Incidents and Patterns of Cerebral Ischemia in Benghazi-Libya

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Abstract: *Introduction: Cerebral ischemia is leading cause of mortality worldwide. The incidence of cerebral ischemia has increased in the Middle East during the last decades. However, there is a lack of data regarding the incidence and patterns of stroke in the Libya. Objective: The main objective of this study is to measure the incidents and pattern of cerebral ischemia in Benghazi, Libya. Methods: Retrospective study included cerebrovascular accident (CVA) patients admitted to Al-Hawari hospital during the period (2011-2013) and in Benghazi Medical Center admitted during period the (2014-2019).31 patients of both sexes were included in this study.* Results and discussion: *According to this study, 67.7% of the study sample were males and 32.3% were females. The highest percentages of patients were above 50 years old. The most common potential risk factors were hypertension (80%) followed by diabetes (48%) and old CVA (42%). The majority of patients suffered right side weakness (45%), left side weakness (29%) and mouth deviation (16%). Aspirin and Simvastatin were the most commonly used drugs among the study sample.* Conclusion: *This study showed that the incidence of cerebral ischemia increases with age in both sexes. Men were more exposed to cerebral ischemia than women. The predominant risk factor was Hypertension followed by diabetes mellitus and old CVA. Management of hypertension and life style modification is important to reduce the risk of cerebral ischemia*

Keywords: cerebral ischemia, hypertension, cardiovascular accident, thrombus

1. Introduction

Cerebral ischemia is a leading cause of death and the main cause of adult long-term disability in developed countries [1]. The incidence of stroke is 150-200/100.000 individuals/ year. One of every seven individuals suffers from cerebral ischemia in their lifetime [2]. Incidence of stroke increases exponentially with advanced age. The incidence is higher in men until advanced age, with a higher incidence of stroke in women after age 85 years [3, 4, 5, 6].

In the Middle East, the incidence of stroke and mortality rate increased during the last decades [7], ischemic stroke was the most common of all types of stroke [8, 9, 10]. Limited studies are available regarding cerebral ischemia in Benghazi, Libya. Here in this study we aim to measure the incidents and patterns of cerebral ischemia in two main hospitals in Benghazi, Libya, Al-Hawari hospital and Benghazi medical center.

2. Methodology

Study design
Retrospective study included cardiovascular accident (CVA) patients admitted to Al-Hawari hospital during the period (2011-2013) and in Benghazi Medical Center, patients admitted during period the (2014-2019).

Inclusion Criteria
All patients diagnosed with ischemic stroke who were admitted to above mentioned hospitals during the stated period.

Exclusion Criteria
All patients diagnosed with hemorrhagic stroke who were admitted to the above mentioned hospitals during the stated period.

Sample size
A total of 31 patients of both sexes were included in this study.

Data collection
Data collected from medical records of the patients. Data included (age, gender, general clinical symptoms, potential risk factors, and management of the disease).

Data analysis
Statistical Product and Service Solution (SPSS) version 25.00 software package was used for the analysis of results.

3. Results

3.1 Age and gender

Distribution of study sample over the 3 defined age periods in this study showed that; 2 patients aged < 50 years, 21 patients aged between 50-70 years and 8 patients aged > 70 years. Males represented 67.7%, while female represented 32.3% of study sample. Table1

Table 1: Age and gender distribution among study sample

Variable	Frequency (%)	n=number
Age		
< 50	6.50%	2
50-70	67.70%	21
>70	25.80%	8
Gender		
Male	67.70%	21
Female	32.30%	10

General Clinical Symptoms
CVA patients included in this study encountered many symptoms as follow: Right side weakness in 45% of patients, left side weakness in 29% of patients, mouth deviation in 16% of patients, slurred speech in 10% of

patients, chest pain in 10% of patients, dizziness in 6.4% of patients, dyspnea in 6.4% of patients, hypothyroidism in 6.4% of patients, numbness in 6.4% of patients, hypoglycemia in 6.4% of patients, loss of conscious in 6.4% of patients, difficulty swallowing in 3.2% of patients, and palpitation in 3.2% of patients (Figure 1).

Potential risk factors
Patient's with hypertension represented 80% of study sample, patients with diabetes mellitus represented 48% of study sample, patients with Old CVA represented 42% of study sample, patients with Pneumonia represented 9.4% of study sample, patients with Kidney failure represented 6.4% of study sample, patients with VitaminB12 deficiency represented 6.4% of study sample, patients with chronic obstructive pulmonary disease represented 6.4% of study sample, patients with epilepsy represented 6.4% of study sample, patients with Alzheimer disease represented 6.4% of study sample, patients with myocardial infarction represented 3.2% of study sample, patients with complete heart block represented 3.2% of study sample, patients with coronary artery disease represented 3.2% of study sample, patients with dilated cardiomyopathy represented 3.2% of study sample, patient's with ischemia heart disease represented 3.2% of study sample and patients with chronic cardio failure represented 3.2% of study sample (Figure 2).

