Table S1. Baseline characteristics in elderly stroke with and without Hospital mortality

|  |  |  |  |
| --- | --- | --- | --- |
| Variables | Hospital mortality, n (%)N=1694 (0.46%) | No Hospital mortality, n (%)N=363836 (99.54%) | ASD (%) |
| Age, (year) | 80.14±8.12 | 76.57±7.24 | 46.41 |
| Gender, Male | 905(53.42) | 202595(55.68) | 4.54 |
| Race, Han | 1647(97.23) | 353089(97.05) | 1.08 |
| Admission NIHSS score | 14(8,21) | 4(2,7) | 123.26 |
|  0-3 | 173(14.66) | 168317(59.26) | 104.18 |
|  4-14 | 417(35.34) | 92767(32.66) | 5.66 |
|  ≥15 | 590(50.00) | 22954(8.08) | 104.11 |
| BMI, kg/m2 | 22.85±4.59 | 23.20±4.27 | 7.90 |
| Medical history |  |  |  |
| Stroke/TIA | 752(44.39) | 128390(35.29) | 18.67 |
| Hypertension | 1183(69.83) | 240197(66.02) | 8.17 |
| Diabetes Mellitus | 423(24.97) | 70882(19.48) | 13.23 |
| Dyslipidemia | 148(8.74) | 24724(6.80) | 7.25 |
| CHD/Previous MI | 385(22.73) | 40549(11.14) | 31.28 |
| Atrial Fibrillation | 368(21.72) | 28809(7.92) | 39.59 |
| Carotid Stenosis | 30(1.77) | 5080(1.40) | 2.96 |
| Heart Failure | 122(7.20) | 5900(1.62) | 27.43 |
| Dementia | 47(2.77) | 3075(0.85) | 14.44 |
| Current smoking  | 146(8.62) | 54179(14.89) | 19.56 |
| Alcoholism  | 229(13.52) | 60805(16.71) | 8.91 |
| Medication at admission |  |  |  |
| Antiplatelet drugs | 394(23.26) | 78695(21.63) | 3.91 |
| Anticoagulant drugs | 111(6.55) | 15691(4.31) | 9.90 |
| Antihypertensive drugs | 900(53.13) | 177763(48.86) | 8.55 |
| Lipid-lowering drugs | 285(16.82) | 55929(15.37) | 3.95 |
| DS done prior to oral intake | 1233(72.79) | 287531(79.03) | 14.63 |
| Swallowing function |  |  |  |
|       Normal | 337(27.69) | 245303(85.80) | 144.81 |
|       Dysphagia | 880(72.31) | 40602(14.20) | 144.81 |
| Swallowing rehabilitation | 540(60.00) | 34054(79.87) | 44.39 |
| Region |  |  |  |
|       East | 736(43.45) | 170192(46.78) | 6.70 |
|       Middle | 426(25.15) | 109919(30.21) | 11.33 |
|       West | 532(31.40) | 83725(23.01) | 18.94 |
| Hospital grade |  |  |  |
|       Secondary | 503(29.69) | 144228(39.64) | 21.02 |
|       Tertiary | 1191(70.31) | 219608(60.36) | 21.02 |

**Notes:** Continuous variables are expressed as mean ± SD or as median (interquartile range, IQR). Categorical variables are expressed as frequency (%).

**Abbreviations:** ASD, absolute standardized difference; BMI, body mass index; CHD, coronary heart disease; DS, dysphagia screening; MI, myocardial infarction; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale; TIA, transient ischemic attacks.

Table S2. The characteristics of stroke patients with dysphagia between with and without swallowing rehabilitation

| Variables | Swallowing rehabilitation N=33548 (80.87%) | No swallowing rehabilitationN=7934 (19.13%) | ASD (%) |
| --- | --- | --- | --- |
| Age, (year) | 78.03(7.39) | 78.45(7.49) | 5.65 |
| Gender, Male | 17849(53.20) | 3967(50.00) | 6.41 |
| Race, Han | 32603(97.19) | 7716(97.25) | 0.36 |
| Admission NIHSS score | 10(5,16)  | 12(6,19)  | 26.15 |
|  0-3 | 6115(21.63) | 1060(17.30) | 10.95 |
|  4-14 | 13942(49.31) | 2495(40.73) | 17.31 |
|  ≥15 | 8216(29.06) | 2571(41.97) | 27.23 |
| Medical history |  |  |  |
| Stroke/TIA | 13597 (40.53) | 4427(55.80) | 30.92 |
| Hypertension | 23001(68.56) | 5365(67.62) | 2.02 |
| Diabetes Mellitus | 7043(20.99) | 1581(19.93) | 2.63 |
| Dyslipidemia | 2741(8.17) | 559(7.05) | 4.22 |
| CHD/Previous MI | 4544(13.54) | 1240(15.63) | 5.92 |
| Atrial Fibrillation | 5265(15.69) | 1486(18.73) | 8.06 |
| Carotid Stenosis | 620(1.85) | 105(1.32) | 4.24 |
| Heart Failure | 1117(3.33) | 323(4.07) | 3.92 |
| Dementia | 677(2.02) | 171(2.16) | 0.98 |
| Current smoking  | 4478(13.35) | 995(12.54) | 2.41 |
| Alcoholism  | 5561(16.58) | 1134(14.29) | 6.34 |
| Region |  |  |  |
|       East | 17143(51.40) | 4143(52.22) | 1.64 |
|       Middle | 7991(23.82) | 2327(29.33) | 12.50 |
|       West | 8414(25.08) | 1464(18.45) | 16.12 |
| Hospital grade |  |  |  |
|       Secondary | 11668(34.78) | 3365(42.41) | 15.72 |
|       Tertiary | 21880(65.22) | 4569(57.59) | 15.72 |

**Notes:** Continuous variables are expressed as mean ± SD or as median (interquartile range, IQR). Categorical variables are expressed as frequency (%).

