

ORIGINAL RESEARCH

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Validity and prognostic value of serum albumin level in emergency acute ischemic stroke egyptian patients**Adel Hamed Elbaih, Islam M Elshaboury, Rasha M Ahmed, Monira A Abd Allah***Suez Canal University, Faculty of Medicine Department of Emergency Medicine, Egypt*

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Abstract

There are two main types of stroke: ischemic and hemorrhagic. Some studies showed the favorable relationship of serum albumin levels on the outcome of patients who suffer from ischemic stroke (IS). Some experimental studies have suggested a neuroprotective effect of albumin either by reducing brain edema or by its antioxidative or antiapoptotic effects. To detect serum albumin level and evaluate its prognostic value in patients with acute ischemic stroke in emergency department in compared to Scandinavian Stroke Scale (SSS). The study was carried out as descriptive (cross-sectional) study conducted on 60 patients with ischemic stroke attending emergency department in Suez Canal University hospital. It was found that all of died patients (100%) had hypoalbuminemia. While (92.5%) of patients who discharged from hospital had normal serum albumin level in follow up. but (7.5%) of them had hypoalbuminemia. And the ROC curve of both SSS and Serum albumin level on admission had Sensitivity: 100% and Specificity: 83% among studied patients. Thus serum albumin level has a direct correlation with short term prognosis of acute ischemic stroke patients. Patients with a lower SSS on admission and had higher levels of serum albumin had good short-term prognosis, and those with a high SSS and had a lower level of albumin had bad prognosis. higher levels of serum albumin is associated with a better short term prognosis. So they may act as indicators of short term prognosis.

Keywords: Ischemic stroke IS, scandinavian stroke scale (SSS), serum albumin, outcome**Introduction**

A stroke or cerebrovascular insult is known as acute onset of a neurologic deficit that is due to a local vascular cause. The definition of stroke is clinical and neuroimaging of the brain are used to confirm the diagnosis [1].

There are two main types of stroke: ischemic due to decrease of blood supply to brain and hemorrhagic due to bleeding. This result in part of the brain does not work properly. Stroke Signs and symptoms may include motor and sensory deficits of one side of the body, confusion, dysarthria, vertigo, or loss of vision. Hemorrhagic strokes as well can be associated with a severe headache [2].

This signs and symptoms might appear early after the stroke has occurred. If symptoms last less than one or two hours it is known as a transient ischemic attack (TIA). (5) Diagnosis is clinically and confirmed by computerized axial tomography (CT) or magnetic resonance imaging (MRI) commonly [3].

In 2013, after coronary artery disease stroke was considered to be

the second most frequent cause of death worldwide, representing about 6.4 million deaths (12% of the total). About 17 million people had a stroke in 2010 and 33 million people have previously had a stroke and were still alive. Between 1990 and 2010 the number of strokes decreased by approximately 10% in the developed world and increased by 10% in the developing world [3].

An ischemic stroke, if diagnosed in about three to four and half hours, could be treatable with a medication which can break down the clot. Aspirin should be used. Stroke rehabilitation is the treatment which try recover lost function and ideally occurs in a stroke unit; however, these units are not available in many countries of the world [4].

The stroke severity on neurologic examination is typically the most important factor that affect short- and long-term outcome [5].

The Scandinavian Stroke Scale (Table 1) assesses the function of nine neurological states by using a scale of 0-6, where 0 represents severe malfunction and 6 represents full functionality. The scale's minimum score is '0' and the maximum '58'. The nine of the score items include: the Consciousness level, Movement of the eye, Motor power of arm, hand, leg (each assessed only on the affected side), Orientation, Speech, Facial palsy and Gait). Total scores can be used to stratify patients into four categories of stroke severity (Table 2) [6].

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Table 1. Scandinavian stroke scale [6].

