

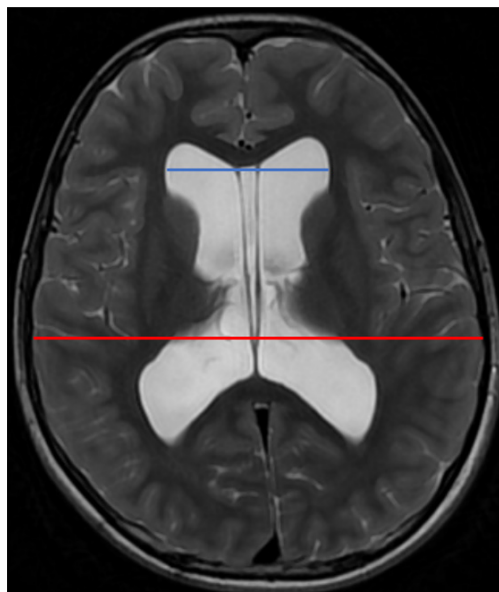
### Sample size calculation

The sample size was determined with G\*Power software version 3.1.9.7 (<http://www.gpower.hhu.de/en.html>) using the mean and standard deviation from the literature and via calculation of the effect size. Effect size (d) was estimated to be 0.4 which kept the power at 0.95 and type I error at 0.05 according to a standard protocol. Therefore, a minimum sample size of 34 for per group was estimated.

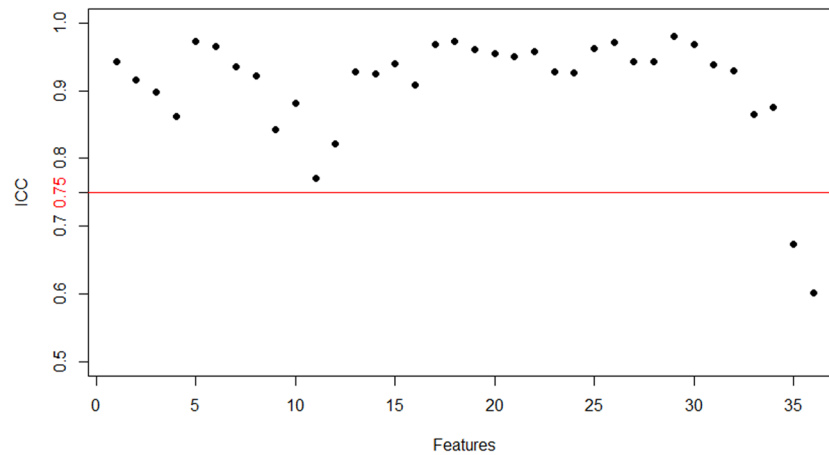
**Table S1** The scanning parameters of the MRI sequences

MRI protocol	TR/TE (msec)	Flip angle (degree)	FOV (mm × mm)	Matrix	Slices	Slice thickness (mm)	NEX	Scan time (min:sec)
3D FIESTA	5.8/2.7	60	18×18	256×256	56	1.2	2	3:09
CUBE T2	2,200/120	90	18×18	320×288	28	1.2	2	2:02
3D pCASL (PLD 1.5 s)	4,597/10.7	111	24×24	512×8	64	4	3	4:27
3D pCASL (PLD 2.5 s)	5,292/10.7	111	24×24	512×8	64	4	3	5:07
T1WI	2,006/22.6	–	24×19.2	320×256	20	5	2	1:51
T2WI	4,206/99.6	–	24×24	416×416	20	5	1.5	0:55
FLAIR	8,000/121.4	–	24×24	320×224	20	5	1	1:44
TOF-MRA	19/3.4	15	22×19.4	320×256	113	1.6	1	3:00
DWI	4,880/77.1	–	24×24	130×160	40	5	3	00:54

MRI, magnetic resonance imaging; TR, repetition time; TE, echo time; FOV, field of view; NEX, Number of EXcitations; 3D FIESTA, three-dimensional fast imaging employing steady-state acquisition; 3D pCASL, three-dimensional pseudo-continuous arterial spin-labeling; PLD, post-labeling delay; T1WI, T1-weighted imaging; T2WI, T2-weighted imaging; FLAIR, fluid-attenuated inversion recovery; TOF-MRA, time-of-flight magnetic resonance angiography; DWI, diffusion-weighted imaging.



**Figure S1** Evans index measurement diagram. The blue line represents the widest diameter of the bilateral ventricles in the frontal horn, while the red line represents the widest diameter of the brain parenchyma at the same level. The ratio of the widest frontal angle diameter of the bilateral ventricles to the widest cranial diameter at the same level is the Evans index.



