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Three months outcome of a sample of stroke patients in Erbil city

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Abstract

Background and objective: Stroke is still one of the major causes of death, and the incidence and mortalities are increasing. The objective of the study is to measure the three months outcome of stroke patients discharged alive from the hospital.

Methods: A longitudinal study was carried out in Rizgary Teaching Hospital in Erbil, Iraq during the period from 1st of April, 2018 to the 30th September, 2018 involving 100 patients with ischemic stroke.

Results: The mean age (± SD) of patients was 64.15 ± 13.35 years, the age ranging from 26-89 years, and the median was 65 years. More than half (54%) of patients were males. Twenty (20%) patients died within three months after the development of stroke, 4% developed ischemic stroke after three months. Significantly higher rates of death were detected among those with chronic obstructive pulmonary disease (*P* <0.001) and those with dysphagia (*P* = 0.002). No significant association was detected between the case fatality rate with age, gender, body mass index, smoking, hypercholesterolemia, ischemic heart disease, angina, congestive heart failure, atrial fibrillation, heart valve dysfunction, strenuous physical activity, treatment for diabetes, treatment for high cholesterol, and HbA1c levels.

Conclusion: The case fatality rate was relatively high three months after the development of stroke. It is recommended to strengthen the follow up measures after patients' discharge from the hospital.

Keywords: Stroke; Erbil; Outcomes; Complications.

Introduction

Despite the fundamental changes in acute stroke management in the last decades, the stroke incidence is, and will be, increasing in developed countries in the next decades.[1-3]

Early complications in admitted stroke patients have a substantial effect on their outcome, in the acute phase, as well as in three months follow up period,[4] knowing that the three months period after stroke is suggested to be regarded as late sub-acute phase by the stroke roundtable consortium.[5] Recovery from stroke is time-dependent and most of the recovery happens early after stroke (within two weeks after stroke) and it is often non-significant after three months, particularly the motor component.[5,6]

Severity of the deficit may be related to the degree of recovery; the milder the deficit, the better the recovery, and an average recovery of those patients is about 70% (± 15%) during 3-6 moths post stroke.[7,8]

We aimed to measure the three months outcome of stroke patients discharged alive from the hospital.

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Methods

Study design:
A longitudinal study

Time of Study:
March 1, 2018 through September 30, 2021. The duration of data collection started on April 1, 2018 and ended on September 30, 2018.

Setting:
Rizgary Teaching Hospital which is the only hospital in Erbil Governorate that possessed a stroke unit at time of data collection.

Sample size and sampling method:
A convenience sample of hundred patients with ischemic stroke who visited the mentioned stroke unit during the period of this study were included. All patients were received and examined by a senior house officer of neurology and then seen and their diagnosis was confirmed by a consultant neurologist depending on American Heart Association/ American Stroke Association Expert Consensus Document. The sample included the patients with ischemic stroke who presented for the first time or with a recurrent attack. Any patient presented with similar features but did not fulfill the definition criteria of (an episode of neurological dysfunction caused by focal cerebral, spinal, or retinal infarction) were excluded.[9]

To measure stroke outcomes, the modified Rankin scale (mRS) was used. It is from grade 0 to six, where grade 0 (no symptoms) and grade six is death.[10]

Data collection:
The patients were assessed by their clinical features (including current modified Rankin Scale) and investigations were performed (non-contrast brain CT or brain MRI, blood glucose, oxygen saturation, serum electrolytes/renal function tests, complete blood count, including platelet count, markers of cardiac ischemia, prothrombin time/INR, activated partial thromboplastin time and ECG were performed for all patients and hepatic function tests, toxicology screen, pregnancy test, arterial blood gas tests, chest radiography, lumbar puncture and electroencephalogram for selected patients). The data was collected by direct interview with patients and with their relatives when required.

On follow up after three months, the results were assessed by the mRS, improvement, development of ischemic stroke, hemorrhagic stroke, myocardial infarction or death.