Patient Name: _____

STROKE Rater Name: _____

SCALE Date: _____

Function	Score	Prognostic Score	Long Term Score
Consciousness:			
-fully conscious	6	_____	
-somnolent, can be awaked to full consciousness	4		
-reacts to verbal command, but is not fully conscious	2		
Eye movement:			
-no gaze palsy	4	_____	
-gaze palsy present	2		
-conjugate eye deviation	0		
Arm, motor power *:			
-raises arm with normal strength	6	_____	_____
-raises arm with reduced strength	5		
-raises arm with flexion in elbow	4		
-can move, but not against gravity	2		
-paralysis	0		
Hand, motor power *:			
-normal strength	6		_____
-reduced strength in full range	4		
-some movement, fingertips do not reach palm	2		
-paralysis	0		
Leg, motor power *:			
-normal strength	6	_____	_____
-raises straight leg with reduced strength	5		
-raises leg with flexion of knee	4		
-can move, but not against gravity	2		
-paralysis	0		
Orientation:			
-correct for time, place and person	6		_____
-two of these	4		
-one of these	2		
-completely disorientated	0		
Speech:			
-no aphasia	10		_____
-limited vocabulary or incoherent speech	6		
-more than yes/no, but not longer sentences	3		
-only yes/no or less	0		
Facial palsy:			
-none/dubious	2		_____
-present	0		
Gait:			
-walks 5 m without aids	12		_____
-walks with aids	9		
-walks with help of another person	6		
-sits without support	3		
-bedridden/wheelchair	0		
Maximal Score	_____	22	48

Table 2. Scandinavian Stroke Score (SSS) Category [6].

SSS score	category
0-18	Very severe stroke
19-32	Severe stroke
33-44	Moderate stroke
45-58	Mild stroke

Materials and Methods

Study design

This was a cross sectional descriptive study carried out to all patients with acute ischemic stroke attending to the Emergency Department (ED) at Suez Canal University Hospital.

Sample size

The sample size was calculated using the following formula: [8].

$$N = [(Z\alpha + Z\beta)/C]^2 + 3$$

Where:

N= sample size

$Z\alpha/2 = 1.96$ (The critical value that divides the central 95% of the Z distribution from the 5% in the tail)

$Z\beta = 0.84$ (The critical value that separates the lower 20% of the Z distribution from the upper 80%)

σ = the estimate of the standard deviation = 0.56

$$C = 0.5 * \ln [(1+r)/(1-r)] = 0.4902$$

R= 0.14 (correlation coefficient between serum albumin and Scandinavian Stroke Score) [6].

Dropout Percentage is 10%. So, by calculation, the sample size was equal to 60 cases.

Inclusion criteria

- Patients over 18 years of age with ischemic stroke diagnosed by CT, MRI or clinically
- Patients diagnosed as having acute ischemic cerebrovascular stroke within 72 hours.
- Both sexes.

Exclusion criteria

- Patients known to have hypoalbuminemia as (chronic liver disease, nephrotic syndrome, malnutrition, chronic heart failure.)
- Patients presenting with other type of stroke (hemorrhagic stroke)

Primary objectives

- 1- To study socio-demographic data and clinical pictures of ischemic stroke in patients attending emergency department.
2. To evaluate the serum albumin level in Patients with acute ischemic stroke at emergency room.
3. To evaluate the short term prognostic value of serum albumin as regards of outcome of patients with acute ischemic stroke.

Research Question

What is the level of serum albumin in patients with acute ischemic stroke and is it has a prognostic value in Emergency Department in Suez Canal University Hospitals?

Data collection

Method

Patients admitted to the Emergency Department of the University Hospital of Suez Canal (Ismailia, Egypt) with acute ischemic stroke and prospectively screened for inclusion in the study. Vital signs, clinical history, physical examination and albumin level was obtained in the Hospital Emergency Department.

Data collected in pre-organized data sheet by the researcher from patients fulfilling inclusion and exclusion criteria. The Patients clinically assessed and managed according to the ABC protocol, after stabilizing the patient, the following questionnaire filled by the researcher of the patient diagnosed as acute ischemic stroke by the medical team in details.

Questionnaire contain the following data

1- Full history (from patient or relatives):

Socio-demographic data: Patient's file number and Patient personal data e.g.: Age

Medical History data:

Complain and Present history (headache, vomiting, motor weakness, unconsciousness, dysarthria, vertigo, tingling, diplopia, convulsions)

- Chronic illness (hepatic disease, cardiac disease, hypertension, diabetes, renal or malignancies)
- Past history of cerebrovascular stroke.

