**Supplementary Material**

**Supplementary Table 1.** Detailed description of the AD neuropathological change of definite AD cases according to Montine criteria

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **Age at LP** | **Gender** | **TLPD** | **Aβ1-42** | **T-tau** | **P-tau181** | **ES** | **Neuropathological change score** | | | **Concomitant pathology** |
|  |  |  |  |  |  |  |  | **A** | **B** | **C** |  |
| AD-1 | 72 | 0 | 1.4 | 670 | 176 | 35.0 | 0 | 2 | 2 | 3 |  |
| AD-2 | 74 | 1 | 3.0 | 867 | 200 | 27 | 0 | 2 | 1 |  | CVD |
| AD-3 | 61 | 0 | 0.1 | 575 | 234 | 35.5 | 1 | 3 | 3 | 3 |  |
| AD-4 | 71 | 0 | 0.3 | 235 | 96 | 38.0 | 2 | 3 | 2 | 1 |  |
| AD-5 | 73 | 1 | 1.3 | 225 | 105 | 19 | 2 | 3 | 2 | 2 |  |
| AD-6 | 82 | 0 | 0.3 | 401 | 248 | 39 | 2 | 3 | 1 |  | LBD |
| AD-7 | 74 | 0 | 0.0 | 272 | 212 | 36 | 2 | 2 | 2 | 2 |  |
| AD-8 | 58 | 0 | 0.5 | 680 | 363 | 75.9 | 2 | 3 | 2 | 2 |  |
| AD-9 | 74 | 0 | 1.8 | 457 | 282 | 44.7 | 2 | 3 | 3 | 3 |  |
| AD-10 | 81 | 1 | 0.1 | 663 | 1200 | 95.0 | 2 | 3 | 2 | 2 |  |
| AD-11 | 86 | 1 | 0.2 | 376 | 185 | 34 | 2 | 2 | 2 | 1 |  |
| AD-12 | 68 | 1 | 2.6 | 272 | 265 | 31 | 2 | 3 | 2 | 2-3 |  |
| AD-13 | 84 | 1 | 1.8 | 386 | 171 | 21 | 2 |  | 1 |  | LBD |
| AD-14 | 55 | 1 | 0.2 | 235 | 195 | 25 | 2 | 3 | 3 | 3 |  |
| AD-15 | 75 | 0 | 0.1 | 138 | 191 | 40.0 | 2 | 3 | 3 | 2 |  |
| AD-16 | 86 | 0 | 0.1 | 783 | 418 | 43.8 | 2 | 2 | 2 | 2 |  |
| AD-17 | 74 | 0 | 0.3 | 321 | 108 | 15.6 | 2 | 2 | 1 | 1 |  |
| AD-18 | 87 | 1 | 0.0 | 428 | 249 | 34.0 | 2 |  | 2 |  | LBD |
| AD-19 | 56 | 0 | 0.0 | 125 | 232 | 24 | 2 | 3 | 3 | 3 |  |
| AD-20 | 92 | 1 | 0.5 | 581 | 310 | 45 | 2 | 2 | 1 | 2 |  |
| AD-21 | 76 | 1 | 0.3 | 661 | 685 | 98.0 | 2 | 3 | 2 | 2 | LBD |
| AD-22 | 66 | 0 | 0.0 | 231 | 194 | 18.9 | 2 | 2 | 1 | 2 |  |
| AD-23 | 74 | 1 | 1.8 | 963 | 299 | 67 | 2 |  | 2 |  | CVD |
| AD-24 | 78 | 0 | 0.0 | 305 | 1200 | 47.5 | 3 | 2 | 2 | 1 |  |
| AD-25 | 72 | 0 | 0.4 | 597 | 439 | 76 | 3 | 3 | 3 | 3 |  |
