

Association Between Different Risk Factors And Stroke At Emergency Department In Neuro Science Hospital

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ABSTRACT

Background: Stroke is an acute neurologic injury and represents the 2nd leading cause of mortality worldwide, and also the most leading cause of acquired disability and morbidity in adults.

Objective: Effect and association between stroke and risk factors.

Type of the study: A retrospective study.

Methods: The study conducted on 312 patients in 2016, all data were collected from patients' files from the emergency unit, which included basic demographic and disease characteristic, co morbid diseases, risk factors, final diagnosis.

Results: both previous stroke, ischemic heart disease was strong predictor of new stroke, and hypertension was major risk factor that associated with new stroke (odd ratio= 13.034, 2.659 and 5.684 respectively), no significant correlation between sex and stroke in the collected sample despite that female had slightly higher rate of stroke than male, patients with age above 70 years carry the highest risk to present with stroke.

Conclusion: The rate of stroke in Iraqi patients still significantly associated with advance age, two major predictor of stroke are associated with stroke previous stroke and ischemic heart disease and hypertension was the major risk factor correlated with new onset stroke, and prevention programs must be implemented on them especially hypertension since it is modifiable risk factor

Key wards: Stroke, hypertension, risk factors

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Stroke is the acute neurologic injury that occurs as a result of either brain ischemia due to thrombosis, embolism, or systemic hypoperfusion or brain hemorrhage due to intracerebral hemorrhage or subarachnoid hemorrhage, approximately 80 percent of strokes are due to ischemic cerebral infarction and 20 percent to brain hemorrhage^[1]. Stroke represents the 2nd leading cause of mortality worldwide, and also the most leading cause of acquired disability and morbidity in adults in most of the regions. Low and middle income countries represent the largest burden of stroke, which account for >85% of stroke mortality worldwide and few reliable data are available that can identify risk factors for stroke in most of these countries^[2,3]. We aimed in this study to determine the frequency of different causes for admission in our center, and determine the risk factor that associated with stroke and the correlation of vital signs with stroke.

Methods: This study was conducted in a tertiary hospital (Neuroscience Hospital/ Al-Rusafa) in which we retrospectively collected the data of 312 patients in November and December 2016 from our data records, the collected information included the demographic data, cause of admission, co-morbid disease, receiving wards, duration of arrival, fate of the patients and final diagnosis. Continuous variables presented using mean with standard deviation or median with its interquartile

range, while discrete variables presented using number and their percentage. Chi square test used for discrete variables, while independent t test or Mann Whitney U test for continuous variables, binary logistic regression analysis used to determine the risk factors or predictors of stroke and the odd ratio was diagrammatically presented using forest plot, data was analyzed using SPSS 20.0 and GraphPad Prism 7.0 software packages.

Results: Patients received in the surgical wards in the emergency room (ER) unit had a median age of 26 years, while those received in the medical wards had a median age of 56 years; male to female ratio was 2:1 and 4:1 in medical and surgical wards respectively, the majority of the patients received from Baghdad residence as illustrated in table 1. Patients with age group between 61 - 70 years represent the majority of received patients in our medical ER unit, the rest of the age group distribution illustrated in figure 1. The mortality rate was 1.19% (95%CI = 1.06 - 1.32%), about 27.0% of the patients was referred from other hospitals. Time of from insult to arrival at ER divided into: 44.4% had unknown time at presentation and 22.2% presented within 3 - 12 hours, 17.5% presented between 13 - 24 hours the rest of the data are shown in table 2. The major cause of admission was focal neurological deficit 39.7% followed by 19.0% as disturbed level of consciousness and 18.5% as seizures the rest of the

data presented in table 3. Hypertension represents the most common existing disease at presentation 38.1% followed by DM 20.6%, previous stroke 19.8% the rest are shown in figure 2. Previous stroke, ischemic heart disease, represent the major predictors that had been associated with new onset stroke at presentation to medical ER, hypertension is the major risk factor for stroke development, on the other hand higher age at presentation, elevated blood pressure and elevated pulse rate also associated with new onset stroke at presentation as illustrated in table 4 and figure 3

Table 1: demographic data

	Receiving medical wards		P value
	Medical	Surgical	
Age, median (IQR)	56 (32 - 65)	26 (3 - 45)	<0.001
Gender, n (%)			0.044
Female	84 (33.3%)	12 (20%)	
Male	168 (66.7%)	48 (80%)	
Residency, n (%)			0.928
Baghdad	236 (93.7%)	56 (93.3%)	
others	16 (6.3%)	4 (6.7%)	

IQR: interquartile range (25% to 75% percentile)