2- Clinical examination:

- Vital signs: pulse, blood pressure, respiratory rate, Temperature
- Initial assessment of ABCDE (airway, breathing, circulation, dysfunction of central nervous system, Glasgow Coma Scale (GCS) and exposure)

- Local examination complete neurological examination

3- Investigations:

Investigations including CBC, ECG, fasting sugar, renal function test, liver function test, serum albumin, C.T or M.R.I. Scan examination.

- Serum albumin level will be measured to the patients on admission at ER department and then measured within 28 days in follow up.
- The Scandinavian Stroke Scale (SSS) score of the patients to assess severity of stroke at admission (baseline) and follow up within 28 days. (Table 1, Table 2). [6]

4- Outcome at Emergency Room: outcome of the patient will be recorded whether:

- 1-discharged on outpatient.
- 2-Admitted to inpatient under observation.
- 3-Admitted to intensive care unit.
- 4-Transferred.
- 5-Died at emergency room.

Data analysis

- Data were collected and presented in order of percentages and tabulated in tables and graphs.
- Data has been analyzed using SPSS (Statistical Package for Social Science) software program version 14.
- Continuous data as age has been described as mean and standard deviation.
- The significance was considered statistically significant if (p value is 0.05) and insignificant if (p value more than 0.05).

Ethical considerations:

1. An agreement will be taken from the head of the department.
2. All the parents of the participants will be informed a brief explanation of this study.
3. The study procedures will not affect the treatment modality the patient is intended to be given by anyway.

Results

This descriptive study (cross- sectional) was conducted to evaluate the serum albumin level and its prognostic value in patient with acute ischemic stroke.

This study was conducted on 60 patients diagnosed to have acute ischemic stroke measuring of serum albumin level and application of Scandinavian stroke scale to evaluate their prognosis in Emergency room and follow up of their outcome at Suez Canal University Hospital. The data was collected from June 2016 to January 2017.

Our study in Table (3) showed that the age of the studied patients ranged from 40-85 years old with majority of them between 55-64 years (30%) while the minority (10%) was between (40-44) years old and the mean age (60±13). And the studied patients the majority of them was females (58.30%) and male sex was (41.70%).

Table 3. Age distribution among the studied patients

Age	Number	Percent
40-44	6	10%
45-54	15	25%
55-64	18	30%
65-74	12	20%
75-84	9	15%
Mean ± SD	60 ± 13	
Range	44(40-84)	

Our study in Figure (1) Showed that the majority of patients have hypertension and Diabetes mellitus (55%) while (45%) of them are non-hypertensive and non-diabetic .It was found that (35%) of patients have past history of old CVS and (65%) of them aren't known to have any past history of CVS, (30%)(18) of them have AF and (25%) have Ischemic heart disease (IHD)(16).

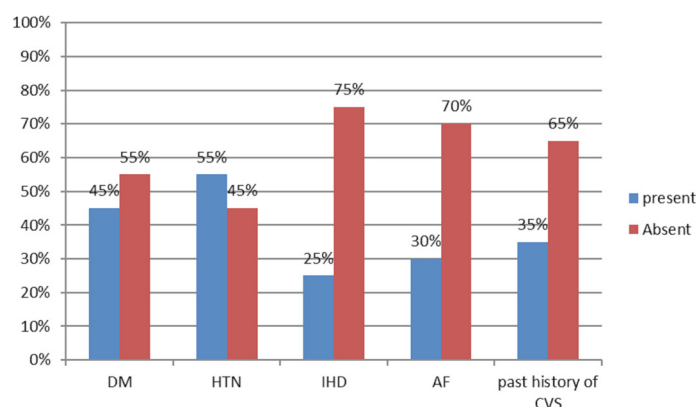


Figure 1. Chronic illnesses among studied patients

The symptoms in studied patients were the majority of patients (60%) had weakness, (55%) of them had weakness on both upper and lower limbs, (91.6%) of the weakness was on the same side of body. It was found that the majority of patients (45%) had dysarthria and disturbed level of consciousness (45%). With vital signs of the studied patients founded that the pulse was in (65%) within normal range and tachycardia in (35%) of the studied group with range (68-150 bpm).(90%) of patients were had normal respiratory rate and (60) were norm thermic.

Our work revealed that (95%) of patients had patent airways, (9%) had normal breathing, and (100%) had normal circulation. Glasgow coma scale (GCS) was between (13-15) in the majority of patients (85%), (10%) had GCS between (9-12) and only (5%) had GCS less than 8.