| AD-26 | 87 | 0 | 3.8 | 629 | 711 | 86 | 3 | 2 | 1 |  |  |
| AD-27 | 97 | 1 | 0.2 | 607 | 426 | 84 | 3 | 3 | 2 | 1 |  |
| AD-28 | 71 | 1 | 0.0 | 404 | 325 | 44.1 | 3 | 3 | 3 | 3 | CVD |
| AD-29 | 88 | 0 | 0.0 | 329 | 1200 | 49.6 | 3 | 3 | 3 | 3 |  |
| AD-30 | 83 | 0 | 0.1 | 587 | 1184 | 42.6 | 3 | 1 | 1 | 0 |  |
| AD-31 | 75 | 1 | 4.7 | 482 | 312 | 32 | 3 | 2 | 2 | 1 |  |
| AD-32 | 88 | 1 | 0.1 | 596 | 727 | 131 | 3 |  |  |  | CVD |
| AD-33 | 82 | 1 | 0.0 | 271 | 166 | 58.6 | 3 | 3 | 3 | 2 |  |
| AD-34 | 86 | 0 | 0.2 | 350 | 1200 | 48.9 | 3 | 2 | 2 | 1-2 |  |
| AD-35 | 66 | 0 | 0.7 | 602 | 585 | 62.0 | 3 | 3 | 3 | 2 |  |
| AD-36 | 72 | 1 | 4.3 | 576 | 359 | 59.4 | 3 | 2 | 3 | 2 |  |
| AD-37 | 80 | 1 | 0.0 | 471 | 1200 | 38.9 | 3 | 2 | 1 |  | CVD |
| AD-38 | 81 | 0 | 0.0 | 553 | 686 | 83 | 4 | 2-3 | 2 |  | LBD |
| AD-39 | 88 | 1 | 0.1 | 470 | 1173 | 53 | 4 | 3 | 3 | 3 |  |
| AD-40 | 63 | 0 | 1.1 | 231 | 562 | 74.0 | 4 | 3 | 3 | 3 |  |
| AD-41 | 74 | 1 | 0.6 | 470 | 415 | 63.9 | 4 | 3 | 3 | 3 |  |
| AD-42 | 76 | 0 | 0.4 | 125 | 584 | 97.0 | 4 | 3 | 3 | 2 |  |
| AD-43 | 87 | 0 | 0.0 | 528 | 1200 | 155.4 | 4 | 3 | 3 | 2 |  |
| AD-44 | 71 | 1 | 0.1 | 292 | 756 | 72 | 4 | 3 | 2 | 2 |  |
| AD-45 | 94 | 1 | 0.3 | 288 | 1200 | 146.4 | 4 |  | 2 |  | CVD |
| AD-46 | 85 | 0 | 0.1 | 566 | 572 | 84 | 4 | 3 | 3 | 3 |  |
| AD-47 | 84 | 1 | 0.0 | 154 | 1200 | 199.0 | 4 | 3 | 3 | 2 | CVD |
| AD-48 | 91 | 0 | 0.1 | 467 | 1200 | 136.4 | 4 | 2 | 2 | 3 |  |
| AD-49 | 63 | 1 | 1.7 | 225 | 375 | 49 | 4 | 3 | 2 |  | LBD |
| AD-50 | 56 | 1 | 0.5 | 512 | 1200 | 151.0 | 4 | 3 | 3 | 3 |  |
| AD-51 | 74 | 1 | 0.1 | 455 | 567 | 87.0 | 4 | 2 | 3 | 3 |  |
| AD-52 | 90 | 1 | 2.6 | 312 | 445 | 112 | 4 | 3 | 2 | 2 |  |
| AD-53 | 70 | 1 | 0.9 | 444 | 583 | 57.3 | 4 | 3 | 3 | 3 |  |
| AD-54 | 86 | 0 | 0.5 | 499 | 385 | 59.4 | 4 | 2 | 2 | 2 |  |
| AD-55 | 76 | 1 | 4.0 | 337 | 393 | 59 | 4 | 3 | 0 | 1-2 | LBD |
| AD-56 | 72 | 1 | 0.2 | 367 | 533 | 46 | 4 | 3 | 3 | 3 |  |
| AD-57 | 85 | 0 | 0.1 | 364 | 538 | 74 | 4 | 2 | 1 |  | PD |
