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Original Article

The Epidemiological, Risk Factors and Clinical Characteristics of Ischemic Stroke in Ardabil Province, Iran: A Hospital Based Study

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ABSTRACT

Introduction: Stroke is the third most common cause of death in world after heart diseases and cancer. Due to the higher rate of stroke and less attention to its occurrence, assessing the prevalence of ischemic brain stroke and its clinical patterns across countries and nations such as Iran could be valuable and important.

Objectives: The aim of this study was to assess the epidemiological, Risk factor and clinical characteristics of ischemic stroke in Ardabil province.

Materials and Methods: This descriptive cross-sectional study has been done on 676 patients with ischemic stroke who referred to Ardabil city hospital during at year 2018. Data collected by using a checklist including demographic and clinical data of patients. Collected data were analyzed by statistical methods in SPSS version 21. The p-value less than 0.05 was considered as significant.

Results: Of all patients, 294 (43.5%) were female and rest of them were male. The mean age of patients was 69.3±13.2 years. Of all patients, 25.3% arrived to the hospital in less than 4.5 hours. The difference between arrival time to the hospital in rural and urban patients was significant. The most risk factors were seen in both sexes was HTN and in female only was DM and in male only was CVA. The results of CT and MRI showed that 30% and 64.9% of patients had lesion respectively that of them the most lesion in MRI was SMALL VESSEL and in CT was Middle Cerebral Artery (MCA).

Conclusion: Results showed that the patients who live in urban areas arrive to emergency sooner than rural patients. The significant relation was seen between AF, residence place and valvular with arriving time to hospital.

Introduction

Stroke is the third most common cause of death in world after heart diseases and cancer. About one-third of all patients with stroke suffer from permanent disability yearly. Disease-related costs can be significant for the system and these costs could be play an important role in the health costs of each country. In summary, more than 80% of all stroke-induced deaths in the world occur in developing countries. In ischemic stroke, blockage of a blood vessel causes blood to flow to a specific area of the brain. There are several risk factors for stroke including gender, age, smoking, alcohol, and high blood pressure (1-2).

Stroke can also be the result of multiple inherited disorders that affect the heart and blood vessels such as cardiomyopathy or familial arrhythmias, homocysteuria, dyslipidemia, hemoglobinopathies, prothrombin antibiotic coagulopathies, hemoglobin abnormalities, and mitochondrial mitochondria. Stroke could be multifactorial and influenced by many polygenics and environmental factors. Identifying the etiology of stroke organizes

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the treatment of the acute phase of the disease and secondary prevention according to the cause of the stroke in each patient (3).

A brain lesion is an abnormality seen on a brain-imaging test, such as magnetic resonance imaging (MRI) or computerized tomography (CT). On CT or MRI scans, brain lesions appear as dark or light spots that don't look like normal brain tissue. Usually, a brain lesion is an incidental finding unrelated to the condition or symptom that led to the imaging test in the first place. A brain lesion may involve small to large areas of your brain, and the severity of the underlying condition may range from relatively minor to life-threatening (4).

On the other hand, introducing the pattern of risk factors for ischemic stroke can make it possible to orient health interventions toward priorities (5).

Identifying the factors that delay the timely and effective treatment of patients facilitates changes in the care system of patients with stroke (3). The only treatment approved by the FDA for cerebral ischemic stroke is the use of tissue plasminogen activator (tpa) during the first three hours of stroke onset which could be influenced by many factors such as the severity of the stroke and time of arrival to the hospital. Sooner arrival of ischemic stroke cases to the hospital has a significant impact on the effectiveness of tpa treatment (6). Due to high incidence of stroke and also less attention to its occurrence in society by improving management methods, patients' survival can be increased and the complications of the disease can be reduced. The aim of this study was to assess the epidemiological, Risk factor and clinical characteristics of ischemic stroke in Ardabil province.

Materials and Methods

Study design and participants

This descriptive cross-sectional study has been done on 676 patients with ischemic stroke who referred to Ardabil city hospital at year 2018. Inclusion criteria includes having acute stroke in form of neurologic focal symptoms that longed more than 24 hours and existence changes in Brain CT which confirmed by neurologist.