Our study revealed that most of patients (65%) were norm-glycemic and (35%) of patients were hyperglycemic. It also shows that (50%) of patients had normal level of albumin (3.5-5gm/dl) and (50%) of them had hypoalbuminemia (less than 3.5gm/dl).

And also the majority of patients (50%) had normal ECG. It was found that (33.3%) of Patient had arrhythmia in ECG and (16.7%) of them had Ischemic changes (IHD) in ECG.

Our study in Table (4) showed that the majority of patients (30%) had middle cerebral artery occlusion (MCA) while (5%) had brain stem infarction on admission.

Table 4. CT Brain findings at admission among studied patients

	On admission	
	Number	Percent
Normal	12	20%
Middle cerebral artery occlusion	18	30%%
Cerebellar infarction	6	10%
Lacunar infarction	3	5%
Basal ganglia infarction	6	10%
Old cerebellar infarction	6	10%
Old Middle cerebral artery occlusion	6	10%
Brain stem infarction	3	5%

While in follow up our study revealed that (10%) of patients developed MCA occlusion .It was found that (10%) developed lacunar infarction.

Scandinavian stroke Scale (SSS) in studied patients. It showed that (35%) of patient were suffering from Disturbed level of consciousness, (15%) had gaze palsy of eye, (10%) had conjugate eye deviation. It else shows that (30%) of patients had raised arm with reduced strength, (20%) raised hand with flexion in elbow, (5%) can move arm but not against gravity, 3% had paralysis. It else shows (15%) had some movement of hand finger tips not reach hand. it was found that (25%) Raise straight leg with reduced strength, (25%) Raise straight leg with flexion of knee, (5%) Can move but not against gravity, (5%) Paralysis. It else shows (5%) of patients were completely disoriented. It else shows that (25%) of patients had incoherent speech, (20%) can say more than yes/no, but no longer sentences. It was found that the majority of patients

(20%) had Facial palsy. It else shows that (20%) of patients can walks with aids ,(10%) can walks with help of another person, (10%) can sit without support and (15%) of them was bedridden.

Our study revealed that the majority of patients (55%) (N: 33) had mild stroke with SSS between (45-58), (40%) (N: 24) had moderate stroke SSS between (33-44).It was found that the minority of patients (5%) (N: 3) had sever stroke with SSS between (19-32) and in Table (5) showed that (95%) (N: 57) had prognostic score of SSS (>22) with good prognosis while (5%) (N: 3) had prognostic score (<=22) with poor prognosis.

Table 5. Show the Prognosis among studied patients using Prognostic value of SSS

Prognostic score points of (0-58)	Number of patients (N)	Percentage (%)
≤ 22	3	5%
> 22	57	95%

Our study revealed that (73.3%) (N: 44) of patients had normal albumin level and (26.7%) (N: 16%) had hypoalbuminemia as in Table (6).

Table 6. Shows level of initial serum albumin among studied population

Initial Serum albumin level (g/dl)	Number of Patients (N)	Percentage (%)
Normal albumin level (3.5-5gm/dl)	44	73.3%
Hypoalbuminemia (less than 3.5gm/dl)	16	26.7%

Table (7) showed that total number of patients (N: 57) who had prognostic score of SSS (>22) and good prognosis (N 44) of them had normal albumin level while (N: 13) had hypoalbuminemia. It was else found that (N: 3) of patients had prognostic score of SSS (<=22) with poor prognosis had hypoalbuminemia.

Table 7. Shows the comparison between initial serum albumin and SSS as prognostic score among studied patients

Prognostic value of SSS (0-58)	Initial serum albumin		Total
	Hypoalbuminemia	Normal albumin	
less than 22 (poor prognosis)	0	3	3
More than 22 (good prognosis)	44	13	57
Total	44	16	60

Our study revealed that all patients (78%.6%) who had mild stroke admitted at inpatients ward while (21.4%) of patients who had moderate stroke admitted at inpatient ward .It shows else and (50%) of patients admitted in ICU had moderate stroke while and (50%) of them had sever stroke. While the majority of patients had mild and moderate stroke and admitted at inpatient ward. The majority of patients (90%) were admitted at inpatient ward and the minority of them (10%) were admitted in intensive care unit (ICU).

