

Supplementary Table 1. Analytical presentation of study characteristics regarding the signaling questions, risk of bias and concerns regarding applicability for patient selection, Index Test, Reference Standard and Flow/Timing, based on the QUADAS Tool; ROB: Risk of Bias; App: Concerns regarding applicability; : low; : high; ?: unclear.

| | | Patient Selection | | | | Index Test | | | Reference Standard | | | | Flow and Timing | | | |
|----|----------------------|-----------------------------|--------------------------|-----|-----|-----------------------|-----|-----|--------------------------|---------------------|-----|-----|-----------------|-------------|-----------------------|-----|
| | | Consecutive / random sample | Innapropriate exclusions | ROB | App | Test assessed blindly | ROB | App | RS classify participants | RS assessed blindly | ROB | App | All patients RS | All same RS | All patients included | ROB |
| 1 | Oba, 2005 | ? | 😊 | ? | 😊 | ? | ? | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 2 | Groschel, 2006 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 3 | Paviour, 2006 | ? | 😊 | ? | 😊 | ? | ? | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 4 | Cosottini, 2007 | ? | 😊 | ? | 😊 | ? | ? | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 5 | Borroni, 2010 | 😞 | 😞 | 😞 | 😊 | ? | ? | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 6 | Longoni, 2010 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 7 | Looi, 2011 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | ? | 😊 |
| 8 | Morelli, 2011 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 9 | Morelli, 2014 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | ? | 😊 |
| 10 | Huppertz, 2016 | ? | 😊 | ? | 😊 | ? | ? | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 11 | Magnesi, 2016 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | ? | 😊 |
| 12 | Pasha, 2016 | 😊 | 😞 | 😞 | 😊 | ? | ? | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 13 | Sankhla, 2016 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 14 | Nigro, 2017a | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 15 | Nigro, 2017b | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 16 | Nizamani, 2017 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 17 | Sisby, 2017 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 18 | Quattrone, 2018 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 19 | Ahn, 2019 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 20 | Krismer, 2019 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 21 | Quattrone, 2019 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 22 | Constantinides, 2019 | 😊 | 😊 | 😊 | 😊 | ? | ? | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 23 | Jabbari, 2020 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 24 | Nigro, 2020 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 25 | Madetko, 2022 | ? | 😊 | ? | 😊 | ? | ? | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | ? | 😊 |

| | | | | | | | | | | | | | | | | |
|---|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | Virahammar, 2022 | ? | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |
| 2 | Quattrone, 2023 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 | ? | 😊 | 😊 | 😊 | 😊 | 😊 | 😊 |

Supplementary Table 2. Analytical data regarding the number of patients per study group, mean values and standard deviations of all available MRI markers in studies of Richardson patients included in the meta-analysis.