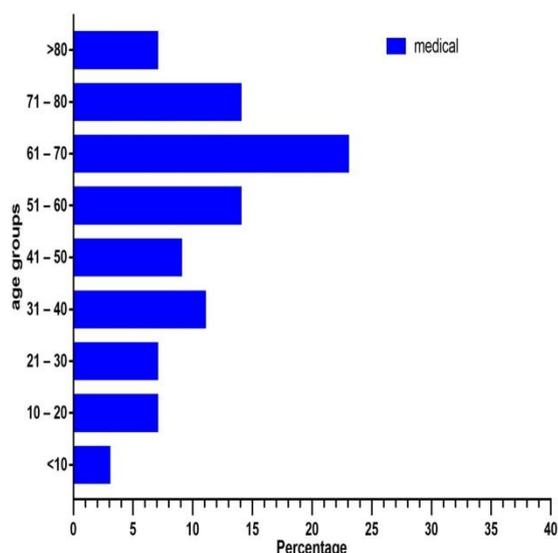


Figure 1: age groups in medical ER unit

Table 2: source of referral, duration of arrival and time at admission for the patients entering the medical ER

Source of referral	Number	(percentage)
Personal	184	(73.0%)
From other hospital	68	(27.0%)

Duration of arrival

Unknown	112	(44.4%)
< 3 hours	24	(9.5%)
3 - 12 hours	56	(22.2%)
13 - 24 hours	44	(17.5%)
25 - 72 hours	16	(6.3%)
Time of admission		
8:00 AM - 3:00 PM	188	(74.6%)
3:01 PM - 7:59 AM	64	(25.4%)

Table 3: cause of admission in patients admitted to medical wards

Initial presentation	Positive	Negative
Focal neurological deficit	100 (39.7%)	152 (60.3%)
D L O C	48 (19.0%)	204 (81.0%)
Back pain	4 (1.6%)	248 (98.4%)
Nausea and vomiting	24 (9.5%)	228 (90.5%)
F e v e r	20 (7.9%)	232 (92.1%)
S e i z u r e	44 (18.5%)	208 (82.5%)
S O B	16 (6.3%)	236 (93.7%)
Psychiatric	8 (3.2%)	244 (96.8%)

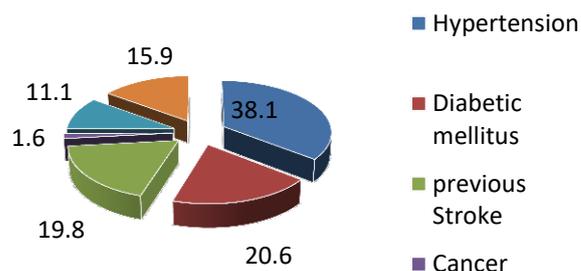


Figure 2: percentage of co morbid disease admitted in medical ward

Table 4: risk factors that correlated with stroke

Risk factors	S t r o k e		OR	95 % CI	P value
	Negative	Positive			
Hypertension	44 (28.9%)	52 (52.0%)	2.659	1.571 - 4.500	<0.001
D M	28 (18.4%)	24 (24.0%)	1.398	0.756 - 2.588	0.285
Previous stroke	8 (5.3%)	42 (42.0%)	13.034	5.768 - 29.543	<0.001
Epilepsy	24 (15.8%)	4 (4.0%)	0.222	0.075 - 0.662	0.007
I H D	8 (5.3%)	24 (24.0%)	5.684	2.437 - 13.260	<0.001
Age at presentation	39.5 ± 20.0	66.4 ± 13.1	1.106	1.076 - 1.136	<0.001
V i t a l s i g n s					
S B P	123.2 ± 23.4	139.2 ± 30.0	1.027	1.015 - 1.039	<0.001
D B P	77.9 ± 15.4	85.0 ± 13.3	1.036	1.016 - 1.057	<0.001
P R	81.6 ± 16.9	89.5 ± 16.3	1.031	1.013 - 1.049	0.001
R R	22.5 ± 15.1	21.4 ± 5.3	0.992	0.968 - 1.015	0.486
Temperature	37.1 ± 1.3	37.1 ± 0.3	1.046	0.808 - 1.355	0.734
S P O ₂	92.5 ± 13.0	94.1 ± 5.1	1.016	0.988 - 1.046	0.271