**Abbreviations:** ASD, absolute standardized difference; CHD, coronary heart disease; DS, dysphagia screening; MI, myocardial infarction; mRS, modified Rankin Scale; NIHSS, National Institutes of Health Stroke Scale; TIA, transient ischemic attacks.

**Table S3.** The Hospital poor outcomes in intracranial stroke patients with and without DS and swallowing rehabilitation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Adverse outcomes | N (%) | Dysphagia Screening | N (%) | Swallowing Rehabilitation |
| *OR* (95% *CI*) | *P* value |  | *OR* (95% *CI*) | *P* value |
| Mortality a |  |  |  |  |  |  |
| Unadjusted | 229(1.31) | 0.60(0.48,0.76) | <0.001 | 90(2.82) | 0.28(0.20,0.39) | <0.001 |
| After IPTW PSM | 306(1.28) | 0.60(0.52,0.70) | <0.001 | 119(2.72) | 0.28(0.21,0.37) | <0.001 |
| After nearest-neighbor PSM | 204(1.26) | 0.60(0.47,0.75) | <0.001 | 80(2.74) | 0.28(0.20,0.40) | <0.001 |
| Mortality + DAMA a |  |  |  |  |  |  |
| Unadjusted | 1719(9.80) | 0.58(0.53,0.63) | <0.001 | 499(15.61) | 0.42(0.35,0.50) | <0.001 |
| After IPTW PSM | 2335(9.76) | 0.58(0.55,0.62) | <0.001 | 680(15.52) | 0.42(0.36,0.49) | <0.001 |
| After nearest-neighbor PSM | 1552(9.59) | 0.57(0.52,0.62) | <0.001 | 446(15.28) | 0.42(0.35,0.51) | <0.001 |
| Pneumonia a |  |  |  |  |  |  |
| Unadjusted | 4980(28.38) | 1.06(0.99,1.13) | 0.11 | 1801(56.33) | 1.04(0.89,1.22) | 0.59 |
| After IPTW PSM | 6743(28.17) | 1.06(1.02,1.11) | 0.006 | 2441(55.71) | 1.05(0.92,1.20) | 0.47 |
| After nearest-neighbor PSM | 4536(28.03) | 1.06(0.99,1.13) | 0.11 | 1648(56.46) | 1.05(0.90,1.24) | 0.53 |

**Notes:** a Model adjusted for age, sex, body mass index, history of stroke, hypertension, diabetes mellitus, dyslipidemia, coronary heart disease/ myocardial infarction, dementia, heart failure, atrial fibrillation, carotid stenosis, current smoking, alcoholism, antiplatelet drugs, anticoagulant drugs, antihypertensive drugs, lipid-lowering drugs; the hospital characteristics (geographic region, hospital grade); We matched patients in a 1:3 ratio using the greedy, nearest-neighbor PSM without replacement;

**Abbreviations:** CI, confidence interval; OR, odds ratio; DAMA, Discharge against medical advice; PSM, Propensity Score Matching; IPTW, inverse probability of treatment weighted.

**Table S4.** The Hospital poor outcomes in subarachnoid hemorrhage patients with and without DS and swallowing rehabilitation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Adverse outcomes | N (%) | Dysphagia Screening | N (%) | Swallowing Rehabilitation |
| *OR* (95% *CI*) | *P* value |  | *OR* (95% *CI*) | *P* value |
| Mortality a |  |  |  |  |  |  |
| Unadjusted | 48(2.99) | 1.15(0.68,1.96) | 0.60 | 15(6.88) | 0.53(0.23,1.21) | 0.13 |
| After IPTW PSM | 70(2.90) | 1.17(0.82,1.66) | 0.38 | 22(6.78) | 0.53(0.27,1.05) | 0.07 |
| After nearest-neighbor PSM | 37(3.06) | 1.18(0.68,2.09) | 0.55 | 13(7.30) | 0.42(0.17,1.03) | 0.06 |
| Mortality + DAMA a |  |  |  |  |  |  |
| Unadjusted | 276(17.20) | 0.92(0.73,1.15) | 0.46 | 64(29.36) | 0.80(0.47,1.35) | 0.40 |
| After IPTW PSM | 411(16.91) | 0.92(0.79,1.07) | 0.28 | 96(29.01) | 0.80(0.52,1.23) | 0.31 |
| After nearest-neighbor PSM | 209(17.29) | 0.92(0.72,1.17) | 0.49 | 54(30.34) | 0.70(0.39,1.26) | 0.23 |
| Pneumonia a |  |  |  |  |  |  |
| Unadjusted | 458(28.54) | 1.13(0.93,1.37) | 0.23 | 117(53.67) | 0.85(0.51,1.39) | 0.51 |
| After IPTW PSM | 684(28.18) | 1.15(1.01,1.31) | 0.04 | 175(52.94) | 0.84(0.56,1.27) | 0.41 |
| After nearest-neighbor PSM | 351(29.03) | 1.17(0.95,1.44) | 0.15 | 96(53.93) | 0.86(0.48,1.52) | 0.60 |

**Notes:** a Model adjusted for age, sex; history of stroke; the hospital characteristics (geographic region, hospital grade); We matched patients in a 1:2 ratio using the greedy, nearest-neighbor PSM without replacement;

**Abbreviations:** CI, confidence interval; OR, odds ratio; DAMA, Discharge against medical advice; PSM, Propensity Score Matching; IPTW, inverse probability of treatment weighted.