Our study in Table (8) showed that on admission the majority of patients (100%) (N: 33) with normal albumin level had mild stroke. It else shows that (54.1%) (N: 13) of patients with hypoalbuminemia had moderate stroke while (45.9%) of them had mild stroke. It was found that all patients (100%) (N: 3) who had sever stroke had hypoalbuminemia.

Table 8. Shows the Relation between initial serum albumin and Scandinavian Stroke Scale (SSS)

SSS categories	Initial Serum albumin (gm/dl)			
	Less than 3.5 (n:16)		3.5 – 5 (n:44)	
	number	Percent	number	Percent
Mild(33) (45-58)	0	0%	33	100%
Mild(33) (45-58)	13	54.1%	11	45.9%
Sever(3) (19-32)	3	100%	0	0%
Mean +- SD	3.1+ _ (.3)		3.9+-(.4)	
Test of Significance	P=0.001*			

*Statistically significant (p-value < 0.05)

Our study revealed that the majority of patients with normal albumin level (3.5-5g/dl) on admission was (N 44)(81.5%) and all of them (100%)were survived and discharged .While 16 Patients had hypoalbuminemia (less than 3.5gm/dl) (N 10)(18.5%) was survived . It was found that (N 6) (100%) of died patients had hypoalbuminemia. While (92.5%) of patients who discharged from hospital had normal serum albumin level in follow up. but (7.5%) of them had hypoalbuminemia.

Our study in Figure (2) showed that on follow up of patients (86.6%) were discharged on outpatient treatment (55%) of them had mild stroke and (31.60%) had moderate stroke. It was found that (13.4%) of patients died, (8.40%) of them was suffering from moderate stroke and (5%) had sever stroke.

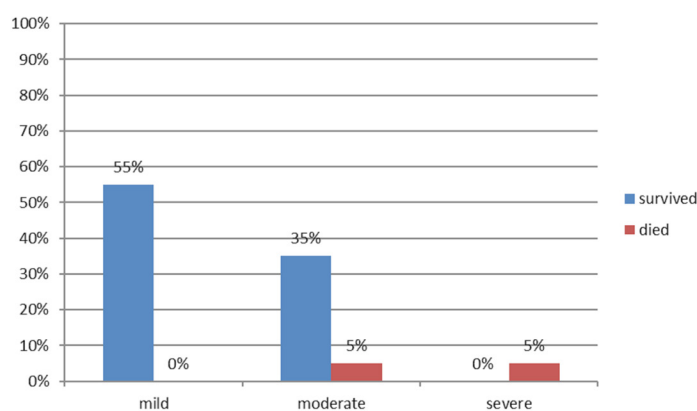


Figure 2. The relation between SSS and outcome of studied patients

Our study in Figure (3) showed the ROC curve of Serum albumin level on admission among studied patients which revealed that Sensitivity: 100% and Specificity: 83% with Cut of value: 3 of serum albumin while Figure (4) showed that ROC curve of Scandinavian Stroke Scale on admission among studied patients which revealed that Sensitivity: 100% and Specificity: 83% with Cut of value: 26 SSS.

