	50 (43)	0.18
Smoking			
Current	10 (14)	18 (16)	0.46
Past smoker	18 (25)	20 (17)	
None	44 (61)	78 (67)	
Drinking	15 (21)	18 (16)	0.43
Family history			
Cerebral aneurysm	10 (14)	24 (21)	0.33
Polycystic kidney	1 (1.4)	1 (0.9)	1
Aneurysm characteristics			
Thrombosed aneurysm	6 (8.3)	5 (4.3)	0.34
Multiple aneurysms	26 (36)	43 (37)	1
Aneurysm location			
ACA/ACoA	10 (14)	17 (15)	0.13
MCA	9 (13)	18 (16)	
ICA	37 (51)	65 (56)	
PCA	0 (0)	1 (0.9)	
BA/SCA	16 (22)	11 (9.5)	
VA/PICA	0 (0)	4 (3.4)	
Posterior circulation	15 (21)	16 (14)	0.23

ACA = anterior cerebral artery; ACoA = anterior communicating artery; BA = basilar artery; ICA = internal carotid artery; MCA = middle cerebral artery; NR = non-major re-recanalization; PCA = posterior cerebral artery; PICA = posterior inferior cerebellar artery; R = major re-recanalization; SCA = superior cerebellar artery; VA = vertebral artery. ¶ Cerebral small vessel disease was diagnosed if one or more of the following radiological features were seen on MRI; (1) small, focal subcortical infarction, (2) diffuse white matter lesions present as white matter hyperintensities on T2WI, (3) microbleeding in the subcortical region. *$p<0.05$. Unless otherwise indicated, values represent the number of aneurysms (%) or median [IQR]. Not all percentage totals reach 100% because of rounding.

Supplemental table 2. Baseline anatomical and procedural characteristics in R and NR groups.

Characteristics	R group (n=72)	NR group (n=116)	p value
First coiling			
Aneurysm size, mm	10.2 [7.5, 13.4]	7.2 [5.6, 10.3]	<0.001*
Neck size, mm	6.9 [5.0, 9.0]	5.0 [3.5, 6.7]	<0.001*
Aspect ratio†	1.3 [1.1, 1.7]	1.3 [1.1, 1.7]	0.89
Aneurysm volume, mm^3	466 [176, 1050]	153 [71, 343]	<0.001*
Endovascular technique			
Primary coiling	15 (21)	24 (21)	0.50
Balloon-assisted	13 (18)	20 (17)	
Double-catheter	23 (32)	48 (41)	
Stent-assisted	21 (29)	24 (21)	
Without stent	51 (71)	92 (79)	0.22
Embolization result (RROC)††			
Class 1	5 (6.9)	14 (12)	0.54
Class 2	53 (74)	79 (68)	
Class 3	14 (19)	23 (20)	
No Class 1	67 (93)	102 (88)	0.32
VER†††	22.6 [19.0, 25.5]	22.4 [19.5, 26.4]	0.65
Second coiling			
Ruptured status	3 (4.2)	2 (1.7)	0.37
Endovascular technique			
Primary coiling	28 (39)	41 (35)	0.001*
Balloon-assisted	7 (9.7)	12 (10)	
Double-catheter	27 (38)	20 (17)	
Stent-assisted	10 (14)	43 (37)	
Without balloon	65 (90)	104 (90)	1
Without stent	62 (86)	73 (63)	0.001*
Type of stent			
Neuroform[α]	6 (60)	38 (88)	0.04*
Enterprise[αα]	4 (40)	3 (7.0)	
LVIS[ααα]	0 (0)	2 (4.7)	
Use of intermediate catheter	11 (15)	46 (40)	0.001*
Type of coil			
Bioactive coil[¶]	29 (40)	26 (22)	0.01*
Large coil[¶¶]	8 (11)	15 (13)	0.82
Hydrogel coil[¶¶¶]	0 (0)	3 (2.6)	0.29
Embolization result (RROC)††			
Class 1	2 (2.8)	23 (20)	0.002*
Class 2	56 (78)	75 (65)	
Class 3	14 (19)	18 (16)	
No Class 1	70 (97)	93 (80)	0.001*
Complication			
Ischemic	2 (2.8)	0 (0)	0.15
Symptomatic††††	1 (1.4)	0 (0)	0.38
Hemorrhagic	1 (1.4)	0 (0)	0.38
Symptomatic††††	0 (0)	0 (0)	NA
Intra-procedural rupture	0 (0)	0 (0)	NA
Follow-up period, month	44.5 [19.0, 84.3]	53.0 [18.0, 105.0]	0.51