Ethical approval:
A verbal consent was taken from any patient or a close relative when unable to do so and the study was approved by the ethics committee of the Kurdistan Board of Medical Specialties.

Statistical analysis:
The statistical package for social Sciences (SPSS), version 25 was used for data entry and analysis. Chi square test of association was used to compare proportions and to show the significance of association. When the expected count of more than 20% of the cells of the table was less than 5, Fisher's exact test was used. Wilcoxon signed ranks test was used to compare the median of the mRS of the same patients on two time periods. A *P*-value of ≤ 0.05 was considered as statistically significant.

Results

One hundred stroke patients were included in the study. Their mean age ± SD was 64.15 ± 13.35 years, ranging from 26-89 years. The median was 65 years. More than half (54%) were males, and the male to female ratio was 1.17: 1. Twenty patients (20%) died within three months after the development of stroke, and (4%) developed ischemic stroke after three months, as presented in Figure 1.

No significant association was detected between the three months case fatality rate with the following factors: age (P = 0.111), gender (P = 0.920), body mass index (P = 0.388), and smoking (P = 0.069), as presented in Table 1.

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Table 1 Case fatality rate by the basic characteristics of the patients

	Dead		Alive		Total		
	No.	(%)	No.	(%)	No.	(%)	*P*-value
Age (years)							
< 40	0	(0.0)	4	(100.0)	4	(100.0)	
40-59	2	(8.0)	23	(92.0)	25	(100.0)	
≥ 60	18	(25.4)	53	(74.6)	71	(100.0)	0.111*
Gender							
Male	11	(20.4)	43	(79.6)	54	(100.0)	
Female	9	(19.6)	37	(80.4)	46	(100.0)	0.920
Body mass index (Kg/m^2)							
< 25	7	(23.3)	23	(76.7)	30	(100.0)	
25-29	9	(22.5)	31	(77.5)	40	(100.0)	
≥ 30	3	(10.7)	25	(89.3)	28	(100.0)	0.388
Smoking							
Non-smoker	10	(17.9)	46	(82.1)	56	(100.0)	
Current smoker	3	(11.5)	23	(88.5)	26	(100.0)	
Ex-smoker	7	(38.9)	11	(61.1)	18	(100.0)	0.069

*By Fisher's exact test. The other p values are estimated by the Chi square test.