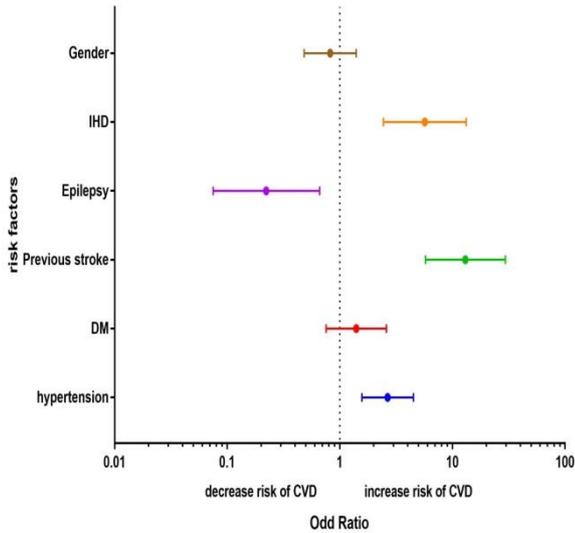


Figure 3: Forest plot of risk factors and predictors for CVD

Age group (years)	O	R	95 % CI	P value
30 - 40	0	.042	0.009-0.191	< 0.001
41 - 50	0	.050	0.011-0.232	< 0.001
51 - 60	0	.071	0.019-0.275	< 0.001
61 - 70	0	.375	0.112-1.259	0.112
71 - 80	2	.000	0.422-9.056	0.368
> 80	Reference			

Discussion: This study shows that previous stroke, hypertension and ischemic heart disease account for most of the risks for new onset stroke presented to our center (tertiary referring specialized center), our study provides essential information about the most common causes of stroke which will be the bases of larger cohort study that will follow. The results of this study show that hypertension represents one of the higher highest risk factors correlated with stroke with an odd ratio of 2.659 (95%CI: 1.571 - 4.5), this outcome is similar to others; O'Donnell *et al* [4] reported that history hypertension was the highest risk factor associated with all causes of stroke (odd ratio= 2.64, 99%CI: 2.26 - 3.08) and this accounts for 24.6% of the population attribute risk of stroke. Their findings are similar to ours, Carrera *et al* also reported a similar outcome of significant association between stroke and hypertension [5]. In addition to using the history of blood pressure as a risk factor for stroke, we included vital signs at presentation in the analysis and we found both elevated systolic and diastolic blood pressure associated with new onset stroke (despite the majority of having antihypertension medication indicating possibly improper use of their medication or non-compliance with them as a potentially source of this significant association of stroke with hypertension), this focusing on blood

pressure as a major risk factor will be reflected as a major target for intervention since it is the most amenable to change in a primary care setting and easily screening programs for prevention which need modest equipment and little specialized expertise [4]. In our study patients with age group 71 - 80 years had the highest risk for developing stroke. This risk was statistically not significant compared to more than 80 years and 61 - 70 years groups, for 50s, 40, and 30s decades the risk of stroke was significantly lower than above 60 years groups in a descending pattern. Brett *et al* [6] reported in a population based study on stroke a mean age of 69.2 years in 2005 which represents a decline in mean age compared to 1993/1994 cohort of mean 71.2 years. They found an increase in the proportion of <50 years having stroke in recent years, in our study peak stroke presented at 70s decade and no significant difference compared to 60s decade indicating we still have extreme age as a strong risk factor for new onset stroke, which can be attributed to longer duration of smoking, hypertension, obesity and other risk factors for developing stroke [6].

Concerning vital signs elevated blood pressure and pulse rate associated significantly with stroke, our findings of blood pressure can be attributed to chronic hypertension, this process in an acute setting often represents an appropriate response to maintain brain perfusion.

In our study we did not find a significant difference in the sex distribution as a risk factor for stroke (OR=0.821, 95%CI: 0.482 - 1.398), despite this non-significant difference still slightly female had a high rate of stroke 42.9% compared to male 38.1%, this is similar to previous study [7] in which the authors reported a higher risk of stroke for female, and they account for this difference to sex steroid hormones, particularly oestrogen and supported by robust sex differences in animal models of ischaemic stroke. [8] Oestradiol has very potent effects on endothelium that promote dilation and blood flow, whereas testosterone has the opposite effects. [9] Similarly, cerebrovascular reactivity is the most robust in premenopausal women, but postmenopausal women have poorer responses than age-matched men. Postmenopausal women receiving oestrogen replacement therapy have reactivity responses similar to premenopausal women. [10] In addition to vascular effects, oestrogen has anti-inflammatory effects that might be modulated by antioxidant and antiapoptosis effects. [11] All of these findings suggest that women are protected by endogenous oestrogens. As a putative neuroprotective agent, oestradiol might be the most widely studied molecule, and yet it has never been tested in patients with acute stroke. [12]

Conclusion: The rate of stroke in Iraqi patients is still significantly associated with advanced age, three major risk factors are associated with stroke: previous stroke, hypertension and ischemic heart disease, and prevention programs must be implemented on them especially hypertension since it is a modifiable risk factor.

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