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Research Article

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Acute Complications After Stroke, Apart from Motor Weakness

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Abstract: Medical complications are common among patients with stroke. In ourIn the country, there is limited information about the morbidity and mortality after an acute stroke in hospitals in our country.Aim:To study the frequency and type of acute complications of stroke, the risk factors associated with these complications, and the mortality rate. Patients and Methods: This is a prospective study; it was done at the Tikrit teaching hospital during the period from the 5th of May to the 5th of May of the year 2024-2025, and this study included 600 patients diagnosed with acute stroke in 2019. They studied and assessed the occurrence of vascular complications until discharge from the hospital or death in the hospital.Results: The number of patients with ischemic stroke was 432 (72%), and the number of patients with hemorrhagic stroke was 168 (28%). 504 patients (84%) had at least one complication. The most common vascular complications were pneumonia in 212 patients (42.1%), urinary tract infection (UTI) in 132 patients (26.2%), pressure sores in 84 patients (16.7%), epilepsy in 48 patients (9.5%), and deep vein thrombosis in 24 patients (4.8%).

Keywords: Stroke, acute complications, and post – stroke death rate.

INTRODUCTION

Stroke is the number one cause of disability, and the third most common cause of death in the world, after coronary heart disease and all Cancers account for 10% of deaths worldwide (Abanto C, 2020). After cerebrovascular accidents, patients are exposed to many complications that may arise from psychological damage to the brain, disability, and slow movement caused by stroke, or from treatment related to stroke (Sylaja PN, 2018). Pathological complications are considered one of the important problems after a stroke because of their direct and indirect negative impact on the body Recovery, improvement, length of hospital stay (LOS), and economic cost (Bhatia R, 2022). Rapidly developing focal neurological signs indicative of a disturbance in the central nervous system, with a longer duration of time, from 24 hours, it can lead to death in the absence of any apparent cause except for vascular causes, as the definition includes Transient cerebrovascular accident (TIA), where symptoms last less than 24 hours (Ministry of Health and Family Welfare, 2022).

The incidence of these complications varies widely between studies, and the percentage of patients who experienced one or more complications ranges from 44-96% while in the hospital (Srivastava MVP, 2020). Also, the most common complications differ among international studies, according to the period of follow-up of patients and the documentation of their occurrence. Pre-existing medical conditions that are risk factors for stroke, comorbidities, advanced age, and disability before stroke affect the development of comorbidities in patients, especially if the stroke is large and the disability is severe (Salunkhe M, 2024). The increase in the duration of hospitalization is accompanied by an increase in the number of complications, as it was noted that the incidence of complications increased by 5.3% for each additional hospitalization day (Kalkonde YV, 2016; Connor MD, 2004; Langhorne P, 2018).

Study Goal

Research importance:

The neurological and other pathological complications after an acute stroke can adversely affect the prognosis of a cerebrovascular accident and increase the mortality rate. Therefore, full knowledge of these complications and identification of the accompanying factors are useful in providing appropriate prevention and treatment. Reducing the rate of acute complications following stroke, and as a result, reducing the mortality rate and length of stay in hospital, as well as the financial cost, while improving the quality of life.

Research objectives:

- Determining the incidence of complications in patients with cerebrovascular accidents.
- Determine the most common complications that affect this group of patients.
- Determining the mortality rate for patients with cerebrovascular accidents.

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Research methods and patients:
This study was carried out in the Hospital for Neurosurgery during 15 days (the fifth of May to the twentieth of May), and it is a prospective study. The total number of study members was 600 patients diagnosed with acute stroke.

All patients included in the research underwent clinical, laboratory, and radiological evaluation by the specialized hospital staff, which included:

Take detailed, satisfactory information upon admission and record information related to the following:
- Demographic information about the patient: (gender, age)
- Medical history that is considered a risk factor for a stroke: (pressure, diabetes, high fat, heart problems, smoking).

Careful clinical examination upon admission and recording of information relating to the following:
- Measurement of vital signs.
- Systolic and diastolic arterial pressure.

Radiological outcomes:
- Axial tomography of the brain without injecting contrast material, and the information related to the radiographic findings was recorded.
- Infarctive injury: the location of the infarction was determined in relation to the cerebral hemispheres (right, left, and bilateral), and locate the affected artery was located (anterior, middle cerebral, posterior cerebellar).
- Cerebral hemorrhage: The site of the hemorrhage was determined in relation to the cerebral hemispheres (right, left, and bilateral).
- Simple chest radiograph.
- ECG

Laboratory analysis:
- General count and formula of hemoglobin.
- Blood sugar.
- Urine and sediment examination.

Patients were assessed and followed up on a daily basis from the time of admission to hospital discharge or in-hospital death for detecting the presence of complications.

RESULTS AND DISCUSSION

The total number of study members was 600 patients. The average age of the study members was (57.23) years. The patients' ages ranged between 30 and 80 years, in a range of 50 years, as shown in Table 1.

Table 1. Distribute the stroke on the all patients based on age status.