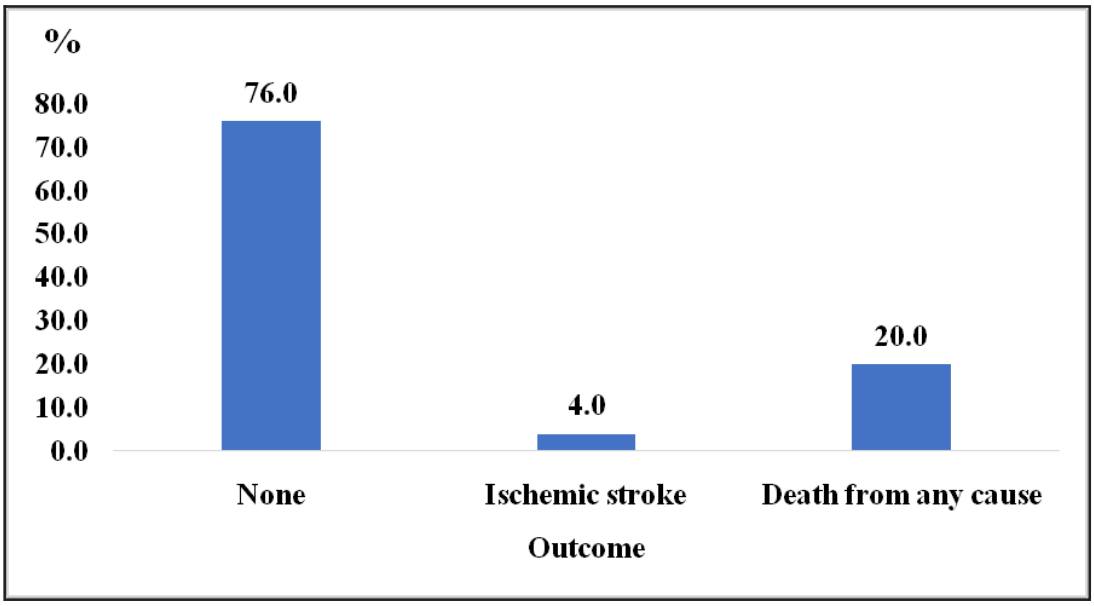

Figure 1 Three months outcome

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It is evident in Table 2 that there was no significant association between the three months case fatality rate and the following factors: hypercholesterolemia (*P* = 0.564), ischemic heart disease (*P* = 0.193), angina (*P* = 0.391), congestive heart failure (*P* = 0.080), atrial fibrillation (*P* = 0.540), heart valve dysfunction (*P* >0.999), strenuous physical activity (*P* = 0.741), treatment for diabetes (*P* = 0.920), treatment for high cholesterol (*P* = 0.275), and HbA1c levels (*P* = 0.622). The death rates among patients with dysphagia (35%) and patients with COPD (60%) were significantly higher than the death rates among patients with no dysphagia (10%) and those with no COPD (12.9%) (*P* = 0.002 and *P* <0.001 respectively) as presented in Table 2.

Table 2 Case fatality rate by the medical history of patients

	Dead		Alive		Total		
	No.	(%)	No.	(%)	No.	(%)	*P*-value
Hypercholesterolemia							
No	14	(18.7)	61	(81.3)	75	(100.0)	
Yes	6	(24.0)	19	(76.0)	25	(100.0)	0.564
Ischemic heart disease							
No	8	(15.1)	45	(84.9)	53	(100.0)	
Yes	12	(25.5)	35	(74.5)	47	(100.0)	0.193
Angina							
No	14	(18.2)	63	(81.8)	77	(100.0)	
Yes	6	(26.1)	17	(73.9)	23	(100.0)	0.391*
Congestive heart failure							
No	12	(15.8)	64	(84.2)	76	(100.0)	
Yes	8	(33.3)	16	(66.7)	24	(100.0)	0.080*
Atrial fibrillation							
No	15	(18.8)	65	(81.3)	80	(100.0)	
Yes	5	(25.0)	15	(75.0)	20	(100.0)	0.540*
Heart valve dysfunction							
No	18	(20.0)	72	(80.0)	90	(100.0)	
Yes	2	(20.0)	8	(80.0)	10	(100.0)	>0.999*
Strenuous physical activity							
No	16	(19.3)	67	(80.7)	83	(100.0)	
Yes	4	(23.5)	13	(76.5)	17	(100.0)	0.741*
Treatment for Diabetes							
No	11	(19.6)	45	(80.4)	56	(100.0)	
Yes	9	(20.5)	35	(79.5)	44	(100.0)	0.920
Treatment for high cholesterol							
No	12	(17.1)	58	(82.9)	70	(100.0)	
Yes	8	(26.7)	22	(73.3)	30	(100.0)	0.275
Dysphagia							
No	6	(10.0)	54	(90.0)	60	(100.0)	
Yes	14	(35.0)	26	(65.0)	40	(100.0)	0.002
COPD							
No	11	(12.9)	74	(87.1)	85	(100.0)	
Yes	9	(60.0)	6	(40.0)	15	(100.0)	< 0.001*
HbA1c							
< 7	7	(14.6)	41	(85.4)	48	(100.0)	
7-9	5	(17.2)	24	(82.8)	29	(100.0)	
> 9	3	(25.0)	9	(75.0)	12	(100.0)	0.622*

*By Fisher's exact test. The other p values are estimated by the Chi square test.

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The median of the modified Rankin scale was four at the start of the study, and after three months this scale decreased to three (*P* <0.001), as presented in Table 3.

Table 4 shows no significant association between HbA1c level and the modified Rankin scale, three months after the development of stroke (*P* = 0.819).