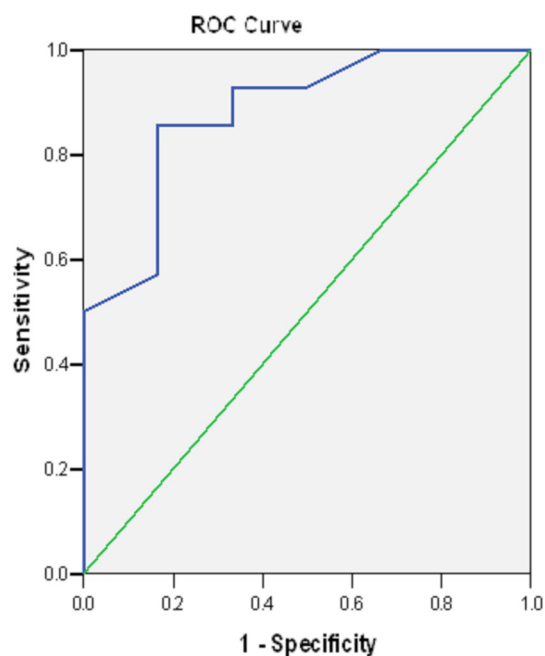


Figure 3. ROC curve of Serum albumin level on admission among studied patients

Area under the curve: 0.8
Sensitivity: 100%
Specificity: 83%
Cut of value: 3

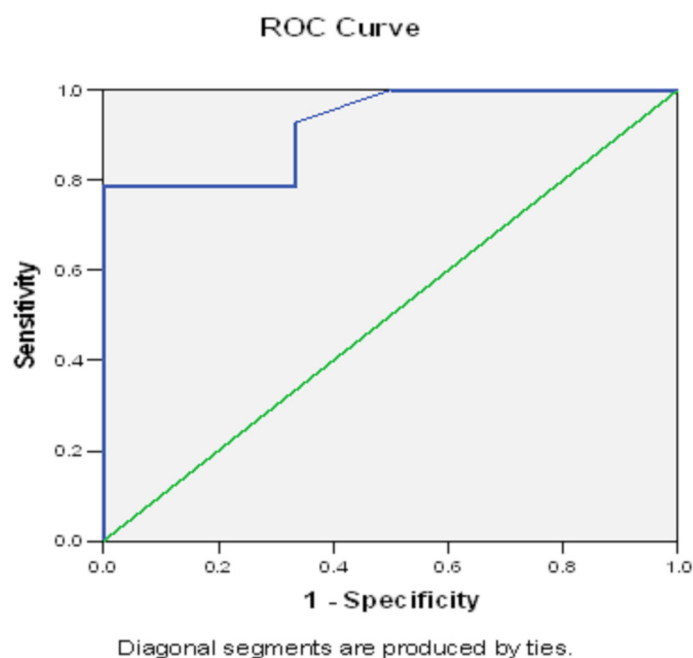


Figure 4. ROC curve of Scandinavian Stroke Scale on admission among studied patients

Area under the curve: 0.9
Sensitivity: 100%
Specificity: 83%
Cut of value: 26

	Area under the curve	Sensitivity	Specificity	Cut off value
Serum albumin on admission	0.8	100%	83%	3
SSS on admission	0.9	100%	83%	26

Discussion

Recent studies have shown prognostic role of serum albumin level in cases of Acute Ischemic Stroke (AIS), a higher level of which correlate with a better prognosis as shown in some western studies [15].

The Scandinavian Stroke Scale (SSS) has been used extensively in clinical research to summaries the neurological deficits in stroke patients. It is useful in documenting and communicating baseline deficits, as well as changes over time and it consists of a prognostic score and a long-term score [6].

This was descriptive study (cross- sectional) had been conducted on 60 patients diagnosed to have acute ischemic stroke with measuring of serum albumin level and application of Scandinavian stroke scale to evaluate their prognosis in Emergency room and follow up of their outcome at Suez Canal University Hospital . The data was collected from June 2016 to January 2017.

Regarding the age distribution among the studied patients, this study showed that the age of patients ranged from 40-85 years old with majority of them between (55-64) years (30%) while the minority (10%) was between (40-44) years old and the mean age (60±13).

These results agree with the results of the study conducted by Kasundra G & Sood I in which the age of patients ranged from 40-85 years old with majority of them between (55-64) years (38%) [9].

Also these results agree with the results of the study done by Dev K & Joshi M in which the majority of the patients (41.5%) were in the age group from (56-70) years old with mean age (58.26±2) [10].

This study showed that the majority of the studied patients was females (58.30%) and male sex was (41.70%).

These results match the results of a study by Dziedzic T et al, in which (49%) of the patients were males and (51%) were females [11].

These results don't match the results of the study done by Dev K & Joshi M in which 63.5% of the patients were males while 36.5% of them were females [10].

This study showed that the majority of patients had hypertension and Diabetes mellitus (55%). It was found that (35%) of patients had past history of old CVS, (30%) of them have AF and (25%) had Ischemic heart disease (IHD).

These results agree with the results of a study conducted by Dziedzic T et al, in which (67%) of the patients had HTN, (21%) of them had AF, however (20%) of them were Diabetic and (59.4%) of them had IHD [11].

