AGE AND SEX SPECIFIC RISK PROFILES AND IN-HOSPITAL OUTCOME IN 2,573 SUBJECTS FROM A MULTICENTRE COHORT

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INTRODUCTION:

We aimed to determine the age and sex related patterns and predictors of the clinical course in a large multi-centre registry (from Spain's nationwide hospital-based stroke registry, RENISEN) of admitted haemorrhagic stroke (HS) patients.

METHODS:

We prospectively studied 2,573 HS from 19 university hospitals. Post traumatic intracranial hemorrhage, post-fybrinosis HS and subarachnoid hemorrhage were excluded. data were analysed by age groups: 18 to 39, 40 to 49, 50 to 59, 60 to 69, 70 to 79, 80 to 89 and ≥ 90 years). Significant disability was defined as a modified Rankin score (mRS) at discharge >2 .

Clinical characteristics by age groups among hemorrhagic stroke admissions

	All	Age groups								
		18-39	40-49	50-59	60-69	70-79	80-89	≥ 90		
Total, n (%)	2573	57	134	282	482	806	734	78		
Age, years	71.4 (13.1)	33.8 (5.1)	44.9 (3.0)	54.8 (2.9)	65.0 (2.9)	75.0 (2.8)	83.5 (2.6)	91.9 (2.0)	p-value*	
Baseline characteristics										
Female sex	1005 (39.1)	29 (50.9)	36 (26.9)	85 (30.1)	141 (29.3)	305 (37.8)	368 (50.1)	41 (52.6)		<0.001
Alcoholism	141 (5.5)	0 (0)	15 (10.6)	42 (14.9)	49 (10.2)	28 (3.5)	6 (0.8)	1 (1.3)		<0.001
Smoker	310 (12.0)	15 (26.3)	48 (35.8)	84 (29.8)	89 (18.5)	51 (6.3)	21 (2.9)	2 (2.6)		<0.001
Hypertension	1755 (68.2)	15 (26.3)	65 (48.5)	161 (57.1)	331 (68.7)	568 (70.5)	553 (75.3)	62 (79.5)		<0.001
Diabetes mellitus	607 (23.6)	1 (1.8)	9 (6.7)	54 (19.1)	134 (27.8)	221 (27.4)	175 (23.8)	13 (16.7)		<0.001
Hyperlipidemia	1009 (39.2)	1 (1.8)	23 (17.2)	89 (31.6)	221 (45.9)	358 (44.4)	290 (39.5)	27 (34.6)		<0.001
Atrial fibrillation	324 (12.6)	0 (0)	2 (1.5)	7 (2.5)	28 (5.8)	113 (14.0)	160 (21.8)	14 (17.9)		<0.001
Ischemic heart disease	190 (7.4)	0 (0)	1 (0.7)	12 (4.3)	31 (6.4)	76 (9.4)	60 (8.2)	10 (12.8)		<0.001
Previous ischemic stroke	243 (9.4)	0 (0)	1 (0.7)	15 (5.3)	37 (7.7)	97 (12.0)	86 (11.7)	7 (9.0)		<0.001
Previous hemorrhagic stroke	197 (7.7)	4 (7.0)	5 (3.7)	13 (4.6)	33 (6.8)	80 (9.9)	57 (7.8)	5 (6.4)		0.041
Previous treatment										
Anticoagulants	419 (16.3)	0 (0)	2 (1.5)	17 (6.0)	51 (10.6)	167 (20.7)	173 (23.6)	9 (11.5)		<0.001
Antiplatelets	687 (26.7)	1 (1.8)	5 (3.7)	43 (15.2)	116 (24.1)	248 (30.8)	241 (32.8)	33 (42.3)		<0.001
Statins	823 (32.0)	2 (3.5)	13 (9.7)	56 (19.9)	177 (36.7)	305 (37.8)	249 (33.9)	21 (26.9)		<0.001
Antihypertensives	1444 (56.1)	10 (17.5)	42 (31.3)	114 (40.4)	273 (56.6)	490 (60.8)	464 (63.2)	51 (65.4)		<0.001
Antidiabetics	478 (18.6)	0 (0)	6 (4.5)	44 (15.6)	108 (22.4)	180 (22.3)	130 (17.7)	10 (12.8)		<0.001
Management										
Stroke code activation	1324 (51.5)	31 (54.4)	67 (50.0)	158 (56.0)	264 (54.8)	432 (53.6)	349 (47.5)	23 (29.5)		0.003
Stroke unit admission	1689 (65.6)	39 (68.4)	89 (66.4)	217 (77.0)	331 (68.7)	538 (66.7)	445 (60.6)	30 (38.5)		<0.001
Intensive care Unit	208 (8.1)	12 (21.1)	19 (14.2)	34 (12.1)	62 (12.9)	63 (7.8)	16 (2.2)	2 (2.6)		<0.001
Stroke severity										
Basal mRS	0.0 (0.0-2.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-3.0)	2.0 (0.0-3.0)		<0.001
NIHSS at admission	7.0 (3.0-16.0)	3.0 (1.0-11.0)	5.0 (1.0-13.5)	6.0 (2.0-14.0)	7.0 (3.0-15.0)	7.0 (3.0-16.0)	7.0 (3.0-16.0)	9.0 (3.0-18.0)		<0.001
Etiology										
Primary	1955 (76.0)	23 (40.4)	88 (65.7)	208 (73.8)	382 (79.3)	614 (76.2)	574 (78.2)	66 (84.6)		<0.001
Secondary	488 (19.0)	25 (43.9)	31 (23.1)	57 (20.2)	82 (17.0)	148 (18.4)	136 (18.5)	9 (11.5)		<0.001
Unknown	130 (5.1)	9 (15.8)	15 (11.2)	17 (6.0)	18 (3.7)	44 (5.5)	24 (3.3)	3 (3.8)		<0.001
Hypertensive	1448 (56.3)	19 (33.3)	77 (57.5)	184 (65.2)	323 (67.0)	411 (51.0)	392 (53.4)	42 (53.8)		<0.001
Amlyoidal	342 (13.3)	0 (0)	0 (0)	6 (2.1)	30 (6.2)	140 (17.4)	148 (20.2)	18 (23.1)		<0.001
ICH location										
- Lobar	922 (35.8)	19 (33.3)	39 (29.1)	73 (25.9)	136 (28.2)	329 (40.8)	290 (39.5)	36 (46.2)		<0.001
- Deep	1177 (45.7)	23 (40.4)	70 (52.2)	145 (51.4)	264 (54.8)	343 (42.6)	300 (40.9)	32 (41.0)		<0.001
- Cerebellar	232 (9.0)	13 (22.8)	15 (11.1)	33 (11.7)	44 (9.1)	60 (7.4)	64 (8.7)	3 (3.8)		<0.001
- IVH	175 (6.8)	0 (0)	4 (4.5)	9 (3.2)	10 (2.1)	24 (3.0)	19 (2.6)	1 (1.3)		<0.001
- Unknown	175 (6.8)	2 (3.5)	6 (4.5)	22 (7.8)	28 (5.8)	50 (6.2)	61 (8.3)	6 (7.7)		<0.001
Clinical evolution										
Febrile syndrome	643 (25.0)	9 (15.8)	17 (12.7)	42 (14.9)	111 (23.0)	218 (27.0)	224 (30.5)	22 (28.2)		<0.001
Respiratory infection	422 (16.4)	4 (7.0)	12 (9.0)	28 (9.9)	73 (15.1)	140 (17.4)	151 (20.6)	14 (17.9)		<0.001
Urinary infection	217 (8.4)	5 (8.8)	6 (4.5)	13 (4.6)	37 (7.7)	79 (9.8)	69 (9.4)	8 (10.3)		0.072
mRS-2 at discharge	4.0 (2.0-5.0)	2.0 (1.0-3.0)	2.0 (1.0-4.0)	3.0 (1.0-4.0)	3.0 (1.0-5.0)	4.0 (2.0-5.0)	4.0 (3.0-5.0)	5.0 (3.0-6.0)		<0.001
mRS-2 at discharge	1690 (68.5)	20 (35.7)	52 (39.7)	154 (55.6)	280 (61.0)	549 (71.1)	571 (81.6)	64 (88.9)		<0.001
Death	393 (15.3)	1 (1.8)	5 (3.7)	14 (5.0)	41 (8.5)	125 (15.5)	183 (24.9)	24 (30.8)		<0.001
Hospital length of stay, days	7.0 (4.0-12.0)	8.0 (5.0-13.0)	8.0 (5.0-14.0)	8.0 (5.0-14.0)	8.0 (5.0-14.0)	7.0 (4.0-12.0)	7.0 (4.0-12.0)	6.0 (2.0-10.0)		<0.001