Discussion

The mean age in this study was 64.1 years; the finding is consistent with previous studies.[11,12] Males were more affected than females, a finding in line with previous studies.[13,14]

We assessed the outcome after three months, as the recovery after stroke is dependent on time, with gradual improvement to highest level until three months and there will be less significant recovery after that.[15]

In this study we assessed the complications which happened to those patients in the first three months post-ischemic stroke. We found that mortality at three months was 20%, which is higher than 10 years mortality in a European tertiary hospital (9.8-15.4%),[16] possibly because of poor health facilities and low health education and compliance of patients and relatives to treatments and physiotherapy measures as an appropriate vascular risk factor management could reduce the risk for subsequent stroke by 70–80%.[17] Nearly similar results were detected by Ismail in another study done in Erbil in 2018 (28.3% mortality in one month follow up).[18]

The risk of recurrence of ischemic stroke may reach a rate of 4.9% to 12.5% at 90 days.[19,20]

This study showed that the rate of recurrent ischemic stroke within three months after the development of stroke was 4%, this is consistent with a study which included cohorts from US, Korea and Brazil (5.3%, 3.0%, and 3.0% respectively and 4.2% in the overall study cohort),[19] but the rates found by Ismail in the same study region (Erbil) for both one and six-months post stroke were higher (16.2% and 14.3% respectively), although

Table 3 Modified Rankin scale at baseline and three months after stroke occurrence

Modified Rankin scale (n = 75)*						
At baseline			After three months			
Mean	(±SD)	Median	Mean	(±SD)	Median	*P*-value**
3.23	(±1.41)	4.0	2.75	(±1.56)	3.0	< 0.001

*Note: The deaths had been excluded. **By Wilcoxon signed ranks test.

Table 4 Modified Rankin scale (assessed after three months) by HbA1c levels

		Modified Rankin scale						
	N	0-2		3-5		6 (death)		
HbA1c%		No.	(%)	No.	(%)	No.	(%)	*P*-value
< 7	48	19	(39.6)	22	(45.8)	7	14.6)	
7-9	29	12	(41.4)	12	(41.4	5	(17.2)	0.819*
> 9	12	3	(25.0)	6	(50.0)	3	(25.0)	
Total	89**	34	(38.2)	40	(44.9)	15	(16.9)	

*By Fisher's exact test. **There are 11 missing data of HbA1c.

he did not measure it for three months post stroke.[18]

The occurrence of dysphagia among our patients was 20%, which is consistent with many studies that found rates of 23%-50%.[21,22] We found dysphagia as an important risk factor for death of our patients possibly because of secondary development of aspiration, malnutrition and pneumonia and this is in line with other studies.[23-25]

Similar to others studies, ours showed increased mortality among stroke patients who had COPD, this is due to multiple factors; COPD worsens the dysphagia, aspiration and chest infection which are more prevalent in stroke patients; higher risks of comorbidities among COPD patients; the hypoxemic and hypercapnic association with severe COPD leading to higher susceptibility to brain injury and hence risk of death.[26,27]

Improvement of modified Rankin scale means decrement in level from score 5 (severe disability; bedridden, incontinent, and requiring constant nursing care and attention) to score 0 (no symptoms). In our study there was improvement of the scale from 3.23 (at baseline) to 2.75 (after 3 months) which is consistent with another study,[28] but the reason of the improvement is not identified whether it is good rehabilitation services by patients' families, good discharge management plans or other factors that contribute and this is a subject for further evaluation by larger sample studies to predict favorable and unfavorable results after three months or later periods after discharge.[29]

Although there was association between HbA1c level and modified Rankin scale after 3 months, but this association was not statistically significant possibly due to small sample size, while in DUST study which included 812 patients, the association was significant.[30]

Conclusion

The case fatality rate was relatively high three months after the development of stroke. It is recommended to strengthen the follow up measures after patients' discharge from the hospital.

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Not applicable.

Competing interests

The authors declare that they have no competing interests.

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