Case fatality rate in one month duration for first ever stroke in Tikrit teaching hospital

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Abstract

Background: Stroke is one of the leading causes of death in the world. Knowledge about predictors of early fatality is essential for optimizing stroke survival strategies. Studies on predictors of survival within the first week after stroke are few and address only some of the potential factors associated with early fatality.

Aim: To identify the mortality rate for stroke, its types and to determine predictors of one-month mortality.

Patients and Methods:

Descriptive (case series) study was conducted in the Tikrit Teaching Hospital for (140) patients who had no history of stroke previously from 1st august 2010 ---1st august 2011 included in this study. Stroke caused by trauma, epidural, subdural hematoma were excluded from the study as well as patients who had vasculitis, tumors and coagulopathy. CT scan of brain was performed routinely for every patient within 72hours of admission to determine type of stroke. Twenty five patients send for MRI of brain.

Results: A total of 140 persons (90 male and 50 female) with first ever stroke, ischemic stroke was represent (68%), and hemorrhagic type was (32%). The mean age of patients was 64±5 years. Regarding risk factors were analyzed according to type of stroke, in ischemic, the hypertension (68.4%) was commonest risk factor for stroke followed by diabetes mellitus (63.1%), whereas for hemorrhagic type, the hypertension still remained the commonest risk factor (77.7%) followed by smoking (44.44%). hemorrhagic stroke associated with severe GCS on admission $\leq$ 8 occurs in (73.3%), while in ischemic type (10.5%). one-month mortality was 23.1% for all stroke patients, and the majority were patients with hemorrhagic stroke (33.3%), while ischemic stroke (15.7%).

Conclusions: Hypertension was the commonest risk factor for both type of stroke in-hospital mortality rate of stroke in Tikrit Teaching Hospital was relatively similar compared to other studies. The independent risk factors were hemorrhagic stroke and Glasgow coma scale $\leq$ 8 on admission.

Key wards Ischemic stroke, hemorrhagic stroke, mortality rate.

Introduction

Stroke is one of the leading causes of death in the world. The annual incidence of stroke in the community is about 2 per 1000 population. In the United States, stroke is currently the third leading cause of death after heart disease and cancer.[1] In 1990, the World Health Organization estimated that 2.1 million people died of stroke in Asia [2].

The approach to stroke has changed. From being rather conservative, the attitude to treatment is now very active. As a result, treatment in the very acute state has come into focus. Risk of death is high

in the first weeks [3] and treatment aimed at ensuring survival in this critical period has high priority. Knowledge about predictors of early fatality is essential for optimizing stroke survival strategies.

Studies on predictors of survival within the first week after stroke are few and address only some of the potential factors associated with early fatality.[4] A larger evidence base exists on the predictors of 30-day case-fatality but with inconsistent results and with few studies based on large populations.[5-9]. Death within the first month after a stroke is mainly caused by the index stroke, whereas deaths occurring later are mainly caused by other diseases, including recurrent stroke, cardiovascular events, complications of immobility, etc [7].

Aim: To identify the mortality rate for stroke and its types, the incidence of major risk factors for stroke, and to determine predictors of one-month mortality.

Patients and Methods

Descriptive (case series) study was conducted in the Tikrit Teaching Hospital for (140) patients who had no history of stroke previously from 1st aug. 2010 ---1st aug. 2011 included in this study. Acute stroke was defined as "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin", according to the World Health organization criteria. Stroke caused by trauma, epidural, subdural hematoma were excluded from the study as well as patients who had vasculitis, tumors and coagulopathy.

Sociodemographic data and medical history were obtained from patients and/ or relatives collected via a questionnaire containing age, sex, and race; known risk factors such as history of hypertension, diabetes mellitus, hypercholesterolemia, transient ischemic attack, smoking, ischemic heart disease, atrial fibrillation, type and time of stroke onset, and length of stay. Neurological examination has been done for all patients when they admission to the hospital including: blood pressure, Glasgow coma scale, motor and sensory deficit and follow-up of patients in the hospital.

Baseline investigations included a full blood count, renal profile, random blood glucose, erythrocyte sedimentation rate, electrocardiography and lipid profile performed for all patients, CT scan of brain was performed routinely for every patient within 72hours of admission to determine type of stroke. Twenty five patients send for MRI of brain.

STATISTICAL ANALYSIS:

All data were entered and analyzed using SPSS. All comparisons of age distribution, risk factors between ischemic and hemorrhagic stroke, and GCS were analyzed using the Chi-square test. Comparisons of GCS, blood glucose, and systolic and diastolic blood pressure on admission between ischemic and hemorrhagic stroke were analyzed using t test. Results were considered to be statistically significant at the level of $p<0.05$.

Results

During the 12 – months period of this study, registered a total of 140 persons (90 male and 50 female) with first ever stroke, ischemic stroke was represent (68%), and hemorrhagic type was (32%) fig(1). The mean age of patients was 64±5 years, the higher incidence for ischemic stroke which represent (38.95%) of patients were between 60-70 years of aged group, while (42.22%) of patients were aged between 50-60 years for hemorrhagic with a significant p value < 0.05 that correlated with type of stroke as in table (1).

