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International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Hemorrhagic Strokes: Predictive Factors of Mortality

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DOI: https://doi.org/10.55248/gengpi.5.0524.1132

ABSTRACT:

Introduction:

Hemorrhagic stroke (HS) is due to bleeding into the brain by the rupture of a blood vessel. Uncontrolled hypertension (HTN) is the most common risk factor for spontaneous HS. Uncontrolled hypertension (HTN) is the most common risk factor for spontaneous HS and increasing age leads to poor short, and long-term prognoses with a majoring risk of death. The aim of our study is establishing the association between risk factors and poor survival outcomes.

Materials and methods:

We conducted a descriptive and analytic cohort study, with prospective data collection among patients, admitted in the emergency ward of Lamine Debaghine hospital Algiers. All HS from January 2022 to January 2024 were included in the study. The approval of patients was obtained for using their medical records. we carried out a multivariate study by logistic regression in which we introduced the following study variables (gender, topography, Glasgow score, ICH score …) and the variables described as being risk factors for stroke mortality, to eliminate the confounding factors in the logit equation of logistic regression.

Results:

The incidence of hemorrhagic stroke among populations at risk of developing a stroke from any causes was 51.53 %. 64.4% were male with (sex ratio: 1.81). Maximum age was 93-year-old minimum age was 36-year-old and the mean age was 65.09 ±1.43 years

Discussion:

ICH patients in Brazil found that the ICH score was a valid predictor of 30-day mortality with a sensitivity of 85.7% and a specificity of 65.2%. The Uganda multivariant study found significant results for Glasgow scale, and ICH score in the univariable analysis and a significant P value in the multivariable for the ICH score. ICH is also significative in Felix A. Schmidt & all study. In our study other risk factors has been studied remaining none significative P>0.05 such as hypertension, diabetes, age, localisation and atrial fibrillation. a study in Uganda comforted our results

Key-words: Hemorrhagic stroke, survival analysis, hypertension, age, outcomes, ICH score, Glasgow

Introduction:

Hemorrhagic stroke is due to bleeding into the brain by the rupture of a blood vessel. It may be further subdivided into intracerebral hemorrhage (ICH) and subarachnoid hemorrhage (SAH). (1). Hemorrhagic stroke (HS), accounts for 10% to27% of strokes worldwide (2) with an incidence of 25 cases of HS per 100,000 inhabitants (3). it contributes to a high proportion of stroke deaths, with a 30-day case fatality rate of >50% for intracerebral hemorrhage and around 45% for subarachnoid hemorrhage (4). it is associated with greater morbidity and mortality than ischemic strokes (5). Uncontrolled hypertension (HTN) is the most common risk factor for spontaneous HS (6) and increasing age leads to poor short- and long-term prognoses with a majoring risk of death (7).

To the best of our knowledge, no study has comprehensively investigated age outcomes among HS patients with different risk factors in Algeria. our aim is to establish using the logit equation of logistic regression potential risk factors and their impact on the short-term mortality

Materials and methods:

We conducted a descriptive and analytic cohort study, with prospective data collection among patients, admitted in the emergency ward of Lamine Debaghine hospital Algiers. All HS from January 2022 to January 2024 were included in the study. The approval of patients was obtained for using their

medical records. Data were analysed according to logistic regression (The age, gender, medical history, Glasgow scales, the territory, clinical features, the evolution of the patient) were registered. We used the medical files, TDM results as sources of information. Furthermore, we carried out a multivariate study by logistic regression in which we introduced the following study variables (gender, topography, Glasgow score) and the variables described as being risk factors for stroke mortality, to eliminate the confounding factors in the logit equation of logistic regression.

