

Supplementary Materials

A multimodal neuroimaging and hepatic imaging analysis for hepatic-type and neurological-type Wilson's disease

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Supplementary Table 1. Neuroimaging and hepatic imaging analysis of Wilson's disease and healthy controls

Characteristics	Wilson's disease (<i>n</i> = 27)	Healthy control (<i>n</i> = 11)	<i>P</i> value
Liver Fat(%)			
Fat-1	2.500 (2.000, 3.600)	2.100 (1.600, 2.900)	0.266
Fat-2	2.700 (2.200, 4.000)	2.100 (1.500, 4.800)	0.253
Fat-3	2.700 (2.100, 3.300)	2.400 (1.400, 3.700)	0.326
Fat-4	2.900 (2.200, 3.800)	2.100 (1.900, 3.600)	0.259
Fat-5	2.700 (1.900, 4.200)	2.400 (1.700, 4.500)	0.551
Fat-6	2.900 (2.000, 3.900)	2.400 (1.600, 4.900)	0.562
Fat-7	2.900 (2.100, 4.300)	2.200 (1.700, 4.100)	0.411
Fat-8	2.800 (2.200, 4.000)	2.300 (1.800, 4.200)	0.551
Liver iron(Hz)			
R ₂ -1	46.400 (39.700, 59.900)	43.700 (37.400, 47.800)	0.227
R ₂ -2	50.300 (42.600, 65.700)	44.900 (42.600, 47.700)	0.303
R ₂ -3	44.500 (39.600, 62.800)	44.900 (36.800, 47.300)	0.499
R ₂ -4	44.700 (40.900, 61.200)	45.700 (39.500, 51.100)	0.541
R ₂ -5	46.300 (41.400, 61.300)	40.800 (38.700, 48.200)	0.044
R ₂ -6	49.800 (39.400, 65.400)	44.600 (37.900, 47.500)	0.118
R ₂ -7	50.900 (42.800, 67.400)	43.600 (37.600, 49.200)	0.050
R ₂ -8	48.700 (41.700, 60.100)	43.100 (41.000, 51.200)	0.198
Brain iron(ppm)			
Left-Cerebellum-Cortex	-0.021589544 (-0.024822662, -0.019011760)	-0.022420594 (-0.026244160, -0.015346334)	0.885
Left-Thalamus-Proper	-0.013989164 (-0.16728946, -0.005932123)	-0.019080880 (-0.022041709, -0.011776572)	0.085
Left-Caudate	0.0159330197 (0.0087221654, 0.0242830855)	0.0079383276 (0.0056457826, 0.0110103334)	0.044
Left-Putamen	0.0114821836 (-0.001928135, 0.0227724281)	0.0004041833 (-0.002582402, 0.0149182147)	0.240
Left-Pallidum	0.0884466026 (0.0704656674, 0.1035836078)	0.0745692665 (0.0555746706, 0.0872149837)	0.085
Brain-Stem	-0.020687872 (-0.023419945, -0.018059047)	-0.021047134 (-0.026882430, -0.016198666)	0.760
Left-Hippocampus	-0.020280310 (-0.024740874, -0.018059047)	-0.019796548 (-0.021927390, -0.013574377)	0.182
Left-Amygdala	-0.027282686 (-0.030492286, -0.022147807)	-0.025114393 (-0.031302421, -0.018353582)	0.595
Left-Accumbens-area	-0.021712787 (-0.036305254, -0.018170109)	-0.017443666 (-0.024074912, -0.014408107)	0.044
Right-Cerebellum-Cortex	-0.021706363 (-0.025192412, -0.019316979)	-0.022638600 (-0.024094149, -0.015716919)	0.641
Right-Thalamus-Pr	-0.012384233 (-0.015305259, -0.017790618)	-0.017790618 (-0.019254961, -0.015305259)	0.215

oper	-0.007611991)	-0.009257509)	
Right-Caudate	0.0186451190 (0.0101227147, 0.0310430459)	0.0088274902 (0.0064590581, 0.0114178917)	0.044
Right-Putamen	0.0133123725 (0.0023191616, 0.0284018922)	0.0003885014 (-0.003136024, 0.0108410255)	0.064
Right-Pallidum	0.0972409799 (0.0747396858, 0.1151896879)	0.0828862129 (0.0678921447, 0.0938320476)	0.074
Right-Hippocampus	-0.018506646 (-0.023145282, -0.16390698)	-0.018798654 (-0.020339720, -0.012231001)	0.509
Right-Amygdala	-0.25877878 (-0.030579262, -0.022721162)	-0.027183762 (-0.030177631, -0.019071171)	0.809
Right-Accumbens-area	-0.021475405 (-0.027952604, -0.017330099)	-0.016302367 (-0.018894024, -0.009497827)	0.009