Treatment
The treatment used for CVA patients included in this study were as follow: Aspirin in 93% of patients, simvastatin in 81% of patients, Metformin in 42% of patients, Lisinopril in 35% of patients, Insulin in 16% of patients, Concor in 13% of patients, Omeprazole in 13% of patients, Lasix in 10% of patients, Zestril in 6.4% of patients, vitamin B12 in 6.4% of patients, Warfarin in 6.4% of patients, Atacande in 6.4% of patients, Ca tablet in 6.4% of patients, Depakin in 6.4% of patients, Thymine in 6.4% of patients, Kuber in 3.2% of patients and vitamin D in 3.2% of patients (Figure 3).

4. Discussion

The epidemiology of stroke is changing rapidly worldwide with a significant increase in stroke incidence [7, 11]. Stoke has been expected to become the fourth commonest cause of ongoing diseases worldwide in 2020 [12]. In the Middle East and Africa, the burden of stroke is increasing and becoming a major health issue [13]. In 2010, stroke was the leading cause of death in middle-income countries in the Middle East which included Algeria, Egypt, Iraq, Jordan, Lebanon, Libya, Morocco, Palestine, Sudan, Syria, and Tunisia [14. Ischemic stroke was the most reported type in studies including all types of stroke (60–90.1%) in Middle East [7].

The crude annual incidence rate for stroke in Benghazi of a crude annual incidence rate for stroke of 48 per 100, 000 population in the year 1995 [15]. Unfortunately only few studies are available regarding stroke in Libya. Ischemic stroke is the most common type of strokes, accounting for more than 80% of all strokes [16, 17]. This study presents the latest data regarding cerebral ischemia in Benghazi.

Age is the one of the factors that are considered predictors for early mortality and disability after a stroke. Other factors include the type of stroke, lesioned location, level of consciousness, severity of neurological impairment [18]. Cerebral ischemia mostly occurs in elderly people. In this study, total number of cases of cerebral ischemia equals to 31 which can be considered a smaller number compared to the 1995 study in Benghazi which included 921 cases of stroke over the period of three years (1991-1993) [15]. This could be because most of cerebral ischemia cases during the last few years, were not admitted to public hospitals and most of the patients were either treated in private hospitals or left to receive their treatment in neighboring countries.

According to our study most (93%) of the CVA patients during the period 2011-2019, were above 50 years old whereas the number of stroke patients who were over 50 in the 1986 study in Benghazi represented only 60% of stroke patients [19]. The other study in 1995 in Benghazi showed that around 60% of the stroke patients were above 45 years [15]. Noting that the 1986 and 1995 Benghazi studies included all stroke patients and not CVA patients only. Our results are similar to the results of studies in Jordan and Lebanon, in which the mean ages of the patients with ischemic stroke were 61.2, 66, and 68 years, respectively [20, 21, 17].

According to current study the percentage of CVA male patients was double the percentage of CVA female patients during the period 2011-2019. CVA male patients in this study represented 67.7% of study sample which is very close to the percentage of males with stroke in Benghazi studies were males represented around 60% of study sample [19, 15]. Men have a higher incidence of CVA through most of life, while this applies to elderly women. According to *Pizov* el al. The incidence of stroke is higher in women after of age 85 years. Genetic factors and hormonal changes play important role in gender-related differences in developing stroke [22].

According to this study, most of CVA symptoms in patients were right side weakness in addition to left side weakness, mouth deviation, slurred speech and chest pain of general clinical symptoms.

Identification of risk factors may help to reduce the incidence of CVA. Hypertension, diabetes mellitus and old CVA are recognized as the most important risk factors for development of cerebral ischemia in population [23]. Hypertension has been the most important risk factor for stroke [24]. Hypertension may increase the likelihood of an ischemic cerebral infarction, and it can also predispose toward an increased extent and severity of infarction [25]. *El Zunni* et al. reported in his study that involved 921 stroke patients that hypertension was the major risk factor accounting for 51% of the stroke patients, 24.6% of patients were diabetic and 20.4% of patients were found to have cardiac lesions. Smoking was the risk factor identified exclusively in male patients (33%) [15]. Moreover, the study by *Ashok et al.* in 1986 reported that hypertension was the commonest association accounting for 54% of the stroke cases, and were more common in the males. While hypercholesterolemia and diabetes were more frequent among the females [19]. In our study, hypertension represented potential risk factor in 80% of all patients,

diabetes represented potential risk factor in 48% of all patients and old CVA represented potential risk factor in 42% of all patients. Our results were also similar to a study in the Middle East by *EL-Hajj* et al. in which hypertension was the most predominant risk followed by diabetes, Dyslipidemia, and smoking (69.4%, 65.8%, 47.34%), respectively. Other risk factors in *El-Hajj* et al. study included previous ischemic transient attack, cardiac diseases and obesity [7].

