Ischemic Stroke in the ICU: Is Gender Related to Risk Factors?

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ABSTRACT:

Introduction:

Stroke is a major public health problem, which has a very heavy impact on a global scale in terms of human and financial consequences. it represents the second cause of death after coronary heart disease, and the first cause of disability in adults in terms of morbidity. The occurrence of a stroke is closely linked to cardiovascular risk factors such as hypertension, diabetes, hypercholesterolemia, smoking and cardio-embolic diseases.

The aim of our study was to determine the incidence and risk factors of stroke in a medical-surgical emergency department.

Materials and methods:

We conducted a descriptive and analytical cohort study, with prospective data collection. We included all patients over 18 years old, admitted to the medical emergency room of the Lamine Debaghine Bab El Oued hospital, for an ischemic stroke from January 2023 to January 2024, among all neurological deficits in favor of stroke. We obtained consent from patients or a relative, and approval from the ethics committee to carry out our study. we used OpenEpi to calculate P-value and Mid P-value for the different risk factors stratified according to gender (with α=0.05 and CL= 95%)

Results:

The overall incidence of ischemic stroke among neurological disorders, was 40.3%. We had 79 cases of ischemic strokes pour 100000 habitants/and the sex ratio (2,4), 34.2% of the patients had a heart disease, 43% of the patients were diabetics. 74.4% of the cases have high blood pressure. The predominant affected artery was the middle cerebral artery with 53.2% .38% of the cases died. The proportion of heart disease in female was 82.6 %, compared to 16.7 % in male. In our study, we found that there was a clearly significant difference (P<0.0001) in the risk of having an ischemic stroke due to heart disease, all causes combined described.

Discussion :

In our study, we found a mean age of 62.41-year-old which is consistent with 6 studies but lower than a study made in 2018 in Blida. We found a higher mortality rate compared to local mortality rate reported in Blida's study. As for the risk factors , we found 74.4% of the cases had hypertension17.7% of AF ,7.6% Coronary artery disease and 43% diabetes mellitus . a study in the USA found 82.4% cases with hypertension 36.5 % diabetes mellitus, 24.1% Atrial fibrillation, 27.1% Coronary artery disease. However, the statistical difference can be explained by the small population that we used in our study compared to the USA study with of 5,751,601 weighted admissions and the obesity that is important in the US population we found consistent result for hypertension and diabetes mellitus with a study made in 2021 but higher than a recent systematic study .we noticed a preponderance in hypertension in the male subjects in contrary to a 2021 study. however, it's consistant with some studies. We noticed a higher proportion of diabetes in female gender which is consistant with many studies . As for the AF and coronary disease our results had higher proportion than described in some studies with a predominant proportion in female subjects for AF as shown in and male gender subjects for coronary disease which is consistant to risk factors' studies . prior ischemic strokes didn't show any gender preference which concords with studies .As for death , we didn't find a significant Although difference (P > 0.05) in death related to gender .although, a study published in 2016 found that female gender was significantly associated with an increased risk of disabling strokes and death .

In our study, we analyzed risk factors according to gender and found that there was a clearly significant difference (P<0.0001) in the risk of having an ischemic stroke due to heart disease, research has also reported the significant risk related to gender and cardiopathy.

Introduction:

Stroke is a significant global health problem.it is the second leading causes of mortality globally and a main cause of disability (1) and recurrent strokes are frequent.in 2018 the incidence reported in Blida by Bezzaoucha was 130.3/100000 .In 2019, ischemic strokes represented 62.4% of worldwide incident strokes and non-traumatic hemorrhagic stroke 27.9%. In 2019, the regional age-standardized point prevalence and death rates of stroke in north Africa and middle east were 1537.5 (95% UI: 1421.9–1659.9) and 87.7 (78.2–97.6) per 100,000, which represent a 0.5% (− 2.3 to 1.1) and 27.8% (− 35.4 to − 16) decrease since 1990, respectively. (2)In 2020, the global prevalence of acute ischemic stroke (AIS) was 68.16 million people and a number of deaths estimated to 3,48 million were caused by ischemic stroke (3).Risk factors, as stated by the 2014 guidelines of the American Stroke Association including hypertension, diabetes mellitus, dyslipidemia, smoking, atrial fibrillation (AF), patent foramen oval (PFO), gender, age and obesity …(4) are numerous and can differ from a population to another . The aim of our study is to stablish the incidence, the risk factors and mortality data for stroke in Algeria.