Regarding risk factors were analyzed according to type of stroke, in ischemic, the hypertension (68.4%) was commonest risk factor for stroke followed by diabetes mellitus (63.1%), hyperlipidemia (47.3%), IHD (31.5%) , whereas for hemorrhagic type, the hypertension still remained the commonest risk factor (77.7%) followed by smoking (44.44%), diabetes mellitus (26.6%), hyperlipedimia (17.7%), with significant P value < 0.05. in this study there were no significant difference in the occurrence of TIA , and AF in both types of stroke P value < 0.132 and 0.23 respectively, in spite of both of them more common in ischemic than hemorrhagic type table (2).

The severity of Glasgow coma scale on admission correlated with type of stroke patients, in hemorrhagic type, severe GCS ≤ 8 occurs in (73.3%) , while in ischemic type (10.5%), moderate GCS ≤ 12 more common in ischemic stroke (58%) than hemorrhagic stroke ≤ (17.7%), and the mild GCS≥ 13 in ischemic type (31.5%), whereas in hemorrhagic stroke (9%) respectively with significant P value ≤ 0.05 table (3).

On admission, hemorrhagic stroke patients had a lower Glasgow coma score, , higher systolic and diastolic blood pressure, lower blood glucose level compared to ischemic stroke patients with P value significant for GCS and non-significant for other parameters as show in table (4).

In this study, one-month mortality was 23.1% for all stroke patients, and the majority were patients with hemorrhagic stroke (33.3%), while ischemic stroke (15.7%) as show in figure (2).

Discussion

Stroke will continue to exert a great impact on the health system because of the high costs in treatment and rehabilitation of stroke patients, therefore risk factor identification and modification are important strategies in stroke prevention [10]. In the present study, ischemic stroke constituted 68% and hemorrhagic stroke 32% of all patients studied, this composition is broadly similar to most studies conducted in this part of the world[11,12].

The mean age of patients was 64±5 years, this figure is comparable to Malaysian studies, where the mean age was 61.8 years by [13], and 65 year in (Penang)[14]. Studies particularly from the West reported older mean age, for example, the mean age for the Austin Hospital, Melbourne was 70.4 year.[13]. The lower mean age of stroke for the Iraqi patients probably reflects the younger age of the Iraqi population overall and psychological factors.

In this study the higher incidence for ischemic stroke was between 60-70 years of aged group, while for hemorrhagic type was aged between 50-60 years ,which differs from(Colombo et al) [15] showed that the majority of hemorrhagic strokes occurred between 61-70 years of age while ischemic strokes between 71-80 years.

Hypertension was the commonest risk factor identified overall and for both types of stroke, (68.4%) and (77.7%) for ischemic and hemorrhagic stroke respectively. Studies conducted in (Turkey)[16], (France)[17], (Ireland)[18] and (India)[19] showed similar results.

Diabetes mellitus ranked second, but only for ischemic stroke, as expected, which represent (63.1%), while smoking (44.44%) was the second risk factor for hemorrhagic stroke. In contrast smoking was found to be the major stroke risk factor, followed by hypertension and hyperlipidaemia in a study conducted by (Bak et al) in (Denmark)[20]. The finding in the present study that diabetes mellitus, ischemic heart disease and hyperlipidaemia are risk factors favoring ischemic rather than hemorrhagic stroke this is similar to

study conducted by(Jorgensen et al)[21].

In this study, one-month mortality was 23.1% for all stroke patients, and the majority were patients with hemorrhagic stroke (33.3%), while ischemic stroke (15.7%), this finding was slightly difference from study in (Malaysian)[22], that represent, the overall one-month stroke mortality was (20.3%). The one-month mortality rate was higher in patients with hemorrhagic stroke (46.8%) than ischemic stroke (11.4%).The Ege Stroke Registry[16] reported an overall 30-day mortality rate of 19.7%, also with a higher mortality rate in hemorrhagic (29%) compared to ischemic stroke (17%). The 28-day case fatality rate for all strokes in the Perth Community Stroke Study was (24%)[23] while the Oxfordshire Community Stroke Project)[24] reported an overall 30-day case fatality rate of (19%), cerebral infarction case fatality rate of (10%) and intracerebral hemorrhage case fatality rate of(50%). (Jaya et al)[25] who reported one-month mortality of 34%, was relatively high compared to this study.

In the (WHO MONICA Project)[26] involving 16 European and two Asian centers from 1985 to 1987, the incidence of stroke was, in general, higher among populations in Eastern than in Western Europe. It was also relatively high in the Chinese population studied, particularly among women. The case-fatality rates at 28 days varied from 15% to 49% among men and from 18% to 57% among women.