| AD-58 | 72 | 0 | 0.2 | 356 | 1200 | 181.8 | 4 |  |  |  | LBD |
| AD-59 | 57 | 1 | 3.9 | 256 | 316 | 91 | 4 | 3 | 3 | 2 |  |
| AD-60 | 71 | 0 | 4.3 | 306 | 674 | 99 | 4 | 3 | 3 | 3 |  |
| AD-61 | 76 | 0 | 0.0 | 342 | 982 | 34 | 4 | 3 | 2 | 3 |  |
| AD-62 | 89 | 1 | 0.3 | 491 | 330 | 50 | 4 | 2 | 2 | 1 |  |
| AD-63 | 84 | 1 | 2.3 | 544 | 667 | 112 | 4 | 3 | 3 | 3 |  |
| AD-64 | 83 | 1 | 1.4 | 481 | 433 | 60 | 4 | 3 | 3 | 3 |  |
| AD-65 | 67 | 1 | 0.1 | 125 | 370 | 19.0 | 4 | 3 | 1 | 2 | CJD |
| AD-66 | 73 | 0 | 0.0 | 211 | 811 | 94 | 4 | 3 | 3 | 1 |  |
| AD-67 | 92 | 1 | 0.1 | 222 | 1200 | 119 | 4 | 3 | 2 | 2 |  |
| AD-68 | 78 | 1 | 0.1 | 480 | 601 | 39 | 4 | 3 | 3 | 2 |  |
| AD-69 | 81 | 1 | 0.2 | 236 | 1200 | 76 | 4 | 2 | 2 | 1 |  |
| AD-70 | 76 | 0 | 3.4 | 439 | 218 | 75.0 | 4 | 2 | 2 | 2 |  |
| AD-71 | 90 | 0 | 3.9 | 453 | 861 | 160 | 4 | 3 | 3 | 3 |  |
| AD-72 | 70 | 0 | 4.1 | 339 | 535 | 74 | 4 | 3 | 3 | 3 |  |
| AD-73 | 83 | 0 | 0.1 | 571 | 420 | 54.2 | 4 | 1 | 1 | 1 |  |
| AD-74 | 86 | 1 | 0.1 | 433 | 1034 | 49 | 4 | 1-2 | 1 |  | CVD |
| AD-75 | 68 | 1 | 2.2 | 462 | 650 | 70.1 | 4 | 3 | 3 | 3 |  |
| AD-76 | 73 | 1 | 0.1 | 141 | 1200 | 79 | 4 | 3 | 3 | 3 |  |
| AD-77 | 77 | 1 | 5.0 | 296 | 795 | 52 | 4 | 2 | 1 | 1 |  |
| AD-78 | 87 | 1 | 0.1 | 460 | 1200 | 141.8 | 4 | 3 | 3 | 3 |  |
| AD-79 | 65 | 0 | 4.8 | 357 | 498 | 62 | 4 | 3 | 3 | 3 |  |
| AD-80 | 79 | 1 | 0.0 | 273 | 1061 | 53 | 4 | 3 | 2 | 2 |  |
| AD-81 | 72 | 1 | 0.1 | 291 | 1200 | 156.9 | 4 | 2 | 2 | 2-3 |  |
| AD-82 | 72 | 1 | 0.0 | 169 | 619 | 69 | 4 | 3 | 2 | 3 |  |
| AD-83 | 74 | 0 | 0.1 | 271 | 418 | 79.0 | 4 |  | 1 |  | PD |
| AD-84 | 70 | 1 | 2.3 | 462 | 795 | 98.0 | 4 | 3 | 3 | 3 |  |
| AD-85 | 88 | 1 | 0.2 | 237 | 662 | 85 | 4 | 3 | 2 | 2 |  |
| AD-86 | 75 | 0 | 0.2 | 391 | 1200 | 240.4 | 4 | 3 | 3 | 1 |  |
| AD-87 | 88 | 1 | 0.6 | 306 | 1165 | 183 | 4 | 3 | 3 | 3 |  |
| AD-88 | 75 | 1 | 1.2 | 435 | 548 | 63 | 4 | 2 | 2 | 2 |  |
| AD-89 | 79 | 1 | 0.1 | 422 | 553 | 89 | 4 | 3 | 2 | 2 |  |