Materials and method :

We realized a descriptive and analytic cohort study on patient admitted in the emergency ward of Lamine Debaghine hospital Bab El Oued, Algiers. All ischemic stroke from January 2021 to January 2024 were recorded. The approval of patients was obtained for using their medical records. The age, gender , medical history ,Glasgow scales at the admission ,length of stay ,the territory ,clinical features, the evolution of the patient were registered . We used the medical files , TDM results as sources of information . we used OpenEpi to calculate P-value and Mid P-value for the different risk factors stratified according to gender . (with α=0.05 and CL= 95%)

Result :

We had 79 cases of ischemic strokes ,70.9% were male with the sex ratio (2,4). Maximum age was 89-year-old minimum age was 17-year-old and the mean age was 62.41years. (tab1). 34.2% of the patients had a heart disease (fig1). 43% of the patients had diabetes mellitus. 74.4% of the cases have high blood pressure. As for medical history of prior strokes, (fig2). The predominant affected artery was the middle cerebral artery with 53.2% of the cases (fig 3). All sequalae are reported in (fig 4) and the Glasgow scale is mentioned in (fig 5) .2.5% of the patients are brain dead. 38% of the cases died .

We used OpenEpi to calculate P-value and Mid P-value for the different risk factors stratified according to gender. (with α=0.05 and CL= 95%).The proportion of heart disease in female was 82.6 %, compared to 16.7 % in male. In our study, we found that there was a clearly significant difference (P<0.0001) in the risk of having an ischemic stroke due to heart disease, all causes combined described in (tab2). The proportion of AF in male was 12.5 %, compared to 30.4 % in female. In our study we did not find a significant difference (P > 0.05) in the risk of having an ischemic stroke due to AF, stratified to gender .The proportion of coronary in male was 8.9 %, compared to 4.3 % in female. In our study we did not find a significant difference (P > 0.05) in the risk of having an ischemic stroke due to coronary, stratified to gender. The proportion of prior stroke in male was 21.43 %, compared to 34.8% in female. In our study, we did not find significant difference (P> 0.05), in the risk of having an ischemic stroke due to prior stroke, stratified by gender. The proportion of diabetes in male was 44,6 %, compared to 39.1 % in female. In our study, we did not find significant difference (P> 0.05) in the risk of having an ischemic stroke due to diabetes, stratified by gender. The proportion of hypertension in male was 75 %, compared to 73.9% in female. In our study, we did not find significant difference (P> 0.05), in the risk of having an ischemic stroke due to hypertension, stratified by gender. The proportion of death in male was 39.3 %, compared to 34.8 % in female. In our study, we did not find significant difference (P> 0.05), in the risk of having an ischemic stroke due to hypertension, stratified by gender.

Discussion :

In our study ,we found a mean age of 62.41-year-old which is consistent with 6 studies reporting a mean age of 62.2 years that were reported in a multicentric study (5) but lower than a study made in 2018 in Blida (Algeria) that found a mean age of 70 years (6) . We also found a preponderance in male gender of 70.9% . a Portuguese study found a lower incidence in male estimated to 60.8% (7) . In our study the strokes were predominant in the territory of the MCA however we didn't find a significant correlation between the topography and the outcomes .Some studies also defined the MCA as the most frequent topography this can be explained by the fact that MCA is the main artery that irrigate the brain and those studies suggested that regions supplied by MCA are associated with worse functional outcomes (8) our result can be explain by the small sample compared to those studies which constitute a bias . We found a mortality of 34.2% which is higher than the one reported in Bezzaoucha's study 22.1%(6). In our study 25.3% had recurrent ischemic strokes. Studies demonstrate recurrent stroke is frequent varying recurrence rates, ranging from 7%-20% at 1 year to 16%-35% at 5 years. (9). Those rates are consistent to the one reported in our study. As for the risk factors, we found 74.4% of the cases had hypertension17.7% of AF ,7.6% Coronary artery disease and 43% diabetes mellitus. a study in the USA found 82.4% cases with hypertension 36.5 % diabetes mellitus, 24.1% Atrial fibrillation, 27.1% Coronary artery disease (10). Those result both highlighted that hypertension ,diabetes mellitus and AF were the most important risk factors for acute ischemic strokes .however , the statistical difference can be explained by the small population that we used in our study compared to the USA study with of 5,751,601 weighted admissions and the obesity that is important in the US population In our study we stratified risk factors according to gender, we found consistant result for hypertension and diabetes mellitus (tab 2) with a study made in 2021 (11) but higher than a recent systematic study (10).we noticed a preponderance in hypertension in the male subjects in contrary to a 2021 study(11).however, it's consistant with some studies (10.12) .We noticed a higher proportion of diabetes in female gender which is consistant with many studies (11.12) As for the AF and coronary disease

our results had higher proportion than described in some studies (10.11) with a predominant proportion in female subjects for AF as shown in (12) and male gender subjects for coronary disease which is consistant to risk factors' studies (9.10). prior ischemic strokes didn't show any gender preference which concords with studies (10.11). As for death, we didn't find a significant Although difference (P > 0.05) in death related to gender. Although, a study published in 2016 found that female gender was significantly associated with an increased risk of disabling strokes and death (13).