Data Collection and Analysis

Data collected by a checklist including demographic and clinical data of patients such as age, sex, residence place, marital status, history of DM, HTN, hyperlipidemia, heart disease, smoking consumption, and also time of vascular attacks, type of vascular lesions according to involved coronary, type of risk factor, time of arrival to the hospital emergency and time of onset diagnostic and therapeutically actions. Collected data were analyzed by statistical methods in SPSS version 21 and p-value less than 0.05 was significant. For quantitative data we used t-test and for qualitative data we used chi-square test.

Results

Of all patients, 56.5% were male and rest of them were female. The mean age of patients was 69.3±13.2 years (Range: 25-98). The mean age of women was 70.1±12.7 years and men was 68.6±13.4 and the difference between two sexes was significant. Most of patients were from urban area (71.2%) and married (97.6%). (Table 1)

The longest time from the onset of stroke symptoms to the arrival of the hospital was 35.9% over 12 hours and the shortest time was less than 4.5 hours which was seen in 25.3% of cases. (Table 2)

The most risk factor among patients was HTN with 468 (69.2%). (Figure 1) The most risk factor after HTN in women was DM with 15.7% and in men was cerebrovascular accident (CVA) with 16.4%. (Table 3)

The relation between AF risk factors with residence of place and valvular with arrival time to emergency and the relation between DM with only ataxia was significant. The difference in the rate of hyperlipidemia (HLP), CVA and Coronary between two sexes was significant (Table 3).

Of all patients, 50.6% had not carotid Doppler, 15.5% had unknown CT-SCAN results and 24.6% had unknown MRI results. (Table 4)
Of all patients with Plaque, 49.5% had under 50%. (Figure 2)
The results of CT and MRI showed that 30% and 64.9% of patients had lesion that of them the most lesion in MRI was SMALL VESSEL (Figure 3) and in CT was MCA (Figure 4).
In terms of disease symptoms, 48.1% of patients had upper sensory symptoms and 44.4% of them had lower sensory symptoms. (Figure 5)
Of all patients, 98.2% had used antiplatelet drugs, 14.3% had used anticoagulant drugs and 12.9% had used both drugs.

Characteristics		**n**	**%**
Sex	Female	294	43.5
	Male	382	56.5
Residence of place	Urban	481	71.2
	Rural	195	28.8
Marital status	Married	660	97.6
	Single	16	2.4

Table 1. Demographic information of patients

Table 2. Arrival time of patients to emergency by residence of place

Arrival time to the hospital (hour)	**Rural**		**Urban**		**Total**		p-value
	n	%	n	%	n	%	
<4.5	36	18.5	135	28.1	171	25.3	0.034
4.5-12	82	42	180	37.4	262	38.8	
>12	77	39.5	166	34.5	243	35.9	