**Figure S2** The ICC between the two observers. The points from left to right are respectively the anterior external watershed (right PLD =1.5 s, left PLD =1.5 s, right PLD =2.5 s, left PLD =2.5 s), posterior external watershed (right PLD =1.5 s, left PLD =1.5 s, right PLD =2.5 s, left PLD =2.5 s), internal watershed (right PLD =1.5 s, left PLD =1.5 s, right PLD =2.5 s, left PLD =2.5 s), frontal cortex (right PLD =1.5 s, left PLD =1.5 s, right PLD =2.5 s, left PLD =2.5 s), parietal cortex (right PLD =1.5 s, left PLD =1.5 s, right PLD =2.5 s, left PLD =2.5 s), temporal cortex (right PLD =1.5 s, left PLD =1.5 s, right PLD =2.5 s, left PLD =2.5 s), occipital cortex (right PLD =1.5 s, left PLD =1.5 s, right PLD =2.5 s, left PLD =2.5 s), cerebellum (right PLD =1.5 s, left PLD =1.5 s, right PLD =2.5 s, left PLD =2.5 s), and thalamus (right PLD =1.5 s, left PLD =1.5 s, right PLD =2.5 s, left PLD =2.5 s). ICC, intraclass correlation coefficient; PLD, postlabeling delay.

**Table S2** Comparison of CBF in different groups at a PLD of 1.5 s

CBF (mL/100 g/min)	Side	Communicating hydrocephalus (N=58)	Obstructive hydrocephalus (N=57)	Control (N=52)	P value	P value 1	P value 2	P value 3
Anterior external watershed	R	37.47±13.7	47.97±13.51	50.33±8	<0.001*	0.015*	<0.001*	0.421
	L	33.32±10.77	40.15±10.83	48.05±7.12	<0.001*	0.104	<0.001*	<0.001*
Posterior external watershed	R	30.8±16.23	44.37±17.32	49.26±10.56	<0.001*	0.01*	<0.001*	0.072
	L	31.17±16.19	41.86±15.9	48.53±10.8	<0.001*	0.124	<0.001*	0.008*
Internal watershed	R	22.32±6.79	25.39±6.76	32.18±6.69	<0.001*	0.217	<0.001*	<0.001*
	L	21.82±6.49	25.78±7.17	32.28±6.46	<0.001*	0.022*	<0.001*	<0.001*
Frontal cortex	R	40.81±14.32	52.61±16.21	58.8±9.52	<0.001*	0.037*	<0.001*	0.004*
	L	38.27±12.33	47.06±13.19	57.66±8.99	<0.001*	0.064	<0.001*	<0.001*
Parietal cortex	R	31.39±16.72	45.64±18.53	51.3±14.04	<0.001*	0.036*	<0.001*	0.033*
	L	31.77±15.92	44.44±18	49.64±13.26	<0.001*	0.1	<0.001*	0.041*
Temporal cortex	R	38.75±12.72	50.42±15.09	53.94±8.98	<0.001*	0.007*	<0.001*	0.128
	L	38.47±12.97	48.29±14.76	53.53±8.81	<0.001*	0.043*	<0.001*	0.021*
Occipital cortex	R	30.74±16.01	42.69±18.37	48.21±13.17	<0.001*	0.129	<0.001*	0.048*
	L	30.48±15.47	43.03±18.47	47.54±12.77	<0.001*	0.064	<0.001*	0.117
Cerebellum	R	36.49±15.13	45.08±16.09	48.58±12.14	0.016*	0.741	0.013*	0.225
	L	37.32±16.84	46.57±15.59	48.52±11.29	0.042*	0.422	0.036*	0.816
Thalamus	R	48.64±15.11	54.8±14.2	56.72±10.57	0.104	0.678	0.101	>0.99
	L	49.76±15.72	54.07±15.24	56.84±11.55	0.234	>0.99	0.303	0.677

Data are the mean ± standard deviation. P value: comparison among the three groups; P value 1: comparison between patients with communicating hydrocephalus vs. those with obstructive hydrocephalus; P value 2: comparison between patients with communicating hydrocephalus vs. controls; P value 3: comparison between patients with obstructive hydrocephalus vs. controls. P values were calculated with the covariance analysis and age being controlled for. P value 1, P value 2, and P value 3 were calculated with post hoc Bonferroni correction for multiple comparisons. \*, P<0.05. CBF, cerebral blood flow; PLD, postlabeling delay; R, right; L, left.