In our study, we analyzed risk factors according to gender and found that there was a clearly significant difference (P<0.0001) in the risk of having an ischemic stroke due to heart disease, research has also reported the significant risk related to gender and cardiopathy (11)

Tables and figures:

Tab1: Proportion of the risk factors according to gender

		gender	
		male	female
Cardiopathy	AF	12,5%	30,4%
	Coronary	8,9%	4,3%
Diabetes		44,6%	39,1%
Prior stroke		21,4%	34,8%
Hypertension		75,0%	73,9%

Tab 2: Percentage risk factors and number death for ischemic stroke according to gender (with α=0.05 and CL= 95%)

	Male (N) F+/F-	Female (N) F+/F-	Risks factors N (%)	CI (95%)	P value
Age > 62 years					
Severe Hypertension	42/14	17/6	59(74.7)	(64.25—83.34)	0.92
AF	17/39	3/19	20(25.32)	(16.7—35.75)	0.11
Cardiopathy	**8/48**	**19/4**	**27(34.2)**	**(24.40—45.2)**	**0.0001**
Ischemic heart disease	5/51	1/22	6(7.6)	(3.14—15.13)	0.55
Diabetes	25/31	9/14	34(43)	(32.47—54.11)	0.65
Prior stroke	12/44	8/15	20(25.32)	(16.7—35.75)	0.21
Deaths	22/34	8/15	30(38)	(29.8 — 49.02)	0.71

(F +): existence of risk factors; (F -): No risk factors

Fig 1: proportion of patients with an associated cardiopathy
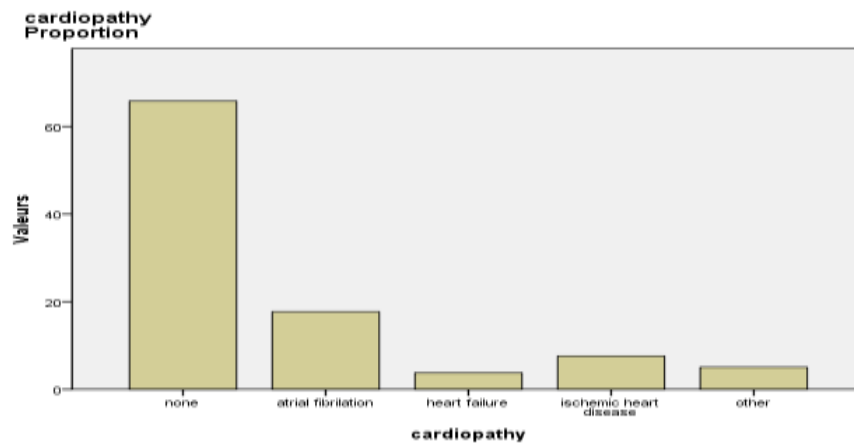

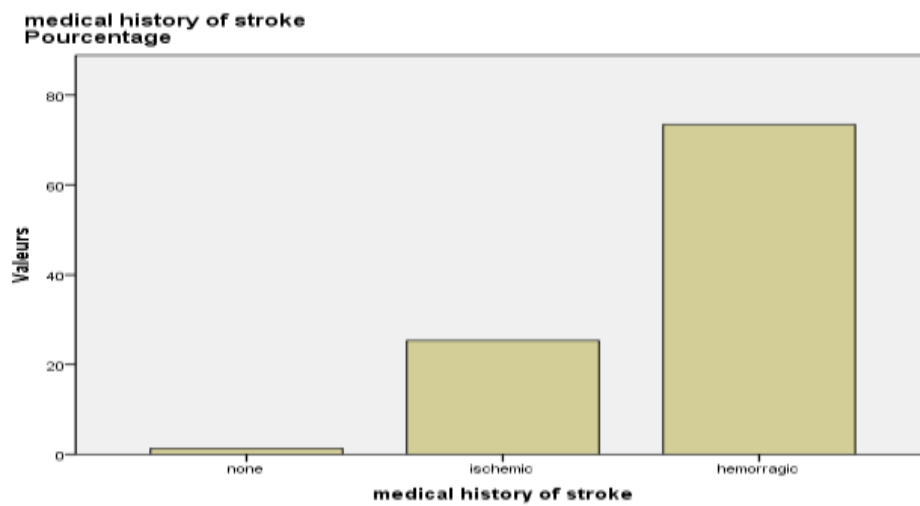**Fig 2: proportion of cases with prior stroke**