This study showed that the majority of patients (60%) had weakness, (91.6%) of the weakness was on one side of body. It was found that the majority of patients (45%) had dysarthria and disturbed level of consciousness (45%).

These results agree with the results of a study by Kasundra G & Sood I in which the majority of them (94%) had motor weakness, (92%) had dysarthria while (16%) only had disturbed level of consciousness [9].

Also these results agree with the results of another study by Dev K & Joshi M in which almost all patients had motor weakness and (98%) of the weakness was on one side [10].

This study showed that tachycardia was found in (35%) of the studied group, (40%) of them were HTN and (60) were normo-thermic.

These results don't match the results of a study by Kasundra G & Sood I in which the majority of the patients were HTN (92%) [9].

This study showed that the majority of patients (50%) had normal ECG and it was found that (33.3%) of patients had arrhythmia in ECG and (16.7%) of them had Ischemic changes (IHD) in ECG.

These results match with the results of a study by Kasundra G & Sood I in which (52%) of the patients had a normal ECG, (14%) had ischemic heart disease on ECG, (44%) had stroke related changes and left ventricular hypertrophy on ECG [9].

This study showed that on admission (30%) of the studied patients had middle cerebral artery occlusion (MCA) while in follow up the majority of patients (80%) had the same CT finding and (10%) of had MCA occlusion and (10%) were have lacunar infarction.

These results are close to the results of a study by Dziedzic T et al, in which (53.7%) of the patients had MCA occlusion, (19%) of them had lacunar infarction, (11.2%) of them had cerebellar infarction [11].

Also these results agree with the results of another study conducted by Bielewicz J et al, in which 55% of the patients had MCA occlusion, (17.9%) of them had lacunar infarction and (16.1%) of them had cerebellar infarction [13].

This study showed that (73.3%) of patients had normal albumin level and (26.7%) had hypoalbuminemia.

These results agree with the results of a study done by Kasundra G et al, in which (68%) of the studied patients had normal serum albumin while (32%) had hypoalbuminemia [9].

Also these results agree with another study conducted by Dziedzic T et al, in which (45.5%) of the patients had serum albumin level < 3.5 gm/dl and (55.5%) had normal serum albumin (3.5 – 5 gm/dl) [11].

This study showed that the majority of patients (55%) had mild stroke with SSS between "45-58" and (40%) had moderate stroke SSS between "33-44". It was found that the minority of patients (5%) had sever stroke with SSS between "19-32"

These results agree with the results of a study conducted by Dziedzic T et al, in which the majority of the studied patients (54.5%) had mean SSS of 41.5+10.8 indicating mild stroke while (45.5%) of them had mean SSS of 19.7+12.8 indicating moderate to severe stroke [12].

This study showed that (95%) had prognostic score of SSS (>22) with good prognosis while (5%) had prognostic score (≤22) with poor prognosis.

These results disagree with the results of a study by Dev K & Joshi M in which (53.4%) of the patients had prognostic score of SSS (<22) with poor prognosis and (46.6%) of them had (>22) with good prognosis [10].

This study showed that the majority of patients (90%) were admitted at inpatient ward and the minority of them (10%) were admitted in intensive care unit (ICU) and it was found that all patients (78.6%) who had mild stroke admitted at the inpatient ward while (21.4%) of patients who had moderate stroke admitted at inpatient ward. It showed that (50%) of patients admitted in ICU had moderate stroke while and (50%) of them had severe stroke.

These results were disagree with the results of a study by Dziedzic T et al, in which (65%) of the studied patients admitted to the Inpatient while (35%) admitted to the ICU and such disagreement may be due to the large sample size of their study (n=759) while the present study (n=60) [11].

This study showed that on admission the majority of patients (100%) (N: 33) with normal albumin level had mild stroke. It else shows that (54.1%) (N: 13) of patients with hypoalbuminemia had moderate stroke while (45.9%) of them had mild stroke. It was found that all patients (100%) (N: 3) who had severe stroke had hypoalbuminemia.

These results agree with the results of a study by Dziedzic T et al, in which the majority of the patients had normal serum albumin level with mild to moderate stroke and had mean SSS of 34.2+15.1 while the minority of them had hypoalbuminemia with severe stroke had mean SSS of (28.5 +16.1) [12].