Brain

Volume(mm³)

Left-Cerebellum-Cortex	47526.62051 ± 4269.465803	53186.94178 ± 5424.091066	0.002
Left-Thalamus-Proper	7003.584665 (6446.520612, 7345.512697)	8534.592810 (6893.856654, 8788.824834)	0.015
Left-Caudate	3373.400320 ± 590.3294338	3973.909468 ± 607.9292399	0.008
Left-Putamen	4892.696464 ± 1047.768626	6005.782388 ± 936.0910660	0.004
Left-Pallidum	1534.896146 (1225.368116, 1783.944169)	1872.720178 (1463.400139, 1951.560185)	0.027
Brain-Stem	16460.45756 ± 1789.143219	18776.76396 ± 2156.955585	0.002
Left-Hippocampus	4281.096406 ± 286.5170696	4605.984437 ± 282.3470110	0.003
Left-Amygdala	1780.824169 ± 151.7411861	1855.577631 ± 174.2105519	0.195
Left-Accumbens-area	601.5840571 ± 94.45932733	656.1884259 ± 96.71826117	0.117
Right-Cerebellum-Cortex	47015.95646 ± 4788.264971	52399.38606 ± 5972.464978	0.006
Right-Thalamus-Proper	7034.040668 (6427.728610, 7495.200711)	8320.536790 (6807.456646, 8608.680817)	0.020
Right-Caudate	3482.224331 ± 619.9633449	4081.948751 ± 586.7200764	0.009
Right-Putamen	4687.680445 ± 1104.492074	5861.887102 ± 813.3482207	0.003
Right-Pallidum	1417.040135 ± 312.5455772	1680.067796 ± 249.5719321	0.018
Right-Hippocampus	4464.824424 ± 336.8588620	4764.606998 ± 426.0377009	0.027
Right-Amygdala	1850.128176 ± 190.5372245	1960.691095 ± 185.8288258	0.111
Right-Accumbens-area	640.4160608 ± 90.90149523	691.5460656 ± 105.9091075	0.143

“Fat(1-8)” and “R₂(1-8)” denote the fat content and quantified iron deposition measured within the regions of interest (ROIs) in the eight Couinaud liver segments. “Brain iron” indicates the assessment of iron deposition in specific brain regions using quantitative susceptibility mapping (QSM). “Brain volume” pertains to volumetric measurements conducted in various brain regions.

Supplementary Table 2. Evaluation of the diagnostic efficacy of neuroimaging and hepatic imaging for Wilson’s disease

Characteristics	AUC	Standard Error	<i>P</i>	95%CI
Liver iron				
R ₂ -5	0.710	0.093	0.044	0.527-0.894
R ₂ -7	0.705	0.090	0.050	0.529-0.881
Brain iron				
Left-Caudate	0.710	0.090	0.020	0.534-0.887
Right-Caudate	0.710	0.087	0.016	0.540-0.881
Brain Volume				
Left-Cerebellum-Cortex	0.795	0.087	0.005	0.623-0.966
Left-Thalamus-Proper	0.754	0.104	0.015	0.550-0.958
Left-Caudate	0.778	0.084	0.008	0.612-0.943
Left-Putamen	0.785	0.084	0.007	0.620-0.949
Left-Pallidum	0.731	0.091	0.027	0.552-0.909
Brain-Stem	0.795	0.097	0.005	0.605-0.984
Left-Hippocampus	0.768	0.082	0.011	0.606-0.929
Right-Cerebellum-Cortex	0.761	0.091	0.013	0.582-0.940
Right-Thalamus-Proper	0.744	0.103	0.020	0.541-0.947
Right-Caudate	0.768	0.089	0.011	0.594-0.942
Right-Putamen	0.805	0.075	0.004	0.657-0.952
Right-Pallidum	0.741	0.083	0.021	0.579-0.902
Right-Hippocampus	0.724	0.103	0.032	0.523-0.925

“R₂” denote the quantified iron deposition measured within liver segments V and VII. “Brain iron” indicates the assessment of iron deposition in specific brain regions using quantitative susceptibility mapping (QSM). “Brain volume” pertains to volumetric measurements conducted in various brain regions.