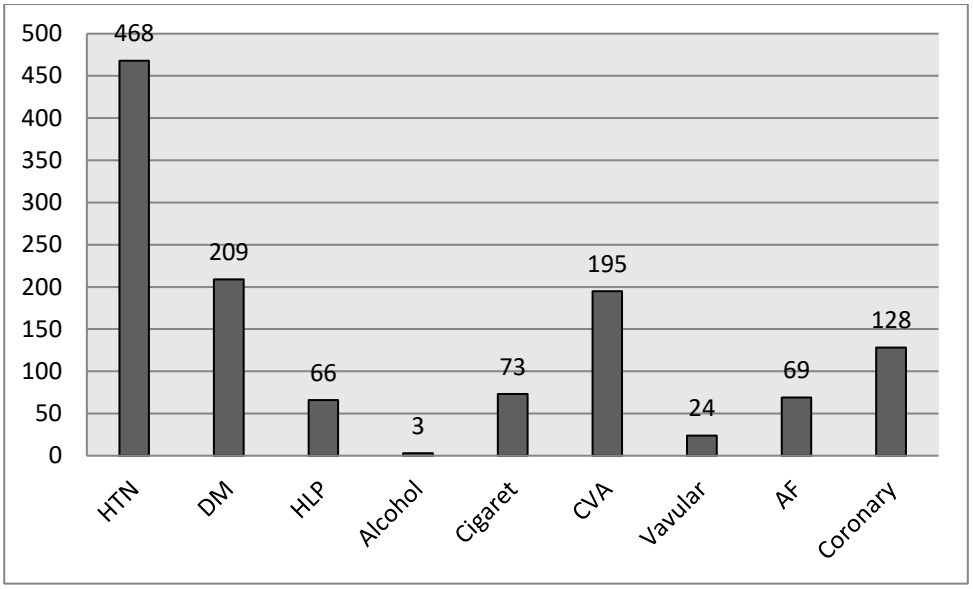

Figure 1. Frequency of risk factors in all studied patients

Table 3. Frequency of risk factors in studied patients by sex

Risk factors	Male		Female		Total		p-value
	n	%	n	%	n	%	
HTN	240	35.5	228	33.7	468	69.2	0.6
DM	103	15.2	106	15.7	209	30.9	0.9
HLP	26	3.9	40	5.9	66	9.8	0.01
ALCOHOL	3	0.4	0	0	3	0.4	0.001
CIGARET	73	10.8	0	0	73	10.8	0.001
CVA	111	16.4	84	12.4	195	28.8	0.03
VALVULAR	13	1.9	11	1.7	24	3.6	0.5
AF	37	5.5	32	4.7	69	10.2	0.5
Coronary	81	12	47	6.9	128	18.9	0.04

Table 4. Results of CT and Doppler and MRI in studied patients

Characteristics		n	%
Doppler	No have	342	50.6
	Normal	145	21.4
	plaque without tightness	76	11.2
	plaque with tightness	113	16.7
CT	Unknown	105	15.5
	Normal	368	54.4
	With lesion	2.3	30
MRI	Unknown	166	24.6
	Normal	71	10.5
	With lesion	439	64.9