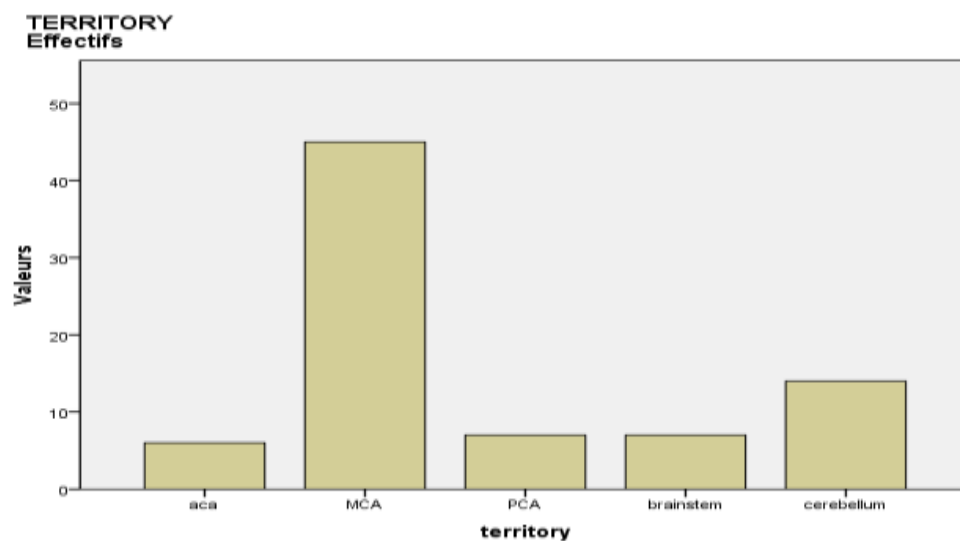Fig 3: territory of ischemic strokes

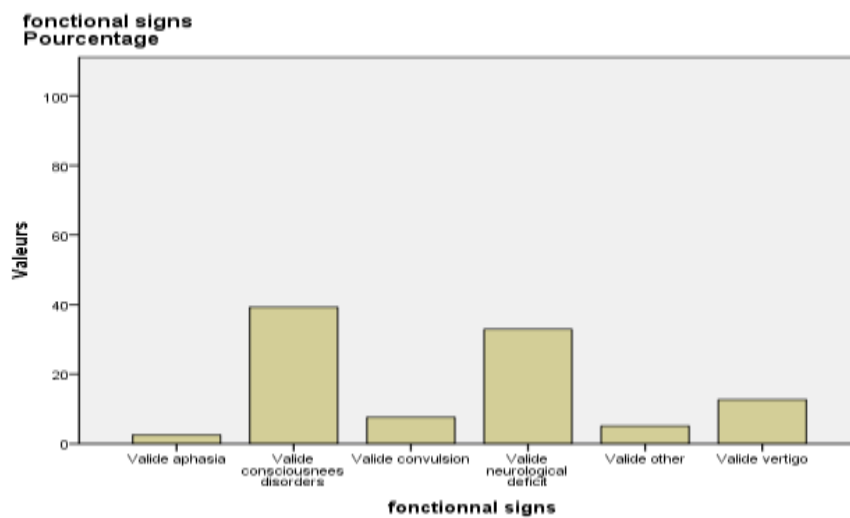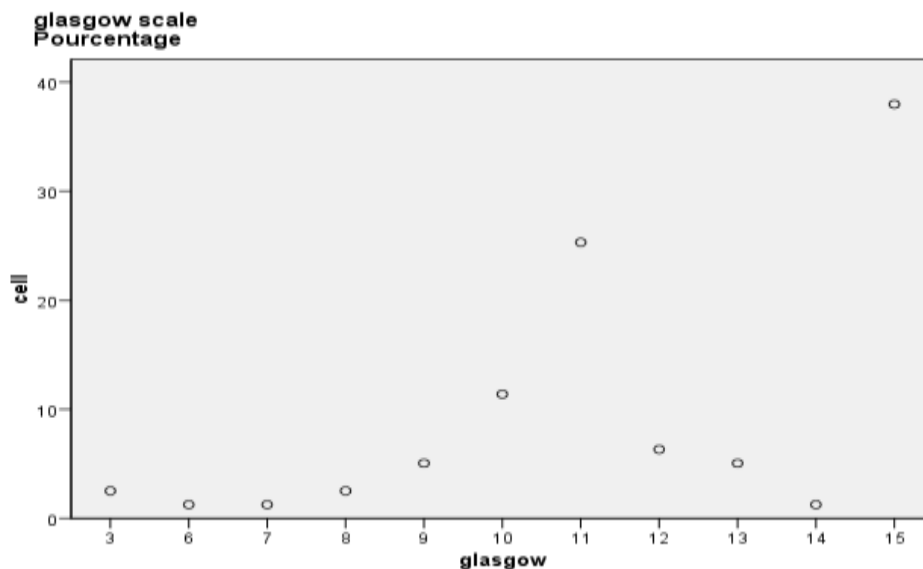Fig 4 : proportion of clinical features

Fig 5 : proportion according to Glasgow scale at the admission

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