Supplementary Table 3. The correlation between UWDRS score and brain volume, liver iron quantification in neurological Wilson's disease

		Liver iron	Brain Volume
		R2-6	Left-Caudate
UWDRS	Pearson correlation	0.635	-0.678
	<i>P</i> value	0.048	0.031

Supplementary Table 4. Neuroimaging and hepatic imaging analysis of neurological Wilson's disease and healthy controls

Characteristics	Neurological Wilson's disease (<i>n</i> = 10)	Healthy control (<i>n</i> = 11)	<i>P</i> value
Liver Fat(%)			
Fat-1	2.400 (1.775, 3.350)	2.100 (1.600, 2.900)	0.698
Fat-2	2.750 (2.025, 3.325)	2.100 (1.500, 4.800)	0.647
Fat-3	2.750 (1.900, 3.300)	2.400 (1.400, 3.700)	0.526
Fat-4	2.850 (1.950, 3.875)	2.100 (1.900, 3.600)	0.597
Fat-5	2.300 (1.700, 3.575)	2.400 (1.700, 4.500)	0.972
Fat-6	2.800 (1.800, 3.400)	2.400 (1.600, 4.900)	0.972
Fat-7	2.900 (1.800, 3.600)	2.200 (1.700, 4.100)	1.000
Fat-8	2.400 (1.750, 3.400)	2.300 (1.800, 4.200)	0.751
Liver iron(Hz)			
R ₂ -1	51.050 (39.875, 66.825)	43.700 (37.400, 47.800)	0.139
R ₂ -2	54.100 (42.375, 84.450)	44.900 (42.600, 47.700)	0.159
R ₂ -3	49.400 (38.100, 79.875)	44.900 (36.800, 47.300)	0.324
R ₂ -4	47.700 (39.250, 71.925)	45.700 (39.500, 51.100)	0.439
R ₂ -5	58.350 (42.375, 73.950)	40.800 (38.700, 48.200)	0.035
R ₂ -6	56.400 (38.425, 81.750)	44.600 (37.900, 47.500)	0.049
R ₂ -7	60.650 (49.250, 95.125)	43.600 (37.600, 49.200)	0.024
R ₂ -8	57.400 (43.225, 89.850)	43.100 (41.000, 51.200)	0.053
Brain iron(ppm)			
Left-Cerebellum-Cortex	-0.02152 (-0.02488, -0.19297)	-0.022420594 (-0.026244160, -0.015346334)	0.833
Left-Thalamus-Proper	-0.01434 (-0.01704, -0.00630)	-0.019080880 (-0.022041709, -0.011776572)	0.121
Left-Caudate	0.02465 (0.01422, 0.33333)	0.0079383276 (0.0056457826, 0.0110103334)	0.003
Left-Putamen	0.27342 (0.01106, 0.04365)	0.0004041833 (-0.002582402, 0.0149182147)	0.007
Left-Pallidum	0.09857 (0.08684, 0.10665)	0.0745692665 (0.0555746706, 0.0872149837)	0.007
Brain-Stem	-0.02017 (-0.02289,	-0.021047134 (-0.026882430,	0.888