Results:

The incidence of haemorrhagic stroke among populations at risk of developing a stroke from any causes was 51.53 %. 64.4% were male with (sex ratio: 1.81). Maximum age was 93-year-old minimum age was 36-year-old and the mean age was 65.09 ±1.43 years. (tab1). 18.8% of the patients had a heart disease (fig 1). 28.7% of the patients were diabetics. 82.2% of the cases have high blood pressure. 5% undergo decompressive craniotomy. 6% had sequalae seizures. ICH score of the patient is reported in (fig 2). As for the most recurrent clinical features paralysis was preponderant with 40% of the cases (fig3). The bivariate analysis (tab 2) found that the following variables: gender is not statistically significantly linked to mortality P> 0.05 but an ICH score >2 A Glasgow score <12 and prior history of ischemic heart disease ate statistically significantly linked to mortality P<0.05. From the initial model, where we introduced all the independent study variables to explain the occurrence of deaths (dependent variable) (tab 3). The multivariate analysis showed that the explanatory variables: the Glasgow score and the ICH score were statistically significantly linked to mortality. The Glasgow score multiplied the risk of death by 3.4 while the ICH score multiplied it. the risk by 4.23 (tab4)

Discussion

In our study the mean age was 65.09 ±1.43 64.4% years, were male which is consistant with a study that found mean 67 ± 14 years and 38% female (8.9).

28.7% of the patients were diabetics. 82.2% of the cases have high blood pressure. 5% undergo decompressive craniotomy. Another study reported as follow: HTN (65%), history of CVD (27%), and history of cerebral stroke (25%) (13). A study reported a history of ischemic stroke (13.6%) History of hemorrhagic stroke, (15.3%) Craniotomy (2.7%) (9)

In our bivariate analysis (tab2). we highlighted an ICH score >2 A Glasgow score <12 and prior history of ischemic heart disease ate statistically significantly linked to mortality with a P <0.05.

A study of ICH patients in Brazil found that the ICH score was a valid predictor of 30-day mortality with a sensitivity of 85.7% and a specificity of 65.2% (10). The Uganda multivariant study found significant results for Glasgow scale, and ICH score in the univariable analysis and a Signiant P value in the multivariable for the ICH score. (11) . ICH is also significative in Felix A. Schmidt & all study (8)

In our study other risk factors has been studied remaining none significative P>0.05 (tab 2) such as hypertension, diabetes mellitensis, age, localisation and atrial fibrillation. some studies found that uncontrolled hypertension (HTN) is the most common risk factor for spontaneous HS (6). a study in Uganda comforted our results (10) for the prior hypertension, the age, localisation. studies shown that the mortality is significantly predicted by Glasgow Coma Scale (GCS) score (11). Another study found consistant results for prior stroke, diabetes and hypertension (13). however, none of (12.13) reported a significant result for ischemic heart disease