| Study number | Study ID | Richardson's Syndrome | | | | | | | | Controls | | | | | | | |
|--------------|---------------------------|-----------------------|---------------|--------------|--------------|------------|-----------|-----------------|-------------|----------|---------------|--------------|--------------|------------|------------|-----------------|-------------|
| | | N | midbrain area | pons area | M/P area | MRPI 1 | MRPI 2 | midbrain volume | pons volume | N | midbrain area | pons area | M/P area | MRPI 1 | MRPI 2 | midbrain volume | pons volume |
| 1. | Oba, 2005 | 21 | 56 (7.6) | 448.6 (52.1) | 0.12 (0.02) | | | | | 31 | 117.7 (14.7) | 570 (42.7) | 0.24 (0.03) | | | | |
| 2. | Groschel, 2006 | 33 | 81.1 (13.6) | | | | | | | 22 | 138.1 (25.6) | | | | | | |
| 3. | Paviour, 2006 | 18 | | | | | | 5.7 (1.1) | 12.8 (1.6) | 18 | | | | | | 8.3 (0.8) | 13.9 (1.5) |
| 4. | Cosottini, 2007 | 15 | 90 (17) | 507 (56) | 0.18 (0.04) | | | 4.0 (0.7) | | 14 | 155 (15) | 570 (45) | 0.28 (0.04) | | | 5.9 (1.7) | |
| 5. | Borroni, 2010 | 18 | | | 0.19 (0.03) | | | | | 25 | | | 0.255 (0.03) | | | | |
| 6. | Longoni, 2011 | 10 | 71 (27) | 512 (94) | 0.129 | 20.7 (7.1) | | | | 24 | 130.5 (30.5) | 537.8 (61.1) | | 0.233 | 10.5 (2.4) | | |
| 7. | Looi, 2011 | 15 | 93.8 (20.1) | 526 (62) | 0.178 | | | | | 15 | 145.3 (20.1) | 577.4 (61.6) | 0.252 | | | | |
| 8. | Morelli, 2011 | 42 | 64 (13.9) | 417 (57) | 0.15 (0.03) | 21.4 (7.4) | | | | 38 | 122 (17.3) | 473 (47.3) | 0.26 (0.04) | 9.4 (1.8) | | | |
| 9. | Morelli, 2014 | 25 | 77.3 (14.6) | 472 (58) | 0.163 (0.02) | 18.9 (4.4) | | | | 81 | 142.4 (21.2) | 528.8 (51.6) | 0.27 (0.04) | 9.2 (1.6) | | | |
| 10. | Huppertz, 2016 | 106 | 136.1 (22.5) | 450 (59) | | | | 8.9 (0.9) | 13.9 (1.6) | 73 | 170 (11.3) | 511.6 (45.2) | | | | 10.5 (0.6) | 15.8 (1.4) |
| 11. | Pasha, 2016 | 17 | 81.1 (23.6) | 499 (59) | | | | | | 30 | 146.1 (15.6) | 504.9 (53.5) | | | | | |
| 12. | Sankhla, 2016 | 26 | 71.9 (16.5) | 461 (61) | 0.16 (0.03) | 23.5 (9.6) | | | | 30 | 135.6 (21.7) | 495.5 (37.7) | 0.27 (0.04) | 9.5 (1.9) | | | |
| 13. | Nigro, 2017a (1/2 - 1.5T) | 44 | 74 (15) | 465 (53) | | 18.3 (5.3) | | | | 19 | 127 (19) | 500 (43) | | 10.1 (1.1) | | | |
| | Nigro, 2017a (2/2 - 3T) | 37 | 72 (14) | 459 (58) | | 20.6 (5.6) | | | | 92 | 134 (18) | 526 (55) | | 9.5 (1.4) | | | |
| 14. | Nigro, 2017b | 15 | 62 (13) | 465 (70) | 0.13 (0.02) | 27.0 (5.8) | | | | 86 | 138 (18) | 524 (53) | 0.26 (0.03) | 9.3 (1.5) | | | |
| 15. | Nizamani, 2017 | 34 | 96 (13.5) | 431 (49) | | | | | | 34 | 149.4 (12.5) | 457.6 (38.1) | | | | | |
| 16. | Silsby, 2017 | 16 | 88.3 (22) | 486 (52) | 0.18 (0.04) | 17.6 (4.1) | | | | 22 | 152.6 (16.3) | 523.8 (45.2) | 0.29 (0.03) | 10.3 (2.0) | | | |
| 17. | Quattrone, 2018 | 46 | | | | 20.4 (4.7) | 5.2 (1.7) | | | 53 | | | | 9.1 (1.3) | 1.5 (0.4) | | |
| 18. | Ahn, 2019 | 27 | 87 (15.8) | 507 (39) | 0.17 (0.04) | | | | | 27 | 129 (18) | 517 (54) | 0.25 (0.02) | | | | |
| 19. | Quattrone, 2019 | 48 | 73.9 (16.2) | | | | | | | 38 | 137.5 (16.4) | | | | | | |
| 20. | Constantinides, 2019 | 43 | 90 (23) | | 0.18 (0.04) | 22.5 (9.0) | | | | 29 | 141.5 (25.9) | | 0.27 (0.02) | 12.5 (4.0) | | | |
| 21. | Jabbari, 2020 | 25 | | | | | | 5.0 (0.5) | | 35 | | | | | | 6.0 (0.5) | |
| 22. | Nigro, 2020 | 108 | 70 (16) | 465 (54) | | 20.1 (5.6) | | | | 139 | 128 (20) | 497 (49) | | 9.6 (2.0) | | | |
| 23. | Madetko, 2022 | 19 | 76 (32) | 477 (39) | 0.16 (0.05) | 19.4 (6.9) | 5.6 (2.3) | | | 16 | 121 (23) | 496 (73) | 0.25 (0.03) | 11.2 (1.8) | 2.3 (0.6) | | |
| 24. | Virhammar, 2021 | 29 | 80.7 (6.7) | | | | | | | 38 | 133.6 (33.6) | | | | | | |
| 25. | Quattrone, 2023 | 62 | | | | 20.2 (5.0) | 5.1 (1.9) | | | | | | | 9.4 (1.3) | 1.4 (0.5) | | |