	-0.01772)	-0.016198666)	
Left-Hippocampus	-0.02212 (-0.02479, -0.01937)	-0.019796548 (-0.021927390, -0.013574377)	0.057
Left-Amygdala	-0.02769 (-0.03065, -0.02230)	-0.025114393 (-0.031302421, -0.018353582)	0.481
Left-Accumbens-area	-0.03385 (-0.04591, -0.02559)	-0.017443666 (-0.024074912, -0.014408107)	0.001
Right-Cerebellum-Cortex	-0.02182 (-0.02565, -0.01958)	-0.022638600 (-0.024094149, -0.015716919)	0.673
Right-Thalamus-Proper	-0.01248 (-0.01822, -0.00768)	-0.017790618 (-0.019254961, -0.009257509)	0.526
Right-Caudate	0.02552 (0.01796, 0.04417)	0.0088274902 (0.0064590581, 0.0114178917)	0.001
Right-Putamen	0.02848 (0.01739, 0.04596)	0.0003885014 (-0.003136024, 0.0108410255)	0.003
Right-Pallidum	0.11344 (0.09485, 0.12382)	0.0828862129 (0.0678921447, 0.0938320476)	0.005
Right-Hippocampus	-0.01859 (-0.02115, -0.01729)	-0.018798654 (-0.020339720, -0.012231001)	0.481
Right-Amygdala	-0.02367 (-0.03076, -0.02272)	-0.027183762 (-0.030177631, -0.019071171)	0.573
Right-Accumbens-area	-0.03095 (-0.03598, -0.02107)	-0.016302367 (-0.018894024, -0.009497827)	0.002
Brain Volume(mm³)			
Left-Cerebellum-Cortex	46036.95 ± 5082.92	53186.94178 ± 5424.091066	0.006
Left-Thalamus-Proper	6595.668626 (5748.354546, 7007.148665)	8534.592810 (6893.856654, 8788.824834)	0.006
Left-Caudate	2793.61 ± 196.99	3973.909468 ± 607.9292399	0.000
Left-Putamen	3815.21 ± 585.63	6005.782388 ± 936.0910660	0.000
Left-Pallidum	1244.160118 (1194.534113, 1464.102139)	1872.720178 (1463.400139, 1951.560185)	0.002
Brain-Stem	15198.82 ± 1558.85	18776.76396 ± 2156.955585	0.000
Left-Hippocampus	4156.32 ± 229.12	4605.984437 ± 282.3470110	0.001
Left-Amygdala	1712.64 ± 137.86	1855.577631 ± 174.2105519	0.052
Left-Accumbens-area	523.58 ± 63.27	656.1884259 ± 96.71826117	0.002
Right-Cerebellum-Cortex	45222.71 ± 4905.92	52399.38606 ± 5972.464978	0.008
Right-Thalamus-Proper	6780.564644 (6070.950576, 7055.640670)	8320.536790 (6807.456646, 8608.680817)	0.011
Right-Caudate	2880.14 ± 414.05	4081.948751 ± 586.7200764	0.000
Right-Putamen	3551.26 ± 707.55	5861.887102 ± 813.3482207	0.000

Right-Pallidum	1205.24 ± 176.89	1680.067796 ± 249.5719321	0.000
Right-Hippocampus	4295.48 ± 188.38	4764.606998 ± 426.0377009	0.005
Right-Amygdala	1766.75 ± 180.23	1960.691095 ± 185.8288258	0.026
Right-Accumbens-area	546.26 ± 66.06	691.5460656 ± 105.9091075	0.004

“Fat(1-8)” and “R₂(1-8)” denote the fat content and quantified iron deposition measured within the regions of interest (ROIs) in the eight Couinaud liver segments. “Brain iron” indicates the assessment of iron deposition in specific brain regions using quantitative susceptibility mapping (QSM). “Brain volume” pertains to volumetric measurements conducted in various brain regions.

Supplementary Table 5. Evaluation of the diagnostic efficacy of neuroimaging and hepatic imaging for neurological Wilson’s disease