Tables and figures: age category

Age	Proportion %
36-51	18.8
52-66	31.7
-67-85	33.7
>85	15.8

Tab 1 proportion of patient with HS according to age brackets

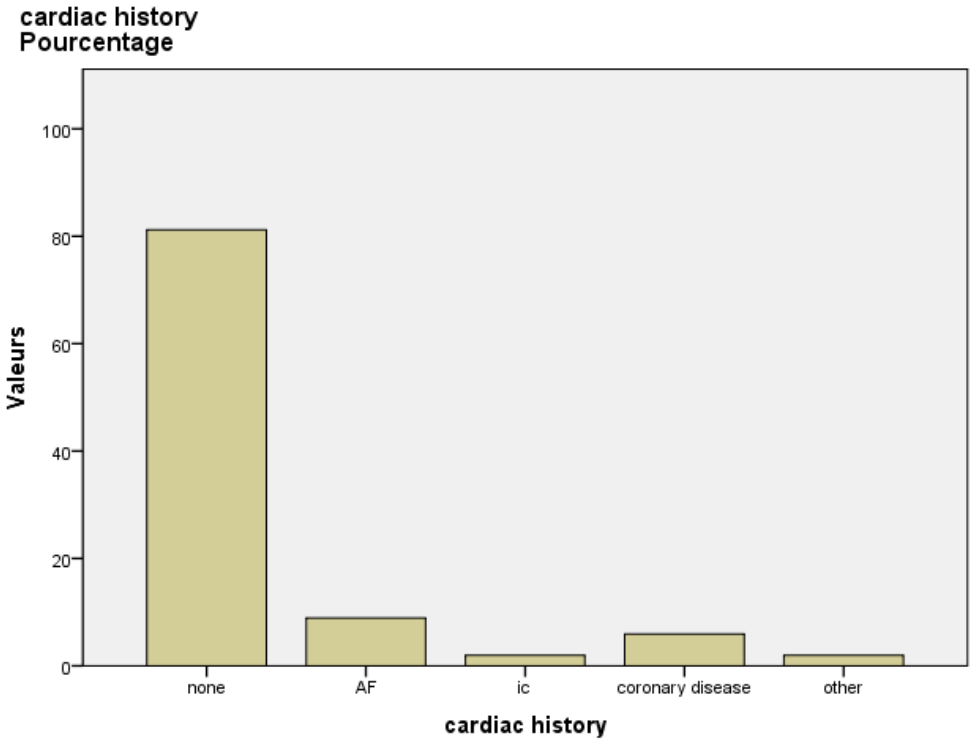

Fig 1: proportion of cardiac medical history in patient with HS

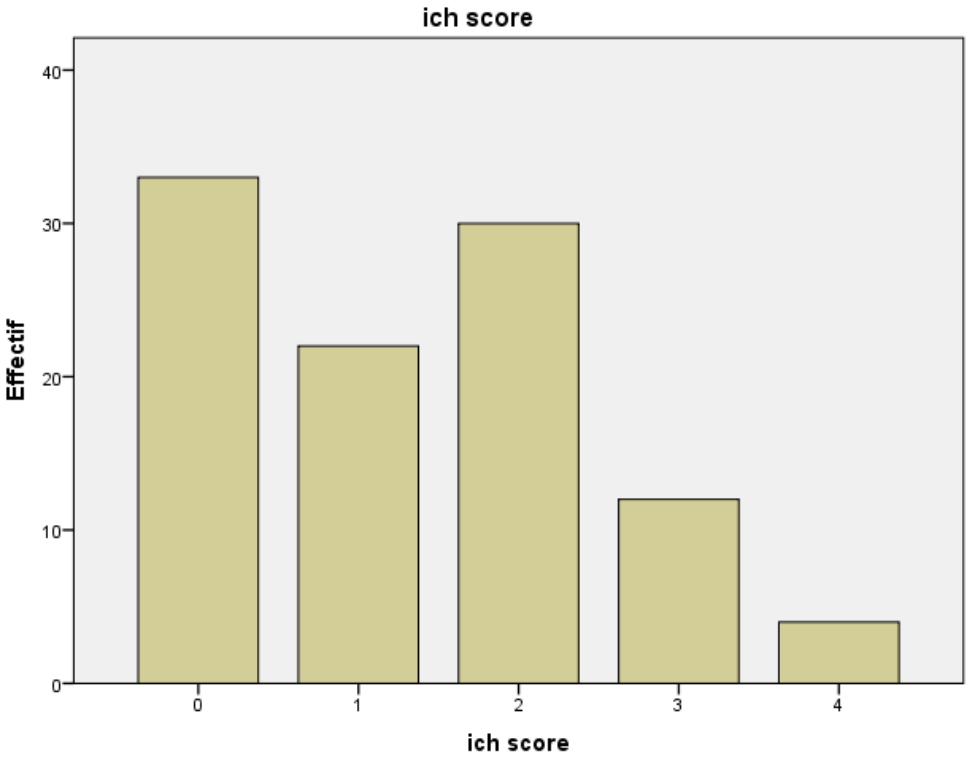

Fig 2: effective patients with HS according to their ICH scores

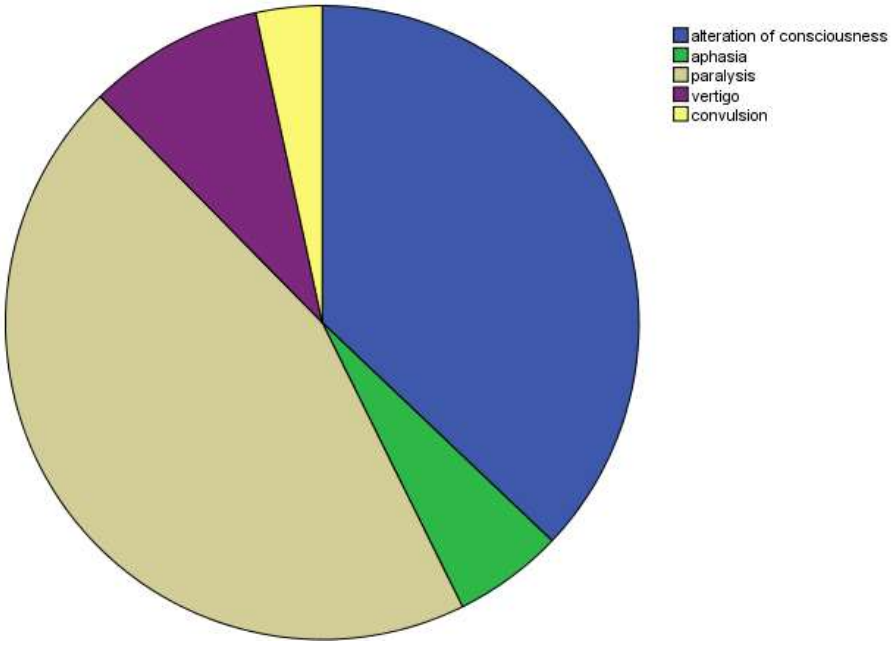

Fig 3 clinical features presented in the ER

Tab 2: bivariate analysis of mortality with different factors with (Cl=95% and α= 0.05)

	Number of patients(N)	Died n=32	Censored n=69	Ratio risk	Limits CI 95 %	P-value
Gender	Female (66)	25	41	1.9	[0.92-3.93]	0.066
	Male (35)	7	28			
age	<65	14	40	1.47	[0.82, 2.63]	0.18
	>65	18	29			
hypertension	no	4	14	1.52	[0.61, 3.8]	0.34
	yes	28	55			
Diabetes	No	21	51	1.3	[0.72, 2.34]	0.39
	Yes	11	18			
Transit tory stroke	No	30	66	1.28	[0.42, 3.9]	0.68
	Yes	2	3			
Prior hemorrhagic stroke	No	3	8	1.181	[0.43, 3.24]	0.74
	Yes	29	61			
a-fib	No	64	28	0.8	0.44, 1.45]	0.4
	Yes	5	4			
Ihd	No	32	59			**0.023**
	Yes	0	10			
Ich	<2	19	63	2.95	1.79, 4.86	**0.0001**
	>2	13	6			

Localisation	Sus tentorial	30	66	0.8	0.25, 2.38	0.68
	Tentorial	2	3			
Glasgow	<12	22	21	2.97	1.57, 5.6	**0.0003**