NR = non-major re-recanalization; NA = not available; R = major re-recanalization; RROC = Raymond-Roy Occlusion Classification; VER = volume embolization ratio. †The aspect ratio was calculated as the ratio of the height to neck size. ††Embolization results were assessed by RROC as follows: Class 1, complete occlusion; Class 2, residual neck; and Class 3, residual aneurysm. †††VER was calculated using the following formula: VER (%) = (volume of coil for embolization) / (volume of aneurysm) x 100. †††Symptomatic complications were classified as an increase of at least one point in the modified Rankin Scale score compared with the preoperative level. [α]Neuroform EZ and Neuroform atlas were included. [αα] Enterprise 1 and 2 were included. [ααα]All were Low-profile Visualized Intraluminal Support Blue. ¶Bioactive coils were all the Matrix2 (Stryker Neurovascular). ¶¶Large coils with a primary diameter of 0.014 inches or larger were all the Target XL (Stryker Neurovascular). ¶¶¶Hydrogel coils were all the HydroCoil Embolic System (MicroVention Terumo). *p<0.05. Unless otherwise indicated, values represent the number of aneurysms (%) or median [IQR]. Not all percentage totals reach 100% because of rounding.

Supplemental table 3. Literature review of factors associated with re-recanalization following second coiling of recanalized aneurysms.

Authors, year	Study period/Facilities	Aneurysms/ Patients	Mean follow-up period, months	Rate of re-recanalization	Incidence of complications Total/Permanent sequelae	Risk factors for re-recanalization after second coiling	Protective factors for re-recanalization after second coiling
Cho et al., 2012[10]	Sep. 2001-Sep. 2011/Single-center	197/162	26.0±18.0	34.3%	7.6%/0%	Posterior circulation, large aneurysm at first coiling, subtotal occlusion at second coiling ††	Stent implantation at second coiling
Lee et al., 2018[11]	Jan. 2008-Jan. 2016/Single-center	133/129	6	35.3%	NA	Posterior circulation, large aneurysm at first coiling (>7 mm), incomplete occlusion at second coiling	NA
Han et al., 2022[12]	Jan. 2012-Jun. 2017/Single-center	49/49†	12.45±11.14	20.5%	4.0%/0%	NA	Complete occlusion at second coiling
Bae et al., 2024[13]	Jan. 2001-Jun. 2021/Single-center	310/308	40.2±33.0	28.1%	4.2%/0%	Neck size at first coiling, ADPKD	Stent implantation, complete occlusion, or residual neck at second coiling
Present study	Jan. 2003-Dec. 2023/Multi-center	188/185	62.3±51.2	38.3%	1.6%/0.5%	Neck size at first coiling	Stent implantation, use of intermediate catheter, or complete occlusion at second coiling

ADPKD = autosomal dominant polycystic kidney disease; NA = not available. †Note that four recanalized aneurysms treated with flow diversion were included. ††Subtotal occlusion was defined as any contrast filling in the aneurysm sac.

Supplemental table 4. Summary of IMC types, sizes, and location.

Characteristics	R group (n=72)	NR group (n=116)
Types		
DAC	4 (36)	2 (4.3)
Cerulean	3 (27)	4 (8.7)
Tactics	3 (27)	16 (35)
Navien	1 (9.1)	0 (0)
Guidepost	0 (0)	9 (20)
AXS Vecta	0 (0)	8 (17)
Asahi Fubuki	0 (0)	3 (6.5)
Sofia	0 (0)	3 (6.5)
Tracker	0 (0)	1 (2.2)
Sizes		
3.2-3.9Fr	6 (55)	25 (54)
4.0-4.7Fr	1 (9.1)	7 (15)
5.0Fr	2 (18)	1 (2.2)
6.0-6.3Fr	2 (18)	13 (28)
Location		
ICA		
Extracranial	2 (18)	0 (0)
Petrous	2 (18)	8 (17)
Cavernous	2 (18)	20 (44)
Supraclinoid	3 (27)	9 (20)
MCA		
M1	0 (0)	2 (4.3)
ACA		
A1	0 (0)	3 (6.5)
VA		
V2	0 (0)	1 (2.2)
V3	1 (9.1)	0 (0)
BA	1 (9.1)	3 (6.5)

ACA = anterior cerebral artery; A1 = horizontal segment of the anterior cerebral artery; BA = basilar artery; Fr = French; ICA = internal carotid artery; IMC = intermediate catheter; MCA = middle cerebral artery; M1 = horizontal segment of the middle cerebral artery; NR = non-major re-recanalization; R = major re-recanalization; VA = vertebral artery; V2 = foraminal segment, extending from the transverse foramen of the sixth cervical vertebra to that of the second cervical vertebra; V3 = atlantic (extradural) segment, extending from the transverse foramen of the second cervical vertebra to the penetration of the dura mater. Unless otherwise indicated, values represent the number of aneurysms (%). Note: Totals may not sum to 100% due to rounding.