This study showed that the majority of patients with normal albumin level (3.5-5g/dl) on admission was (81.5%) and all of them survived and discharged .While 16 Patients had hypoalbuminemia (less than 3.5gm/dl) (N: 10) (18.5%) was survived. It was found that (N: 6) (100%) of deceased patients had hypoalbuminemia.

These results agree with the results of the study conducted by Vahdani A et al, in which (67.5%) of the survived patients had normal serum albumin while (75%) of the deceased patients had hypoalbuminemia [14].

This study showed that (92.2%) of patients who discharged from hospital had normal serum albumin level in follow up while (7.5%) of them had hypoalbuminemia.

Regarding the SSS and outcome, it was found that on follow up of patients (86.6%) were discharged on outpatient treatment (55%) of them had mild stroke and (31.60%) had moderate stroke. It was found that (13.4%) of patients died, (8.40%) of them was suffering from moderate stroke and (5%) had sever stroke.

Limitations of the study

Although we used a larger sample size than that used in Bielewicz, Joanna, et al, [13] the sample size was still small and the study could not be blinded which might have introduced some bias into the results. Additionally some patients refused to be enrolled in

this study and this study was conducted in one center at Suez Canal University hospital (SCUH). While some CVA patients shifted between more than one physicians in SCUH.

Conclusion

HTN and Diabetes were the most common chronic illnesses the patients had a risk factors for stroke while minority had AF and were IHD.

It was found that the majority of patients had weakness, dysarthria and disturbed level of consciousness.

On admission (30%) of the patients had middle cerebral artery occlusion (MCA) while in follow up the majority of patients had the same CT finding and (10%) of had MCA occlusion and (10%) were have lacunar infarction.

Most of the patients had normal albumin level while minority of them had hypoalbuminemia.

The majority of patients were admitted at inpatient ward and the minority of them were admitted in intensive care unit (ICU) and it was found that all patients who had mild stroke admitted at the inpatient ward while half of patients admitted in ICU had moderate stroke and the other half had severe stroke.

On admission the majority of patients with normal albumin level had mild stroke and most of the patients with hypoalbuminemia had moderate and mild stroke. It was found that all patients who had severe stroke had hypoalbuminemia.

This study showed that the majority of patients with normal albumin level and all of them survived and discharged .While (18.5%) had hypoalbuminemia was survived. It was found that all the deceased patients had hypoalbuminemia.

This study showed that (92.2%) of patients who discharged from hospital had normal serum albumin level in follow up while (7.5%) of them had hypoalbuminemia.

Regarding the SSS and outcome, it was found that on follow up the majority of patients were discharged on outpatient treatment most of them had mild and moderate stroke. It was found that (13.4%) of patients died, most of them were suffering from moderate and severe stroke.

IT was found that the sensitivity and specificity of serum albumin of 100% and 83% respectively regarding severity of stroke and SSS had sensitivity and specificity of 100% and 83% in prognosis of severity of stroke.

Our results indicate that higher levels serum albumin is associated with a better short term prognosis. Thus, they may act as indicators of short term prognosis.

Recommendations

- An organized protocol for the emergency evaluation of patients suspected to have acute stroke is recommended.
- Emergency imaging of the brain is recommended before

initiating any specific therapy to treat acute ischemic stroke .Either CT or MRI is recommended to exclude intracranial hemorrhage.

- Using of stroke rating scale as Scandinavian Stroke Scale (SSS) is recommended to evaluate short term and long term prognosis of patients.
- Evaluation of serum albumin level at time of admission is recommended as some trials and experimental studies revealed that it has a neuroprotective effect on brain.
- Evidence based protocols for management of ischemic stroke should be developed for every aspect of care, from pre-hospital health education to post hospital discharge of ischemic stroke patients.
- Emergency physicians should participate at all levels of planning for ischemic stroke care and management.
- Data in many developing countries currently suggest an increase in prevalence of ischemic stroke but also a decrease in mortality rate due to advanced management modalities.
- Emergency Medicine Service (EMS) providers should be trained and educated in the management of stroke patients and how to deal in critical cases.
- The Ministry of health should increase the awareness of general population about ischemic stroke and its possible complications.

Competing interests

The authors declare that they have no competing interest

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Ethical approval

Before the study, permissions were obtained from local ethical committee.

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