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Risk Factors for Ischemic Stroke, About 442 Cases

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Original Research Article

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Abstract: Stroke is a personal, familial, and social disaster. It is the third leading cause of death worldwide, the first cause of acquired disability and the second cause of dementia; its cost is astronomic. The aim of this study was to assess the frequency of ischemic stroke and its major risk factors in our context. We conducted a retrospective study from January 2010 to December 2015. It focuses on 442 cases of patients hospitalized for ischemic stroke in the Neurology Department in the Ibn Tofail hospital, university hospital Mohammed VI Marrakesh, Morocco. Our department covers much of southern Morocco. The diagnosis of ischemic stroke was established in base of clinical and CT scan criteria. There were 216 men (48.6%) and 226 women (51.4%). The average age was 61 years. It was 60.5 ± 11.07 years for men and 62.5 ± 13.6 years for women. Hypertension was the major and most frequent factor with 43%. The ischemic stroke revealed hypertension in 30.3% of cases. Tobacco consumption was noted in 25 % of patients. The incidence of diabetes (type 2) was 13%. The rate of patients with dyslipidemia was 13,8 %. Left ventricular hypertrophy was noted in 30.4% of cases, atrial fibrillation in 13.9% of cases. The ischemic strokes were caused by cardiac embolism in 28.4% of cases. The recorded death rate was 13.4%. Hypertension poorly treated or ignored was the main risk factor for ischemic stroke in our department. This is a first study done in third level Hospital of Marrakesh, focusing on risk factors of ischemic stroke. This study allows us to draw the profile of stroke management in our daily practice. Hypertension is the most significant modifiable risk factor for stroke. The control of all risk factors as a primary or secondary prevention is the pillar of the management of stroke.

Keywords: Risk factors, ischemic stroke, vascular risk factors, hypertension, prevention.

INTRODUCTION

Stroke is a personal, familial, and social disaster. It is the most common acute neurological disorder and the leading cause of neurological hospitalization, thus, stroke is the third leading cause of death worldwide, the first cause of acquired disability and the second cause of dementia: its cost is astronomic [1]. Despite advances in prevention, the prevalence and incidence of ischemic stroke is expected to rise given the aging population [2].

A large number of risk factors for stroke are described, as a reflection of the heterogeneity of the disease. Some of them are nonmodifiable such as sex, age, family history, genetics, and migraine. Others are modifiable and are related either to life-style such as smoking, alcohol, physical inactivity, or to diseases and subclinical diseases such as hypertension, diabetes, dyslipidemia and cardiopathies [1, 3].

Ischemic stroke is frequent in our environment and is responsible for serious consequences in terms of households but also on the macro-economic scale. Successful diminution of the impact of stroke on the population will require shifting our emphasis away from treating end stages of generalized atherosclerosis and other diseases to preventing underlying diseases and stroke. Detection and more effective treatment of risk factors as well as improved acute medical care and improvement in diagnosis procedures may play an important role in its prevention. The aim of this study is to assess the frequency of ischemic stroke and its major risk factors in Moroccan context.

PATIENTS AND METHODS

We conducted a single-center retrospective study collecting 442 patients hospitalized for ischemic stroke in the Neurology Department in the Ibn Tofail hospital, university Hospital Mohammed VI Marrakesh, Morocco from January 2010 to December 2015. Our department covers much of southern Morocco.

Inclusion Criteria

We included all patients with stroke Ischemic stroke between 2010 and 2015, without knowing their risk factors.

Exclusion criteria

Patients with transient ischemic attack, or hemorrhagic stroke or subarachnoid hemorrhage were excluded.

Information extracted from the folders included:

- Age, gender,
- Rural or urban origin,
- Presence or absence of acute stroke risk factors such as hypertension, diabetes, the existence of an underlying heart disease, history of cigarette smoking, migraine, the use of oral contraception and the presence of history of Transient ischemic attack in the patient.

The diagnosis of ischemic stroke was established in base of clinical and CT scan criteria.

RESULTS

Among our patients, 51% were female (226 patients) and 49% male (216 patients). The average age was 61 years: It was 60.5 ± 11.07 years for men and 62.5 ± 13.6 years for women. The predominant age range was between 46 and 65 years (figure 1). Concerning stroke risk factors, 189 of our patients were hypertensive (43%). Smoking was noted in 110 patients (25%). Among our patients 44% were from urban areas against 56% of rural origin. Hypertension was the major and most frequent factor with 43 % (figure 2). The ischemic stroke revealed hypertension in 30.3% of cases. The prevalence of diabetes (type 2) was 13% (58 patients). Obesity was noted in 20% of patients and dyslipidemia in 13,8% (61 patients) (figure 2). Five percent of our patients were alcoholics and 7% followed for migraine. Left ventricular hypertrophy was noted in 30.4% of cases, atrial fibrillation in 13.9% of cases. The ischemic strokes were caused by cardiac embolism in 28.4% of cases. We noted the use of oral contraception in 38 % of women. The recorded death rate was 13.4% (59 patients).