Age	Frequency, [n = 600]	Rate of patients, %
30-40 YEARS	84	14 %
41-50 YEARS	96	16 %
51-60 YEARS	180	30 %
61-70 YEARS	108	18 %
71-80 YEARS	132	22 %
TOTAL PATIENTS	600	100 %

- The number of male research subjects was 54%
- The number of female research subjects was 23 patients (46%), as shown in Table 2.

Table 2: The number of male female research subjects

Gender	Percentage
Male	54%
Female	46%

Stroke pattern:
The results that were conducted for all patients upon admission showed the distribution of the stroke pattern as follows:

- Hemorrhagic stroke: 168 patients (28%).
- Ischemic stroke: 432 patients (72%).

As shown in Table 3

Table 3: Percentage of the the distribution of the stroke pattern

Strokes	Percentage
Hemorrhagic stroke	28%
Ischemic stroke	72%

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Hemorrhagic stroke:
The number of patients with hemorrhagic stroke for the research personnel was 14 patients. When examining the site of hemorrhage for the cerebral hemispheres:

- The number of patients with cerebral hemorrhage on the left side was 57.1% of total cases.
- The number of patients with cerebral hemorrhage on the right side: 28.5% of total cases.
- The number of patients with bilateral cerebral hemorrhage Side: 14.2% of total cases.

Ischemic stroke:
The number of ischemic stroke patients for the research subjects was 432 (72%).

The study of the clotting site for the affected artery:

- The number of patients with anterior thrombosis: 16.6%.
- The number of patients with average thrombosis 58.3%.
- The number of patients with thrombosis Rear: 25%.

The studying of the coagulation site for the two cerebral hemispheres:

- The number of patients with right thrombosis: 10 (27.7%).
- The number of patients with left thrombosis: 19 (52.7%).
- The number of patients with bilateral thrombosis: 7 (19.4%)

Risk factors for stroke:
The specialist doctors in the Hospital for Neurosurgery questioned the patients or their families, documenting the antecedents that constitute risk factors for the development of stroke.
The most common risk factor for stroke was hypertension, which was found in 468 patients (78%).
Table No. (4) Shows the risk factors for stroke in research patients:

Table 4: risk factors for stroke in research patients

RISK FACTORS	NUMBER OF PATIENTS	PERCENTAGE
HYPERTENSION	468	78 %
SMOKING	408	68 %
DIABETES	324	54 %
HIGH BLOOD FAT	216	36 %
IHD	144	24 %
CVA	108	18 %

The incidence of complications among the research patients:
The patients of the study group, 42 patients, showed the occurrence of at least one complication during the hospital stay, while 8 patients did not have any complications.
In other words, the incidence of severe complications in the study patients is 504 (84%). As shown in Table 5:

Table 5. Prevalence of complications in the patients.

Complications	NUMBER OF PATIENTS
Patients with complications	504
Patients without complications	96

Acute complications:
The most common acute complications of the research patients were studied with their rate of occurrence, as well as the pattern of distribution of the research patients according to the number of complications that occurred, as follows:

- The number of patients who had complicating pneumonia was 216 patients (42.8%).
- The number of patients who had complicating UTI: 132 patients (26.1%).
- The number of patients who had complicating pressure sores was 84 patients (16.6%).
- The number of patients who had complicating epilepsy was 48 patients (9.5%).
- The number of patients who had complicated deep vein thrombosis: 24 patients (4.7%).

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Table 6: Acute complications that occurred in the research patients

ACUTE COMPLICATIONS	NUMBER OF PATIENTS	INCIDENCE
PNEUMONIA	216	42.8 %
UTI	132	26.1 %
PRESSURE SORES	84	16.6 %
EPILEPSY	48	9.5 %
DVT	24	4.7 %

After observing acute complications after a stroke, it was found that in Table 7:

- The number of patients who had one complication was 240 patients (40%).
- The number of patients who had two complications: 144 patients (24%).
- The number of patients who had three or more complications: 120 patients (20%).

Table 7: Perecetage of research subject afer observing cute complication

Complications	Percentage
Patients with three or more complications	20%
Patients with two complications	24%
Patients with one complication	40%
Patients without	16%

The relationship between the sex of the patient and the occurrence of acute complications after stroke:

As we mentioned before, the number of research patients who had complications was 504.

The total number of male research patients was 324 patients (54%), and the number of males who were diagnosed with severe complications after a stroke was 240 patients (74%).

The total number of female research patients is 276 patients (46%), and the number of female creditors who have been diagnosed with severe complications after stroke is 264 patients (95.6%). As shown in Table 5:

After conducting the statistical study to assess the relationship between the patient's gender and the occurrence of acute complications, it was found that the difference is not statistically significant, and therefore, it can be said:

Table 8: The relationship between the sex of patients and the occurrence of acute complications after thrombosis

Patients Gender	Patient Group	Number of Patients	Percentage
Male	All Male Patients	324	100%
	With Acute Complications	240	74.0%
	Without Complications	84	25.9%
Female	All Female Patients	276	100%
	With Acute Complications	264	95.6%
	Without Complications	12	4.3%
Total Patients		600	
	With Acute Complications	504	
	Without Complications	96	

Length of stay in hospital

The average length of hospital stay for the research patients was 6 days and ranged from 2 to 10 days.