Characteristics	AUC	Standard Error	<i>P</i>	95%CI
Liver iron				
R ₂ -5	0.773	0.105	0.010	0.566-0.979
R ₂ -6	0.755	0.112	0.023	0.535-0.974
R ₂ -7	0.791	0.107	0.007	0.581-1.001
Brain iron				
Left-Caudate	0.882	0.076	0.000	0.732-1.032
Left-Putamen	0.845	0.088	0.000	0.674-1.017
Left-Pallidum	0.845	0.088	0.000	0.674-1.017
Left-Accumbens-area	0.945	0.047	0.000	0.854-1.037
Right-Caudate	0.918	0.062	0.000	0.797-1.050
Right-Putamen	0.882	0.083	0.000	0.719-1.045
Right-Pallidum	0.864	0.084	0.000	0.700-1.028
Right-Accumbens-area	0.909	0.063	0.000	0.786-1.032
Brain Volume				
Left-Cerebellum-Cortex	0.827	0.092	0.011	0.648-1.000
Left-Thalamus-Propor	0.855	0.083	0.006	0.692-1.000
Left-Caudate	0.964	0.036	0.000	0.893-1.000
Left-Putamen	0.973	0.029	0.000	0.915-1.000
Left-Pallidum	0.909	0.063	0.002	0.786-1.000
Brain-Stem	0.891	0.071	0.002	0.751-1.000
Left-Hippocampus	0.891	0.069	0.002	0.755-1.000
Left-Accumbens-area	0.900	0.072	0.002	0.758-1.000
Right-Cerebellum-Cortex	0.827	0.090	0.011	0.651-1.000
Right-Thalamus-Propor	0.827	0.096	0.011	0.638-1.000
Right-Caudate	0.955	0.041	0.000	0.874-1.000
Right-Putamen	1.000	0.000	0.000	1.000-1.000
Right-Pallidum	0.936	0.050	0.001	0.838-1.000
Right-Hippocampus	0.827	0.103	0.011	0.625-1.000
Right-Amygdala	0.782	0.103	0.029	0.579-0.984
Right-Accumbens-area	0.873	0.082	0.004	0.712-1.000

“R₂” denote the quantified iron deposition measured within liver segments V, VI and VII. “Brain

iron” indicates the assessment of iron deposition in specific brain regions using quantitative susceptibility mapping (QSM). “Brain volume” pertains to volumetric measurements conducted in various brain regions.

Supplementary Table 6. Neuroimaging and hepatic imaging analysis of hepatic Wilson’s disease and healthy controls

Characteristics	Hepatic Wilson’s disease (<i>n</i> = 17)	Healthy control (<i>n</i> = 11)	<i>P</i> value
Liver Fat(%)			
Fat-1	2.500 (2.350, 3.700)	2.100 (1.600, 2.900)	0.171
Fat-2	2.700 (2.150, 4.350)	2.100 (1.500, 4.800)	0.172
Fat-3	2.700 (2.100, 4.500)	2.400 (1.400, 3.700)	0.311
Fat-4	2.900 (2.200, 3.850)	2.100 (1.900, 3.600)	0.195
Fat-5	3.000 (2.250, 4.200)	2.400 (1.700, 4.500)	0.371
Fat-6	3.500 (2.300, 3.950)	2.400 (1.600, 4.900)	0.384
Fat-7	3.600 (2.350, 4.300)	2.200 (1.700, 4.100)	0.230
Fat-8	3.100 (2.450, 4.300)	2.300 (1.800, 4.200)	0.279
Liver iron(Hz)			
R ₂ -1	44.800 (39.600, 59.150)	43.700 (37.400, 47.800)	0.438
R ₂ -2	44.400 (41.350, 61.900)	44.900 (42.600, 47.700)	0.572
R ₂ -3	42.100 (39.750, 60.150)	44.900 (36.800, 47.300)	0.742
R ₂ -4	44.400 (41.200, 58.700)	45.700 (39.500, 51.100)	0.707
R ₂ -5	43.100 (41.100, 56.200)	40.800 (38.700, 48.200)	0.126
R ₂ -6	44.100 (39.600, 56.150)	44.600 (37.900, 47.500)	0.335
R ₂ -7	45.900 (42.200, 60.750)	43.600 (37.600, 49.200)	0.172
R ₂ -8	46.800 (40.850, 57.350)	43.100 (41.000, 51.200)	0.556
Brain iron(ppm)			
Left-Cerebellum-Cortex	-0.02159 (-0.02539, -0.01623)	-0.022420594 (-0.026244160, -0.015346334)	0.944
Left-Thalamus-Proper	-0.01366 (-0.01662, -0.00564)	-0.019080880 (-0.022041709, -0.011776572)	0.138
Left-Caudate	0.01089 (0.00652, 0.02003)	0.0079383276 (0.0056457826, 0.0110103334)	0.335
Left-Putamen	0.00625 (-0.00537, 0.01392)	0.0004041833 (-0.002582402, 0.0149182147)	0.944
Left-Pallidum	0.08002 (0.06161, 0.09402)	0.0745692665 (0.0555746706, 0.0872149837)	0.466
Brain-Stem	-0.02155 (-0.02363, -0.01777)	-0.021047134 (-0.026882430, -0.016198666)	0.724
Left-Hippocampus	-0.01912 (-0.02478, -0.01730)	-0.019796548 (-0.021927390, -0.013574377)	0.495
Left-Amygdala	-0.02653 (-0.03078, -0.02057)	-0.025114393 (-0.031302421, -0.018926365)	0.760