a. p-values have been obtained excluding the unknown values.

Quantitative variables (Age, mRS and NIHSS) are present as median and interquartile range; qualitative variables are presented as number and percentage.

NIHSS, National Institutes of Health Stroke Scale; mRS, modified Rankin Scale; IVH, isolated intraventricular hemorrhage.

RESULTS:

The mean (SD) age was 71.2 (13.2) years. 964 (39.1%) subjects were women and 772 (31.3%) were >80 years old. 1690 (68.5%) had mRs >2 at discharge. Older patients were more likely to be female and exhibit primary aetiologies. Previous treatment with anticoagulants was more frequent in women than in men. Older subjects and women were less likely to be admitted to a stroke unit or have a stroke code activated. Age, female sex, diabetes mellitus, NIHSS at admission and febrile syndrome were predictors of poor outcome.

CONCLUSION:

Clinical characteristics, aetiology and management differed with respect to age group and sex. The poorest outcome was in elderly patients. Strategies need to be implemented to ensure equal care was given to all age groups and sex.

Multivariate analysis. Predictors of poor prognosis

	OR	95% CI	p-value
Age	1.05	1.04-1.05	<0.001
Age groups			
- 18-39	1.56	1.41-1.72	<0.001
- 40-49	1.19	0.62-2.27	0.609
- 50-59	2.25	1.24-4.09	0.008
- 60-69	2.82	1.58-5.02	<0.001
- 70-79	4.43	2.51-7.82	<0.001
- 80-89	7.98	4.47-14.22	<0.001
- ≥ 90	14.4	5.77-36.00	<0.001
Baseline characteristics			
Sex female	1.32	1.04-1.67	0.025
Alcoholism	1.32	0.79-2.21	0.283
Smoker	1.32	0.79-2.20	0.288
Hypertension	0.98	0.76-1.55	0.884
Diabetes mellitus	1.37	1.04-1.81	<0.001
Atrial fibrillation	1.25	0.80-1.98	0.331
Ischemic heart disease	0.86	0.55-1.33	0.490
Previous treatment			
Anticoagulants	1.26	0.82-1.94	0.292
Antiplatelets	1.18	0.88-1.58	0.280
Statins	1.11	0.85-1.44	0.453
Stroke awakening	1.27	0.94-1.70	0.120
Stroke severity			
NIHSS at admission	1.30	2.0 (1.0-4.0)	<0.001
Etiology			
Primary	0.86	0.64-1.15	0.316
Clinical evolution			
Febrile syndrome	2.90	2.06-4.08	<0.001