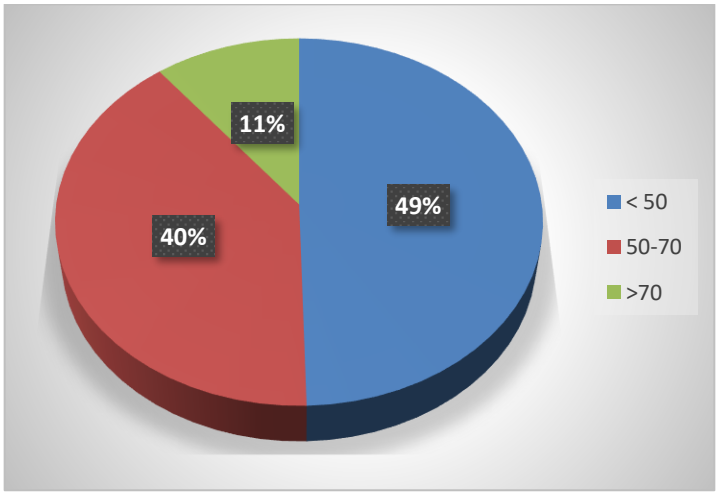

Figure 2. Frequency of plaque in all studied patients

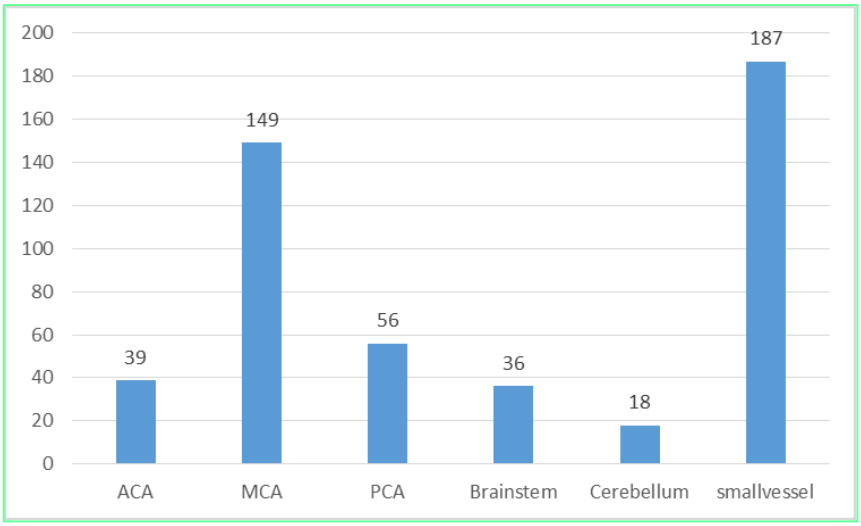

Figure 3. Frequency of type of lesion in MRI of studied patients

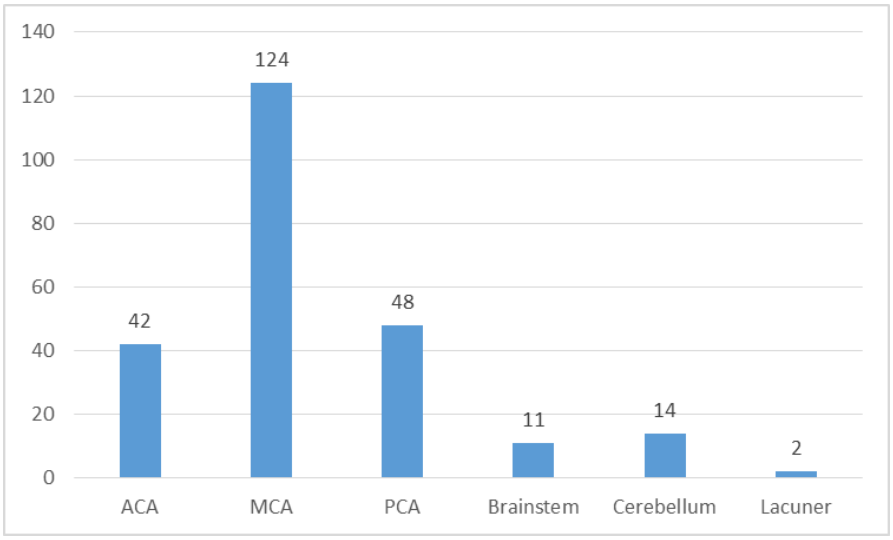

Figure 4. Frequency of type of lesion in CT-scan of studied patients

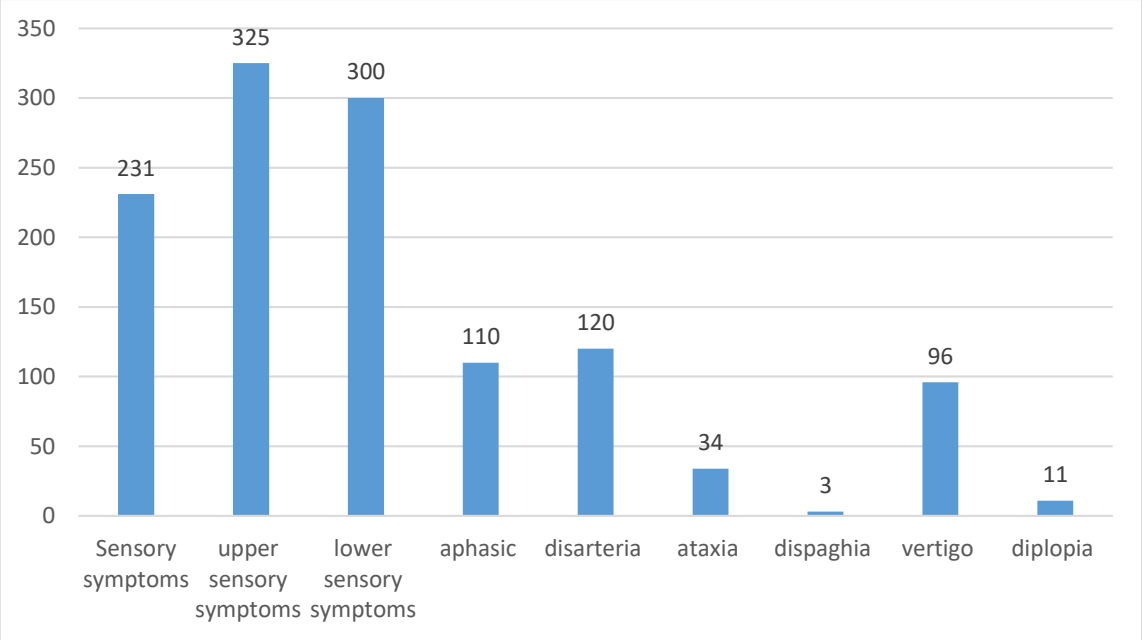

Figure 5. Frequency of disease symptoms in all studied patients

Discussion

Stroke is the third common cause of death in developed countries and the most common neurological disability in middle and old age groups and is in the first rank of neurological diseases between agents. In this study, the mean age of patients was 69.3±13.2 years (Range: 25-98). The mean age of women was 70.1±12.7 years and men was 68.6±13.4 and the difference between two sexes was significant. In the sabzghabaei et al study, the mean age of the patients was 66.50 ± 13.49 years which was similar to our study results (7-9).