		-0.018353582)		
Left-Accumbens-area	-0.02074 (-0.02492, -0.01305)	-0.017443666 (-0.024074912, -0.014408107)	0.525	
Right-Cerebellum-Cortex	-0.02165 (-0.02545, -0.01753)	-0.022638600 (-0.024094149, -0.015716919)	0.689	
Right-Thalamus-Proper	-0.01196 (-0.01457, -0.00712)	-0.017790618 (-0.019254961, -0.009257509)	0.165	
Right-Caudate	0.01293 (0.00471, 0.02708)	0.0088274902 (0.0064590581, 0.0114178917)	0.438	
Right-Putamen	0.01023 (-0.00693, 0.01336)	0.0003885014 (-0.003136024, 0.0108410255)	0.466	
Right-Pallidum	0.08501 (0.06989, 0.10690)	0.0828862129 (0.0678921447, 0.0938320476)	0.466	
Right-Hippocampus	-0.01851 (-0.02351, -0.01507)	-0.018798654 (-0.020339720, -0.012231001)	0.621	
Right-Amygdala	-0.02731 (-0.02973, -0.02033)	-0.027183762 (-0.030177631, -0.019071171)	0.981	
Right-Accumbens-area	-0.02068 (-0.02312, -0.01386)	-0.016302367 (-0.018894024, -0.009497827)	0.086	
Brain Volume(mm³)				
Left-Cerebellum-Cortex	48402.90 ± 3589.63	53186.94178 ± 5424.091066	0.009	
Left-Thalamus-Proper	7322.184695 (6635.952630, 7781.184739)	8534.592810 (6893.856654, 8788.824834)	0.086	
Left-Caudate	3714.45 ± 459.12	3973.909468 ± 607.9292399	0.210	
Left-Putamen	5526.51 ± 662.27	6005.782388 ± 936.0910660	0.124	
Left-Pallidum	1739.01665 (1535.004146, 1860.840177)	1872.720178 (1463.400139, 1951.560185)	0.269	
Brain-Stem	17202.60 ± 1501.59	18776.76396 ± 2156.955585	0.031	
Left-Hippocampus	4354.50 ± 297.35	4605.984437 ± 282.3470110	0.035	
Left-Amygdala	1820.93 ± 148.70	1855.577631 ± 174.2105519	0.578	
Left-Accumbens-area	647.47 ± 78.79	656.1884259 ± 96.71826117	0.796	
Right-Cerebellum-Cortex	48070.80 ± 4530.65	52399.38606 ± 5972.464978	0.039	
Right-Thalamus-Proper	7237.296687 (6656.688632, 7633.980725)	8320.536790 (6807.456646, 8608.680817)	0.086	
Right-Caudate	3836.39 ± 410.25	4081.948751 ± 586.7200764	0.203	
Right-Putamen	5356.17 ± 647.13	5861.887102 ± 813.3482207	0.079	
Right-Pallidum	1541.63 ± 310.81	1680.067796 ± 249.5719321	0.26	
Right-Hippocampus	4564.44 ± 368.74	4764.606998 ± 426.0377009	0.198	
Right-Amygdala	1899.17 ± 183.91	1960.691095 ± 185.8288258	0.397	

Right-Accumbens-area	685.22 ± 72.22	691.5460656 ± 105.9091075	0.855
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“Fat(1-8)” and “R₂(1-8)” denote the fat content and quantified iron deposition measured within the regions of interest (ROIs) in the eight Couinaud liver segments. “Brain iron” indicates the assessment of iron deposition in specific brain regions using quantitative susceptibility mapping (QSM). “Brain volume” pertains to volumetric measurements conducted in various brain regions.