Hypertension poorly treated or ignored was the main risk factor for ischemic stroke in our department. Finally, a history of Transient ischemic attack was noted in 6% of our patients.

Table-1: Risk factors for stroke and their relative risk (RR) [1]

Major risk Factors	Moderate risk factors	Weak or debated risk factors
Age	Cigarette smoking	High cholesterol
Hypertension	Diabetes	Obesity
	Physical inactivity	Hypercoagulability
	Oral contraception use	Migraine with aura
	Male sex	
	Family history of stroke	

Major: Risk factors with relative risk (RR) ≥ 4.
Moderate: Risk factors with relative risk (RR) ranging between 2 and 4.
Weak: Risk factors with relative risk (RR)< 2.

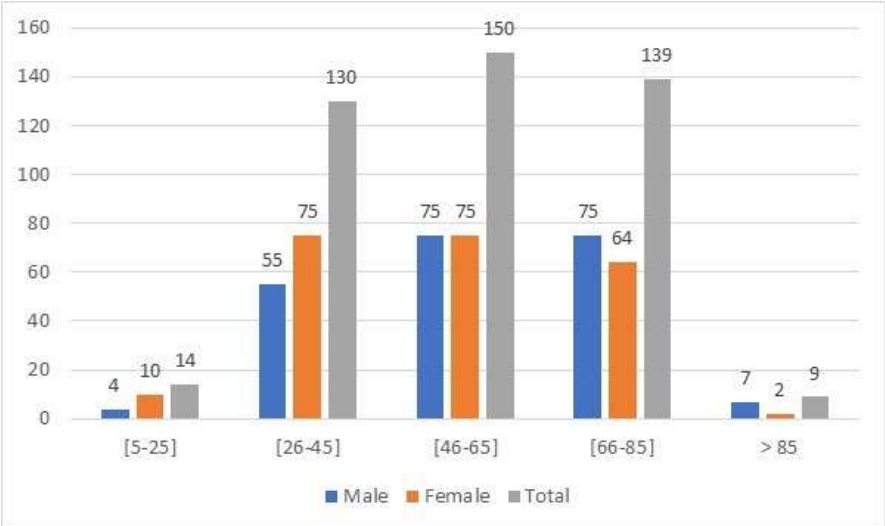

Fig-1: Distribution of Patients by Age Range

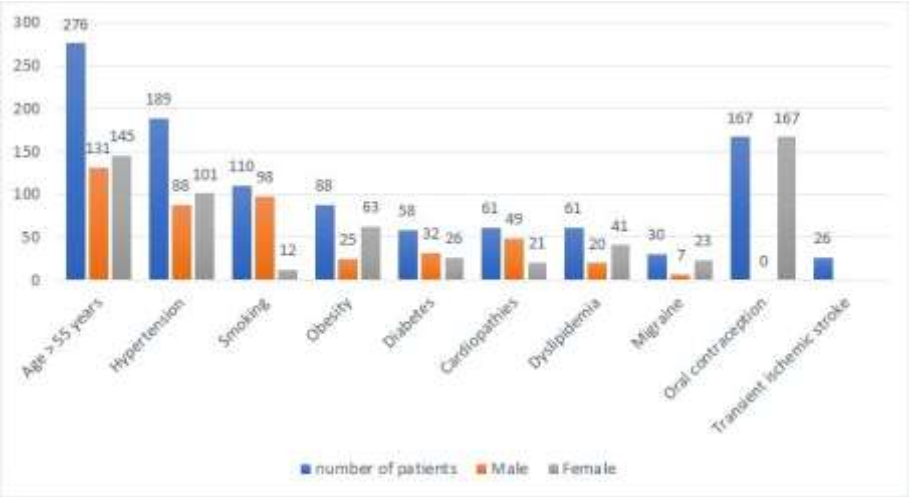

Fig-2: Risk factors for ischemic stroke

DISCUSSION

Prevalence of ischemic stroke in a hospital depends on the degree of specialization of each service. The reduction in stroke incidence in Western countries for the past several decades has been attributed to better treatment of risk factors [4]. The Framingham study was the first major epidemiological study that identified specific risk factors associated with cardiovascular disease: It demonstrated a correlation between cigarette smoking, hypertension, impaired glucose intolerance, atrial fibrillation, obesity, and the development of cardiovascular disease. Subsequent epidemiological studies, such as the Honolulu Heart study and Northern Manhattan Stroke Study corroborated these findings and added new data regarding alcohol and inflammation [4, 5].

A large number of risk factors for stroke are described (table 1). They can be classified as modifiable and non-modifiable.

Non-modifiable risk factors

This category of risk marker includes those that place persons at risk of stroke, but that are generally not modifiable. Persons with risk markers in this category, however, may benefit from prevention or control of modifiable factors [6].