**Table S3** Comparison of CBF in different groups at a PLD of 2.5 s

CBF (mL/100 g/min)	Side	Communicating hydrocephalus (N=58)	Obstructive hydrocephalus (N=57)	Control (N=52)	P value	P value 1	P value 2	P value 3
Anterior external watershed	R	43.39±9.87	50.75±10.41	50.64±6.16	0.006*	0.021*	0.012*	>0.99
	L	42.05±7.21	46.12±8.69	49.05±5.38	<0.001*	0.178	<0.001*	0.064
Posterior external watershed	R	42.75±11.46	52.34±12.63	51.88±7.59	0.002*	0.006*	0.006*	>0.99
	L	42.6±11.53	50.03±12.46	52.03±6.81	0.002*	0.048	0.001*	0.663
Internal watershed	R	31.54±6.86	32.43±6.68	36.2±5.75	<0.001*	0.698	<0.001*	0.01*
	L	32.42±7.27	32.78±6.7	35.57±5.54	0.014*	>0.99	0.016*	0.102
Frontal cortex	R	47.73±9.71	55.6±12.27	58.65±7.31	<0.001*	0.059	<0.001*	0.103
	L	47.26±8.41	52.85±9.72	57.27±6.23	<0.001*	0.078	<0.001*	0.006*
Parietal cortex	R	44.04±13.16	55.08±14.4	57.24±9.51	<0.001*	0.012*	<0.001*	0.555
	L	44.68±12.29	53.94±13.55	56±8.4	0.001*	0.036*	0.001*	0.570
Temporal cortex	R	47.6±9.28	50.42±15.09	57.26±7.49	0.001*	0.017*	<0.001*	0.784
	L	48.59±9.15	53.94±11.15	57.6±6.83	<0.001*	0.285	<0.001*	0.052
Occipital cortex	R	46.53±13.2	56.17±13.89	59.1±8.12	<0.001*	0.014*	<0.001*	0.369
	L	46.46±13.27	55.18±14.16	58.69±7.24	<0.001*	0.030*	<0.001*	0.233
Cerebellum	R	48.24±12.11	53.91±12.81	55.12±7.74	0.016*	0.150	0.014*	>0.99
	L	48.64±15.11	54.8±14.2	54.88±7.31	0.046*	0.198	0.051	>0.99
Thalamus	R	53.45±10.47	54.7±9.76	53.26±8.32	0.643	>0.99	>0.99	>0.99
	L	55.73±11.75	54.63±10.31	54.36±8.51	0.821	>0.99	>0.99	>0.99

Data are the mean ± standard deviation. P value: comparison among the three groups; P value 1: comparison between patients with communicating hydrocephalus vs. those with obstructive hydrocephalus; P value 2: comparison between patients with communicating hydrocephalus vs. controls; P value 3: comparison between patients with obstructive hydrocephalus vs. controls. P values were calculated with the covariance analysis and age being controlled for. P value 1, P value 2, and P value 3 were calculated with post hoc Bonferroni correction for multiple comparisons. \*, P<0.05. CBF, cerebral blood flow; PLD, postlabeling delay; R, right; L, left.

**Table S4** Comparison of  $\Delta$ CBF in the different groups

CBF (mL/100 g/min)	Side	Communicating hydrocephalus (N=58)	Obstructive hydrocephalus (N=57)	Control (N=52)	P value	P value 1	P value 2	P value 3
Anterior external watershed	R	5.92±6.73	2.77±7.16	0.31±4.85	0.002*	0.602	0.002*	0.061
	L	8.73±6.6	5.98±7.55	1±4.74	<0.001*	>0.99	<0.001*	<0.001*
Posterior external watershed	R	11.95±7.93	7.97±8.25	2.62±6.28	<0.001*	0.759	<0.001*	<0.001*
	L	11.42±8.03	8.17±8.94	3.5±7.19	<0.001*	>0.99	0.001*	0.001*
Internal watershed	R	9.23±5.44	7.04±6.81	4.02±5.7	0.001*	>0.99	0.001*	0.013*
	L	10.6±5.66	7.01±5.88	3.29±4.5	<0.001*	0.038*	<0.001*	0.001*
Frontal cortex	R	6.92±7.13	3±8.1	-0.15±5.39	<0.001*	0.637	<0.001*	0.013*
	L	8.98±6.74	5.79±8.29	-0.39±5.63	<0.001*	0.873	<0.001*	<0.001*
Parietal cortex	R	12.65±7.26	9.44±8.35	5.94±7.47	0.002*	>0.99	0.005*	0.010*
	L	12.91±7.21	9.49±9.26	6.36±7.96	0.009*	>0.99	0.020*	0.028*
Temporal cortex	R	8.85±6.54	5.35±6.56	3.32±5.2	0.002*	0.433	0.002*	0.110
	L	10.12±8.05	5.65±7.09	4.07±5.16	0.003*	0.133	0.002*	0.409
Occipital cortex	R	15.8±8.66	13.48±10	10.88±8.75	0.136	>0.99	0.536	0.155
	L	15.97±9.49	12.15±10.44	11.15±9.57	0.509	>0.99	0.846	>0.99
Cerebellum	R	10.88±10.8	8.51±9.37	6.54±7.13	0.276	>0.99	>0.99	0.328
	L	10.92±11.01	7.34±12.01	6.36±8.79	0.650	>0.99	>0.99	>0.99
Thalamus	R	4.81±12.03	-0.1±9.96	-3.47±5.87	0.006*	>0.99	0.006*	0.067
	L	5.97±11.21	0.57±10.72	-2.48±6.57	0.005*	0.624	0.004*	0.125

Data are the mean  $\pm$  standard deviation. P value: comparison among the three groups; P value 1: comparison between patients with communicating hydrocephalus vs. those with obstructive hydrocephalus; P value 2: comparison between patients with communicating hydrocephalus vs. controls; P value 3: comparison between patients with obstructive hydrocephalus vs. controls. P values were calculated with the covariance analysis and age being controlled for. P value 1, P value 2, and P value 3 were calculated with post hoc Bonferroni correction for multiple comparisons. \*,  $P < 0.05$ .  $\Delta$ CBF, delta cerebral blood flow; CBF, cerebral blood flow; R, right; L, left.