| AD-90 | 93 | 0 | 0.2 | 291 | 429 | 50 | 4 | 3 | 2 | 2-3 |  |
| AD-91 | 84 | 0 | 0.0 | 494 | 668 | 78 | 4 | 3 | 2 | 1 |  |
| AD-92 | 87 | 1 | 0.0 | 492 | 596 | 95.8 | 4 | 3 | 3 | 3 |  |
| AD-93 | 78 | 1 | 0.1 | 322 | 1066 | 87.0 | 4 | 3 | 3 | 2 |  |
| AD-94 | 75 | 0 | 0.1 | 379 | 434 | 55.0 | 4 | 3 | 1 | 3 |  |
| AD-95 | 88 | 0 | 4.0 | 375 | 909 | 111.2 | 4 | 3 | 3 | 2 |  |
| AD-96 | 55 | 0 | 3.0 | 249 | 709 | 103 | 4 | 3 | 3 | 3 |  |
| AD-97 | 88 | 0 | 0.5 | 488 | 437 | 46 | 4 | 2-3 | 0 |  | LBD |
| AD-98 | 79 | 0 | 0.0 | 344 | 800 | 28.3 | 4 | 1 | 1 | 0 |  |
| AD-99 | 73 | 1 | 0.2 | 570 | 610 | 60.0 | 4 | 3 | 3 | 2 |  |
| AD-100 | 78 | 1 | 0.1 | 430 | 1065 | 141 | 4 | 3 | 3 | 3 |  |
| AD-101 | 65 | 1 | 4.1 | 163 | 611 | 96.9 | 4 | 3 | 3 | 2 |  |
| AD-102 | 67 | 0 | 2.9 | 489 | 1200 | 182 | 4 | 3 | 3 | 3 |  |
| AD-103 | 80 | 1 | 4.6 | 365 | 379 | 69 | 4 | 3 | 3 | 3 |  |
| AD-104 | 83 | 0 | 0.3 | 563 | 908 | 89 | 4 | 3 | 3 | 2 |  |
| AD-105 | 83 | 1 | 0.2 | 356 | 405 | 37 | 4 | 3 | 2 | 2 |  |
| AD-106 | 77 | 1 | 0.3 | 339 | 361 | 65.0 | 4 | 3 | 2 |  | LBD |

The AD pathological classification is based on the criteria of Montine [18]. The AD neuropathological change is evaluated by applying an “ABC” score representing Aβ plaques (A), NFT stage (B), and neuritic plaque score (C). Few patients did not receive a full ABC score or AD neuropathology was evaluated based on the previous scoring system of Thal [45] and Braak [46,47]. Age at moment of LP is represented in years. Gender 0 = female, 1 = male. All biomarker values are presented in pg/ml. Levels of Aβ1-42 <638.5 pg/ml, T-tau >296.5 pg/ml, and P-tau181 >56.5 pg/ml were defined as abnormal. An ES of 0-1 is classified as neurochemically “improbably having AD”, an ES of 2-3 as “possibly having AD”, and an ES of 4 as “probably having AD”. AD, Alzheimer’s disease; CVD, cerebrovascular disease; ES, Erlangen Score; LBD, Lewy body disease, LP, lumbar puncture; PD, Parkinson’s disease.