Age is the single most important and most powerful risk factor for stroke [3]. There is an approximate doubling of stroke risk with each successive decade after 55 years of age [6]. Although stroke risk is highly associated with advanced age, incidence rates for stroke have increased in pediatric populations, and stroke rates may be increasing among middle-aged women [3, 6]. Our study reveals a high rate of young patients with 128 ones (29% of our patients).

In relation to sex, there is generally a higher prevalence and incidence of stroke in men than women: The Incidence rates are multiplied by 1.25 in men [3, 6, 7]. The annual number of stroke deaths in men is greater [7]. In our study, we found a slight female predominance, which is not significant. Female sex was associated with higher mortality 31W \ 16 M in our study.

Modifiable risk factors

Hypertension is believed to be the first modifiable risk factor for stroke; indeed, it is present in 40 to 85% of cerebral infarction studies and 70% of all strokes [3, 8].

Hypertension is the strongest modifiable and independent risk factor for both ischemic and hemorrhagic stroke in middle and late age. there is a regular increase in stroke risk with blood pressure, even in normotensive subjects, without any threshold down to at least 115/75 mmHg. Those with borderline hypertension blood pressure 130–139/85–89 mmHg have about twice the stroke risk of subjects with normal blood pressure [1, 8, 9]. Numerous studies and meta-analysis have shown the benefit of blood pressure lowering, with a 30% – 40% reduction in stroke risk for a 10 mmHg reduction in systolic blood pressure in primary prevention and 28% reduction in secondary prevention [1].

In our study, systolic hypertension was found in 43% of cases and used to be the most important modifiable risk factor for stroke in both sexes and regardless of age. The death rate was greater in severe hypertension.

Smoking doubles the risk of stroke and increases both hemorrhagic and ischemic stroke risk. This is particularly important when smoking is combined with hypertension and/or diabetes [3]. Cigarette smoking or passive smoking is one of the modifiable risk factors; it is responsible of hypercoagulability, endothelial dysfunction and

inflammation, resulting in progression of atherosclerosis [4]. Finally, there is 50% risk reduction by quitting smoking [4]. Smoking was noted in 110 patients (25%) and in 45% of men patients.

Approximately 33% of persons with ischemic stroke have diabetes mellitus, an established risk factor for stroke [4]. Diabetes is a strong risk factor for ischemic stroke, probably because of accompanying risk factors, such as obesity, hypertension and lipid abnormalities. The population attributable risk for diabetes causing stroke is 15–20% [3]. The prevention of stroke in diabetic patients is based on the control of other risk factors [10]. This prevention is crucial given that the relative risk of death is higher for stroke in diabetes [10]. The prevalence of diabetes in our patients was 13%.

High serum levels of total cholesterol or low-density lipoprotein (LDL) cholesterol have not been related to stroke risk overall in multiple observational epidemiological studies [4]. It seems that cholesterol has the opposite relationship to ischemic stroke (positive relation) and hemorrhagic stroke (inverse relation). A recent meta-analysis showed that each 1 mmol/L decrease in LDL cholesterol equates to a reduction in relative risk for stroke of 21% [1] and that statin therapy is associated with a 25% reduction of fatal and nonfatal stroke [4].

The atrial fibrillation (AF) is the 1st controlled cardiac cause of stroke [11]; is responsible for about 10% of ischemic strokes [3]. The diagnosis of AF is important because oral anticoagulants reduce stroke risk statistically of the order of 68% [11]. In our study, the AF was also by far the most important cardioembolic etiology found.

Obesity is accompanied with a relative risk multiplied by 2, and it worsened if associated with other risk factors: hypertension, diabetes and high cholesterol [12]. It was present in 20% of our patients.

In relation to Transient ischemic attack, the average risk of suffering from a recurrence of TIA or stroke after a first episode of TIA is 5% within 48 hours, 10% in one month, hence the interest of antiplatelets therapy in the prevention of such case [13].

There are several less well-documented or potentially modifiable risks for stroke, including: migraine headache with aura especially among women when associated with hypertension; treatment to reduce migraine frequency is considered reasonable though it is un- proven to reduce stroke risk [6, 13] and the use of oral contraception which is associated with an increased relative risk of infarction of 2.75 [14]. It increases more if there are other risk factors [14].

CONCLUSION

This is a first study done in third level Hospital of Marrakesh, focusing on risk factors of ischemic stroke. This study allows us to draw the profile of stroke management in our daily practice. Hypertension is the most significant modifiable risk factor for stroke.

The control of all risk factors as a primary or secondary prevention is the pillar of the management of stroke. Not only pharmacological treatment, but also life-style modification including diet and exercise are recommended. Yet there are many established and less established risk factors lacking scientific evidence for screening and treatment.

Conflict of interest

Authors declared they have no conflict of interest.

Authors' contributions

All the authors have read and agreed to the final manuscript.

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