Supplementary Table 7. Evaluation of the diagnostic efficacy of neuroimaging and hepatic imaging for hepatic Wilson’s disease

Characteristics	AUC	Standard Error	<i>P</i>	95%CI
Brain Volume				
Left-Cerebellum-Cortex	0.775	0.100	0.015	0.579-0.972
Brain-Stem	0.738	0.117	0.036	0.508-0.968
Left-Hippocampus	0.695	0.102	0.086	0.495-0.896
Right-Cerebellum-Cortex	0.722	0.105	0.051	0.515-0.929

Supplementary Table 8. Neuroimaging and hepatic imaging analysis of hepatic Wilson’s disease and neurological Wilson’s disease

Characteristics	Neurological Wilson’s disease (<i>n</i> = 10)	Hepatic Wilson’s disease (<i>n</i> = 17)	<i>P</i> value
Liver Fat(%)			
Fat-1	2.400 (1.775, 3.350)	2.500 (2.350, 3.700)	0.392
Fat-2	2.750 (2.025, 3.325)	2.700 (2.150, 4.350)	0.725
Fat-3	2.750 (1.900, 3.300)	2.700 (2.100, 4.500)	0.651
Fat-4	2.850 (1.950, 3.875)	2.900 (2.200, 3.850)	0.802
Fat-5	2.300 (1.700, 3.575)	3.000 (2.250, 4.200)	0.315
Fat-6	2.800 (1.800, 3.400)	3.500 (2.300, 3.950)	0.365
Fat-7	2.900 (1.800, 3.600)	3.600 (2.350, 4.300)	0.379
Fat-8	2.400 (1.750, 3.400)	3.100 (2.450, 4.300)	0.119
Liver iron(Hz)			
R ₂ -1	51.050 (39.875, 66.825)	44.800 (39.600, 59.150)	0.315
R ₂ -2	54.100 (42.375, 84.450)	44.400 (41.350, 61.900)	0.530
R ₂ -3	49.400 (38.100, 79.875)	42.100 (39.750, 60.150)	0.688
R ₂ -4	47.700 (39.250, 71.925)	44.400 (41.200, 58.700)	0.802
R ₂ -5	58.350 (42.375, 73.950)	43.100 (41.100, 56.200)	0.269
R ₂ -6	56.400 (38.425, 81.750)	44.100 (39.600, 56.150)	0.353
R ₂ -7	60.650 (49.250, 95.125)	45.900 (42.200, 60.750)	0.120
R ₂ -8	57.400 (43.225, 89.850)	46.800 (40.850, 57.350)	0.120
Brain iron(ppm)			
Left-Cerebellum-Cortex	-0.02152 (-0.02488,	-0.02159 (-0.02539,	0.841