	>12	10	48			

Tab 3: multivariate analysis of the mortality by logistic regression

Initial logistic regression model

	A	E.S.	Wald	ddl	Sig.	Exp(B)	IC pour Exp(B) 95%	
							Inferior	Superior
step1[a]	**gender**	1.425	.628	5.145	1	**.023**	**4.158**	**14.24**
	age	1.093	.611	3.194	1	.074	2.983	9.90
	hta	.685	.734	.872	1	.350	1.984	8.36
	diabetis	-.013	.642	.000	1	.984	.987	3.47
	t_stroke	.814	.810	1.011	1	.315	2.257	11.04
	H-stroke	.542	.895	.368	1	.544	1.720	9.931
	Atrial fibrilation	-.884	.957	.853	1	.356	.413	2.70
	Ischemic heart	-20.644	11511.535	.000	1	.999	.000	
	glasgow	1.510	.554	7.429	1	**.006**	**4.525**	**13.398**
	ICH	1.281	.691	3.431	1	.064	3.599	13.958
	T_gphie	-.512	1.204	.181	1	.671	.599	**.057**
	Constante	-4.206	1.291	10.612	1	.001	.015	

Variable(s) entered in: g_re, a_bn, hta, d_t, t_stroke, S_hs, A_fb, I_card, g_wbn, I_ch, T_gphie.

Tab 4: Final logistic regression model

	A	E.S.	Wald	ddl	Sig.	Exp(B)	IC pour Exp(B) 95%	
							Inferior	Superior
Glasgow	1.220	.469	6.756	1	**.009**	**3.386**	1.350	8.496
ICH	1.442	.634	5.167	1	**.023**	**4.230**	1.220	14.667
Tgphie	-.203	1.145	.031	1	.859	.816	.087	7.698
Constante	-1.710	.360	22.552	1	.000	.181		

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