Supplementary Table 3. Analytical data regarding the number of patients per study group, mean values and standard deviations of all available MRI markers in studies of MSA-P patients included in the meta-analysis.

| Study number | Study ID | MSA-P | | | | | | | | Controls | | | | | | | |
|--------------|----------------|-------|-----------------|-----------------|----------------|---------------|--------------|-----------------|---------------|----------|-----------------|-----------------|----------------|---------------|--------------|-----------------|---------------|
| | | N | midbrain area | pons area | M/P area | MRPI 1 | MRPI 2 | midbrain volume | pons volume | N | midbrain area | pons area | M/P area | MRPI 1 | MRPI 2 | midbrain volume | pons volume |
| 1. | Oba, 2005 | 25 | 97.2 (17.0) | 381.6 (97.0) | 0.27 (0.07) | | | | | 31 | 117.7 (14.7) | 570 (42.7) | 0.24 (0.03) | | | | |
| 2. | Huppertz, 2016 | 60 | 153.8 (15.3) | 440.3 (90.7) | | | | 9.8 (0.7) | 13.4 (2.7) | 73 | 170 (11.3) | 511.6 (45.2) | | | | 10.5 (0.6) | 15.8 (1.4) |
| 3. | Magnesi, 2016 | 20 | 111.0 (17.4) | 451.5 (88.6) | 0.26 (0.07) | 10.3 (3.6) | | | | 29 | 119.1 (12.5) | 535.1 (32.8) | 0.22 (0.02) | 13.1 (2.0) | | | |
| 4. | Krismer, 2019 | 18 | | | | | | 4.0 (0.4) | 9.0 (1.7) | 26 | | | | | | 3.9 (0.3) | 9.7 (0.8) |
| 5. | Madetko, 2022 | 21 | 108 (19) | 459 (65) | 0.24 (0.05) | 10.8 (2.5) | 2.6 (0.9) | | | 16 | 121 (23) | 496 (73) | 0.25 (0.03) | 11.2 (1.8) | 2.3 (0.6) | | |

Supplementary Table 4. Analytical data regarding the number of patients per study group, mean values and standard deviations of all available MRI markers in studies of corticobasal syndrome patients included in the meta-analysis.

| Study number | Study ID | Corticobasal syndrome | | | | | | | | Controls | | | | | | | |
|--------------|----------------|-----------------------|-----------------|-------------|----------------|---------------|--------------|-----------------|---------------|----------|-----------------|-------------|-----------------|---------------|--------------|-----------------|-------------|
| | | N | midbrain area | pons area | M/P area | MRPI 1 | MRPI 2 | midbrain volume | pons volume | N | midbrain area | pons area | M/P area | MRPI 1 | MRPI 2 | midbrain volume | pons volume |
| 1. | Groschel, 2006 | 18 | 128.7 (17.4) | | | | | | | 22 | 138.1 (25.6) | | | | | | |
| 2. | Borroni, 2010 | 16 | | | 0.23 (0.03) | | | | | 25 | | | 0.255 (0.03) | | | | |
| 3. | Jabbari, 2020 | 17 | | | | | | 5.5 (0.5) | 14.1 (1.7) | 139 | 128 (20) | 497 (49) | | 9.6 (2.0) | | | |
| 4. | Madetko, 2022 | 19 | 81 (22) | 444 (61) | 0.18 (0.05) | 15.4 (5.0) | 4.2 (1.7) | | | 16 | 121 (23) | 496 (73) | 0.25 (0.03) | 11.2 (1.8) | 2.3 (0.6) | | |