	-0.19297)	-0.01623)	
Left-Thalamus-Proper	-0.01434 (-0.01704, -0.00630)	-0.01366 (-0.01662, -0.00564)	0.960
Left-Caudate	0.02465 (0.01422, 0.33333)	0.01089 (0.00652, 0.02003)	0.009
Left-Putamen	0.27342 (0.01106, 0.04365)	0.00625 (-0.00537, 0.01392)	0.004
Left-Pallidum	0.09857 (0.08684, 0.10665)	0.08002 (0.06161, 0.09402)	0.035
Brain-Stem	-0.02017 (-0.02289, -0.01772)	-0.02155 (-0.02363, -0.01777)	0.688
Left-Hippocampus	-0.02212 (-0.02479, -0.01937)	-0.01912 (-0.02478, -0.01730)	0.248
Left-Amygdala	-0.02769 (-0.03065, -0.02230)	-0.02653 (-0.03078, -0.02057)	0.581
Left-Accumbens-area	-0.03385 (-0.04591, -0.02559)	-0.02074 (-0.02492, -0.01305)	0.003
Right-Cerebellum-Cortex	-0.02182 (-0.02565, -0.01958)	-0.02165 (-0.02545, -0.01753)	0.841
Right-Thalamus-Proper	-0.01248 (-0.01822, -0.00768)	-0.01196 (-0.01457, -0.00712)	0.514
Right-Caudate	0.02552 (0.01796, 0.04417)	0.01293 (0.00471, 0.02708)	0.018
Right-Putamen	0.02848 (0.01739, 0.04596)	0.01023 (-0.00693, 0.01336)	0.002
Right-Pallidum	0.11344 (0.09485, 0.12382)	0.08501 (0.06989, 0.10690)	0.021
Right-Hippocampus	-0.01859 (-0.02115, -0.01729)	-0.01851 (-0.02351, -0.01507)	0.880
Right-Amygdala	-0.02367 (-0.03076, -0.02272)	-0.02731 (-0.02973, -0.02033)	0.616
Right-Accumbens-area	-0.03095 (-0.03598, -0.02107)	-0.02068 (-0.02312, -0.01386)	0.009
Brain Volume(mm³)			
Left-Cerebellum-Cortex	46036.95 ± 5082.92	48402.90 ± 3589.63	0.169
Left-Thalamus-Proper	6595.668626 (5748.354546, 7007.148665)	7322.184695 (6635.952630, 7781.184739)	0.011
Left-Caudate	2793.61 ± 196.99	3714.45 ± 459.12	0.000
Left-Putamen	3815.21 ± 585.63	5526.51 ± 662.27	0.000
Left-Pallidum	1244.160118 (1194.534113, 1464.102139)	1739.01665 (1535.004146, 1860.840177)	0.007
Brain-Stem	1519.82 ± 1558.85	17202.60 ± 1501.59	0.003
Left-Hippocampus	4156.32 ± 229.12	4354.50 ± 297.35	0.082
Left-Amygdala	1712.64 ± 137.86	1820.93 ± 148.70	0.072
Left-Accumbens-area	523.58 ± 63.27	647.47 ± 78.79	0.000
Right-Cerebellum-Cortex	45222.71 ± 4905.92	48070.80 ± 4530.65	0.138
Right-Thalamus-Proper	6780.564644 (6070.950576, 7055.640670)	7237.296687 (6656.688632, 7633.980725)	0.031
Right-Caudate	2880.14 ± 414.05	3836.39 ± 410.25	0.000

Right-Putamen	3551.26±707.55	5356.17±647.13	0.000
Right-Pallidum	1205.24±176.89	1541.63±310.81	0.004
Right-Hippocampus	4295.48±188.38	4564.44±368.74	0.019
Right-Amygdala	1766.75±180.23	1899.17±183.91	0.081
Right-Accumbens-area	546.26±66.06	685.22±72.22	0.000

“Fat(1-8)” and “R₂(1-8)” denote the fat content and quantified iron deposition measured within the regions of interest (ROIs) in the eight Couinaud liver segments. “Brain iron” indicates the assessment of iron deposition in specific brain regions using quantitative susceptibility mapping (QSM). “Brain volume” pertains to volumetric measurements conducted in various brain regions.

Supplementary Table 9. Evaluation of the diagnostic efficacy of neuroimaging and hepatic imaging in differentiating the hepatic type from the neurological type of Wilson’s disease

Characteristics	AUC	Standard Error	<i>P</i>	95%CI
Brain iron				
Left-Caudate	0.806	0.087	0.009	0.636-0.976
Left-Putamen	0.835	0.082	0.004	0.674-0.997
Left-Pallidum	0.747	0.095	0.035	0.560-0.934
Right-Caudate	0.776	0.091	0.018	0.598-0.955
Right-Putamen	0.871	0.077	0.002	0.719-1.000
Right-Pallidum	0.771	0.095	0.021	0.584-0.957
Brain Volume				
Left-Thalamus-Proper	0.797	0.088	0.011	0.624-0.970
Left-Caudate	0.976	0.026	0.000	0.925-1.000
Left-Putamen	0.988	0.016	0.000	0.958-1.000
Left-Pallidum	0.818	0.090	0.007	0.641-0.994
Brain-Stem	0.841	0.078	0.004	0.688-0.994
Left-Accumbens-area	0.906	0.064	0.001	0.781-1.000
Right-Thalamus-Proper	0.753	0.094	0.031	0.568-0.938
Right-Caudate	0.953	0.040	0.000	0.874-1.000
Right-Putamen	0.982	0.021	0.000	0.942-1.000
Right-Pallidum	0.824	0.083	0.006	0.661-0.986
Right-Hippocampus	0.718	0.099	0.063	0.524-0.911
Right-Accumbens-area	0.912	0.055	0.000	0.804-1.000