GCS of ≤8 and hemorrhagic stroke were identified as independent risk factors for stroke mortality in this study, while others characteristics such as systolic blood pressure ≥160, diastolic blood pressure ≥100 and random blood glucose ≥8 mmol/l on admission were not predictors of death, this was agreement with(Malaysian) [22]. Coma at stroke onset also was shown to be an independent predictor of mortality by (Terent and Anderssen)[27],(Benedetti *et al*) [28] and (Chambers *et al*) [29].

The poorer prognosis in hemorrhagic than ischemic stroke is probably due to the lower GCS at presentation, more rapid deterioration and the greater frequency of complete paralysis at presentation. A greater number of patients with hemorrhagic (33.3%), than (15.7%) ischemic stroke died.

Conclusion

Hypertension was the commonest risk factor for in-hospital mortality rate of both type of stroke in Tikrit Teaching Hospital was relatively similar compared to other studies. The independent risk factors were hemorrhagic stroke and GCS ≤ 8 on admission. The limitation of this study was that the assessment was done merely during the in-patient period and hence the mortality after discharge was not included in the analysis.

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Table (1) Age distribution of ischemic and hemorrhagic stroke.

Age/years	Ischemic N=95	Hemorrhagic N=45	P value
30-39	5 (5.26%)	5 (11.11%)	$X^2 = 21.86$ P<0.05
40-49	4 (4.2%)	8 (17.77%)	
50-59	20 (21.05%)	19 (42.22%)	
60-69	37 (38.95%)	7 (22.22%)	
70-	29 (30.52%)	6 (13.33%)	
Total	95(68%)	45(32%)	

Table (2) Risk factors in ischemic and hemorrhagic stroke.

Risk factors	Ischemic N=95	Hemorrhagic N=45	P value
Hypertension	55(68.4%)	35(77.7%)	$^*X^2$=5.25 P< 0.02 sig.
Diabetes M.	60(63.1%)	12(26.6%)	X^2=16.27 P < 0.00 sig.
Hyperlipidaemia	45(47.3%)	8(17.7%)	X^2=11.36 P< 0.001sig.
Smoking	50(52.6%)	20(44.44%)	X^2=0.818 P< 0.36 NS
IHD	30(31.5%)	5(11.11%)	X^2=6.82 P <0.009sig.
TIA	15(15.7%)	3(6.6%)	X^2=2.268 P< 0.132NS
AF	10(10.5%)	2 (4.4%)	X^2=1.44 P< 0.23 NS

$^*X^2$ = chi square test

Table (3) Glasgow coma scale in stroke patients on admission.

Glasgow coma scale	Ischemic N=95	Hemorrhagic N=45	P value
13-15	30 (31.5%)	4 (9%)	$X^2 = 56.61$ P<0.05
9-12	55 (58%)	8 (17.7%)	
3-8	10 (10.5%)	33 (73.3%)	
Total	95	45	

Table (4) features of ischemic and hemorrhagic stroke

Characters	Ischemic N=95	Hemorrhagic N=45	P value
GCS on admission	11+_ 3	8+_2	T=0.36 P<0.05 Sig.
Systolic BP	165+_50	180+_50	T=2.24 P >0.05 NS
Diastolic BP	100+_32	110+_32	T=1.02 p>0.05 NS
Blood glucose	8.2+_4.5	7.3+_3.3	T=1.34 p>0.05 NS

Figure (1) show the percentage of stroke.

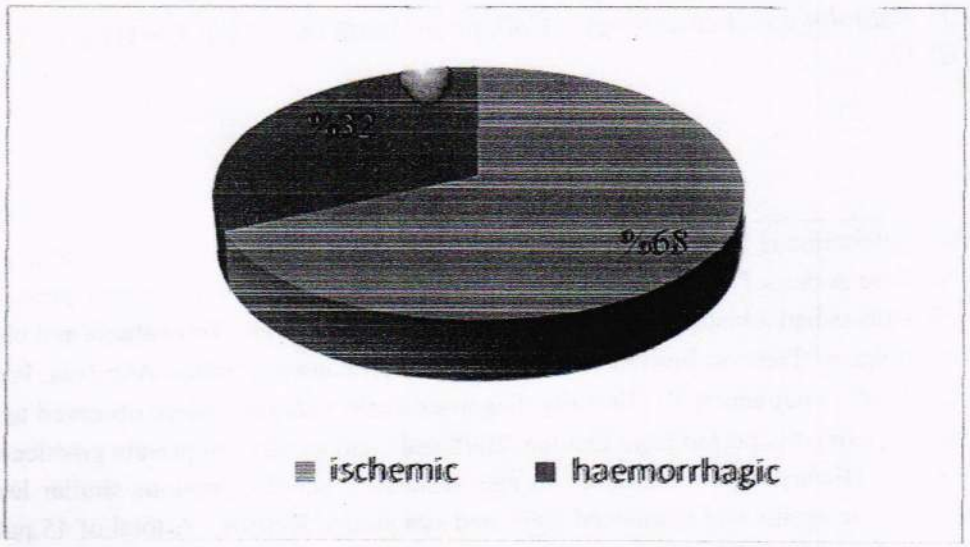

Figure (2) death percent according to type of stroke