Aspirin and Simvastatin were the most commonly used drugs among the study sample. More than 90% of CVA patient were on Aspirin treatment in this study. Until now Aspirin and tissue-plasminogen activator (tPA) thrombolysis are the only effective pharmacological treatments for acute ischemic stroke patient outcome [26]. Unfortunately there is no data available on different treatments of stroke in the Middle East [27]. Studies have shown that only some countries in the Middle East such as Qatar, United Arab Emirates and Iran are improving the stroke care including thrombolysis treatment and rehabilitation services [7]. Still, many other countries in the Middle East including Libya need to take serious measures in order to improve stroke management and treatment.

5. Conclusion

In the last 15 years, stroke research productivity was very low in the Arab World compared to other regions of the world due to several impeding factors. This study has shown that the incidence of cerebral ischemia increases with age in both sexes. Men were more exposed to Cerebral Ischemia compared to Women. Our study also showed a predominance of hypertension, diabetes, and old CVA as potential risk factors for cerebral ischemia in our population. Accordingly management of hypertension, diabetes, and life style modifications are important to reduce the incidence of cerebral ischemia.

6. Conflict of Interest

None

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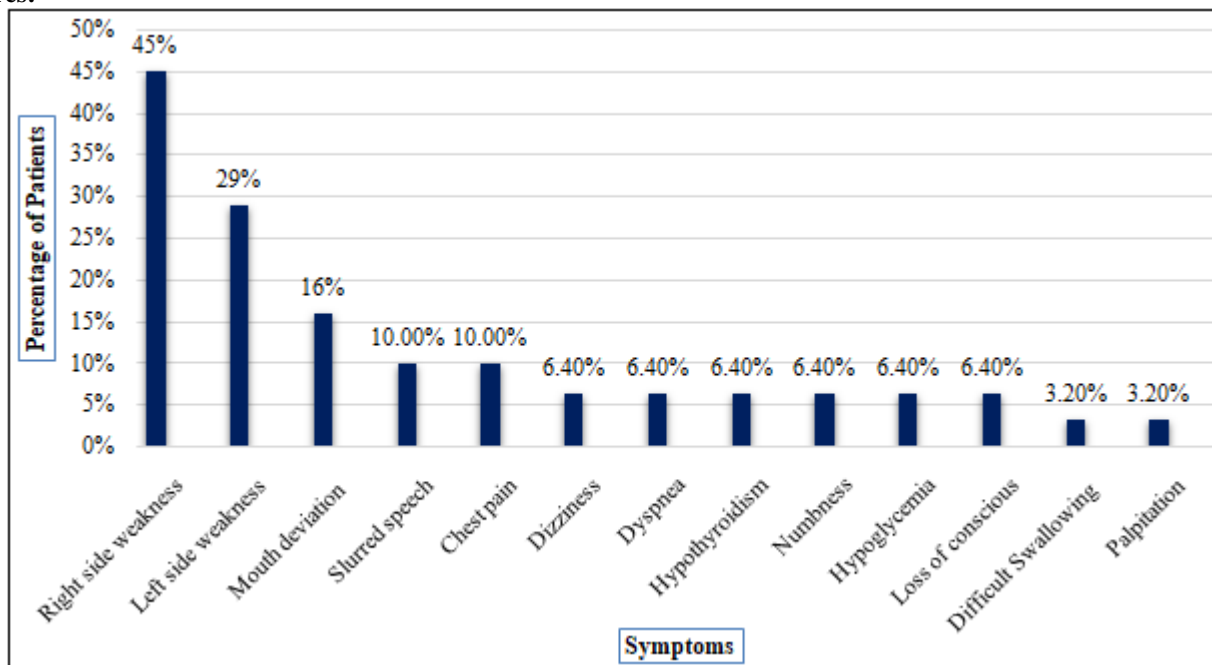
Figures:

Figure 1: General clinical symptoms distribution of all patients included in the study
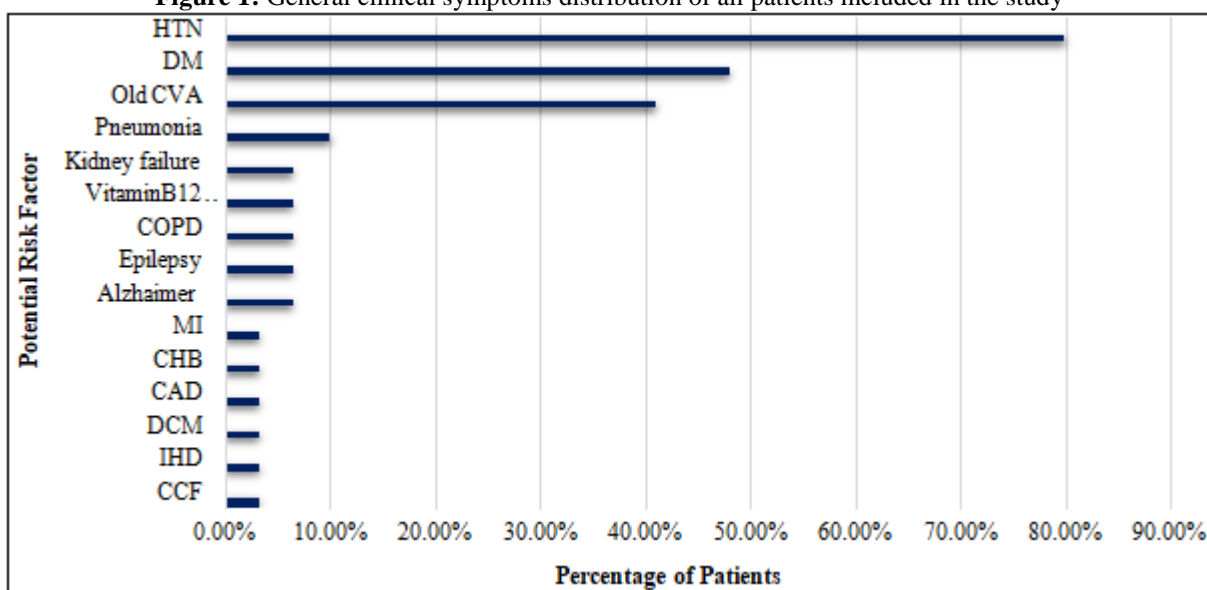

Figure 2: Percentage distribution of potential risk factors of all patients included in the study (HTN=Hypertension, DM=Diabetes mellitus, CVA=Cardio vascular accident, COPD=Chronic obstructive pulmonary disease, MI=Myocardial infarction, CHB= Complete Heart Block,

CAD= Coronary Artery Disease, DCM= Dilated Cardiomyopathy, IHD= Ischemia Heart Disease, CCF= Chronic Cardio Failure)
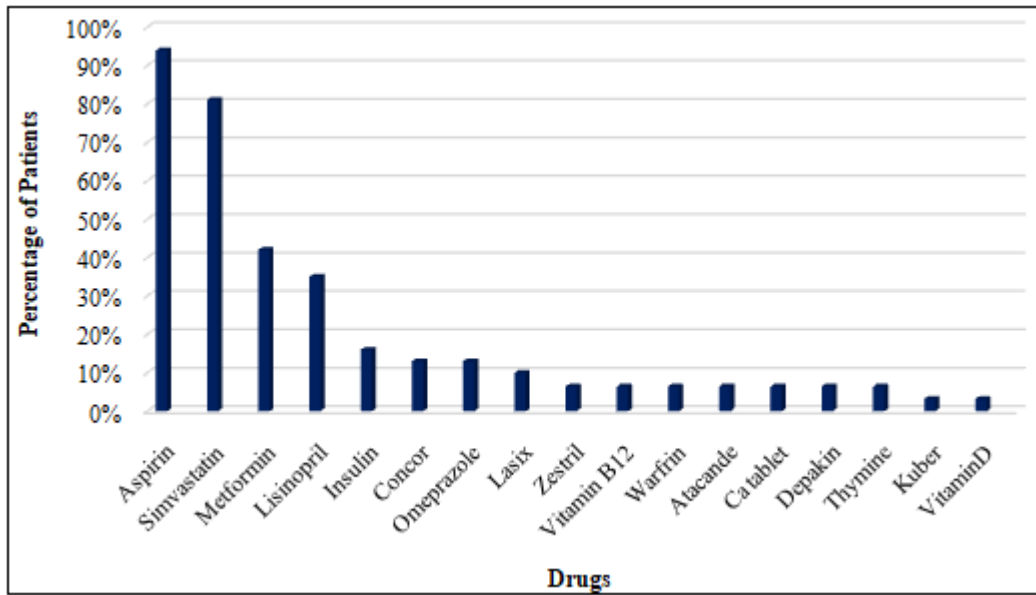
Figure 3: Percentage distribution of treatment of all patients included in the study