- The average LOS of patients with acute complications after the stroke: 8 days.
- The average LOS of patients without acute complications after the stroke: 4 days.

Death rate and its connection with acute complications in research patients:

During the follow-up period in the hospital, 156 patients (26%) died. As shown in Table 9:

Table 9: Percentage of death and discharge with acute complications after the stroke

Items	Percentage
Discharge at home after hospitalization	74%
Acute death after stroke	26%

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Among the 156 deaths, (76.9 %) patients had at least one complication during the hospitalization period, while three cases of death were not associated with acute complications, and there were cases of cerebral hemorrhage with a very severe stroke.

Discussion and comparison with the results of international studies

This study consisted of 50 patients diagnosed with acute stroke.

The average age of patients in our study was 57.23 years, and this number is almost close to what a Chinese study reported in 2013, which is 64 years. (10)

While it was lower than the average age in studies of some Scandinavian countries, where the average age of stroke patients in a Norwegian study in 2007 was 77 years. (7) Since the average lifespan of the population of developed countries is higher than ours, and because stroke occurs with age, it is expected that the average age of stroke patients will be higher in these countries.

The sex distribution of the research patients was approximately equal. Ischemic stroke patients constituted 72% of the research patients, and hemorrhagic stroke patients accounted for 28%. From the outset, we excluded patients with subarachnoid hemorrhage, and they were not included in this study.

The incidence of at least one complication in stroke patients in our study was 84%, which is a high rate of complications and consistent with what is published in the medical literature, which indicates the incidence of complications at a rate of 44-96% while they are in the hospital.

The most common complications that occurred in stroke patients: pneumonia 42.8%, UTI 26.1%, pressure 16.6%, epilepsy 9.5%, DVT 4.7%). The prevalence of acute complications after stroke varies between studies, due to the difference in the follow-up period, the different criteria used to identify acute complications, and the difference in the level of health care provided. The most common acute complications that occurred in the patients of our study are inflammatory complications (pneumonia and urinary tract infection), and many international studies have indicated the prevalence of inflammatory complications in the acute period after stroke, as in the Malaysian study (11) and the Pakistani study (12) and the Chinese study (10) as well as the French study (13). Perhaps the high rate of pneumonia in the patients of our study can be explained by inhalation caused by the parents feeding the patients without paying attention to their dysphagia disorder. While generalized pain, high temperature, and progression of stroke were the most common complications in the Norwegian study (7). DVT was the most delayed complication after stroke, and its rate was 4.7% in our study. Our study showed that acute complications of stroke occur in older patients, and the Chinese study (10) and Norwegian (7) studies agree with this, unlike the Malaysian study (14), where there was no difference in the incidence of acute complications according to age.

In our study, there was no significant difference in the incidence of severe complications between males and females, and this is consistent with the Malaysian study. The Taiwanese study indicated that the incidence of severe complications in men is more than in women, unlike the promotional and Chinese studies, which showed that the incidence of acute complications in women is more than in men.

The average hospital stay (LOS) for stroke patients in our study was 6 days. The statistical results showed that patients with acute complications after stroke spend a longer period of stay in hospital than stroke patients without complications, and this is what most international studies have agreed upon.

The death rate in the acute period after a stroke during hospitalization was 26%, and this rate is very close to the rates mentioned globally. In the United Kingdom, the death rate after a stroke is 12% after 7 days and 18% after 30 days.

The Pakistani study indicated that the mortality rate during the hospitalization period was 4%. A study conducted in Uganda in 2015 (16) indicated that the death rate within 7 days is 6.3%, while a study conducted in China in 2014 (17) indicated that the death rate within 30 days is 22.4 %.

CONCLUSIONS

- The average age of stroke patients in our patients is 57.23 years.
- Stroke occurs almost in almost equal percentages in males and females.
- The incidence of at least one complication after a stroke in the patients of our study was 84%.
- The most common complications that occurred in stroke patients are inflammatory complications: Pneumonia (19%), UTI

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(26.1%), pressure sores (16.6%), epilepsy (9.5%), DVT (4.7%).

- Injury to the median cerebral artery is more associated with the occurrence of complications.
- The average hospital stay (LOS) for thrombosis patients in our study was 6 days.
- The death rate in the acute stage after stroke was 26%

RECOMMENDATIONS

- The sample size studied in this research is small, which may weaken the statistical power of the research, so we recommend conducting future studies on larger samples.
- Our research was limited to studying the complications that occur during the hospitalization period, and the complications that develop after leaving the patient still need further studies.
- If our study showed more severe interictal deaths, we recommend future studies of risk factors for mortality in a large sample.
- Physical therapy for the respiratory muscles in these patients, and training of nursing and medical staff to take care of them during the recovery period.
- The higher the severity of the stroke, the more patients had to be placed in the intensive care unit.

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