Results of this study showed that of all patients, 56.5% were male and the rest were female. In other studies in Iran, the incidence of stroke in women was more than men.In sabzghabaei et al study the incidence of stroke in male was more than female (9-12).

In term of residence place, 71% of patients were in urban area and 29% in rural area that could be related to life style of people and less of some risk factors such as stress, air pollution and also upper rate of urban population ratio to rural population.

The trend of treatment usually related to the referral time of patients to health centers and in patients who referred to hospital in less than 4.5 hour after onset of symptoms, TPA treatment is started which has positive impact. But in our study, 35% of patients referred to hospital in more than 12 hours that could be due to residence place of patients, less knowledge, un-prevalent symptoms among patients such as ataxia, weakness and or elderly age and their relation to other people which in this study there was a significant relation was seen between residence place and referral time to hospital (6).

Concerning risk factors associated with ischemic stroke, the most common risk factor was HTN which was observed in 69.2% of patients, followed by other common risk factors, including diabetes mellitus in 30.9% and CVA in 28.8%. In the study of Talebi et al. in 2014, high blood pressure was reported in 72.3% of females and 59.3% of males, while 28.8% of females and 18.7% of males had diabetes and smoking was reported in 6.3% of females and 35.3% of males, which indicated a high prevalence of hypertension along with other risk factors for ischemic stroke. In the study by Fahimfar et al. in 2017, among risk factors for stroke, including age over 65, male sex,

hypertension, diabetes, and chronic kidney disease, the risk factors such as hypertension, diabetes mellitus, and smoking were considered to be major risk factors for ischemic stroke (5,8).

Study vascular risk factors showed that the most risk factor was history of BP and the least was Cerebrovascular disease. In a study on 250 patient with the involvement of the anterior and posterior circulatory system of the brain, results showed that there wasn't a significant difference between two groups in term of DM and HTN. But in these patients the risk factors such as HTN and smoking was high. In sabzghabaei et al study, 73.7% of patients had hypertension and 44.3% had DM which was similar to our study results (9,13).

In Oskoui et al study, the first risk factor was HTN and smoking (14).

As a result of our study, about half of the patients (49.4%) underwent carotid Doppler ultrasound, which one-sided carotid artery stenosis was observed in 28% of the patients. The prevalence of patients with Plaque containing stenosis was 20% that in current study is about 16.7%. The frequency of carotid stenosis associated with ischemic stroke has been very different in various studies. In the study by Chang et al. in 2002, the prevalence of carotid stenosis was 24.3%, in Tan et al. study in Taiwan in 2005, it was 6%, and in Fernandes et al. study in 2016 in India was 24%. Overall, the incidence of carotid artery stenosis in patients with ischemic stroke appears to be visible in 6% to 24% of the patients and in our study this rate was in the estimated range (15-17).

He et al in a study in China showed that of all risk factors, Hypertension is the most common risk factor for prevalent stroke (71.34%), followed by smoking (30.62%) and alcohol use (25.73%). Our data show that hypertension is the most common risk factor in patients with prevalent stroke (69.2 %), followed by DM (30.9%) and CVA (28.8%) but no significant differences were found between sexes or between rural and urban areas ($p > 0.05$). ALSO. The rate of smoking and Alcohol use in our study was lower than this study (18).

Results of CT-scan showed that 61% of patients had MCA vascular involvement and 20% HAD vascular involvement that in compare with other studies, the ACA involvement was more and in Oskoui et al study the involvement circulation was mostly MCA (14).

In sabzghabaei et al study, the most common areas involved in the brain CT scanning were periventricular areas in 20.5%, left middle cerebral artery (MCA) in 15.4%, and lacunar infarction 8.8% of the cases. Compare results of our study with sabzghabaei study showed that the rate of MCA involvement in our study was more than sabzghbaei study (9).

Conclusion

Although in recent years, with the expansion of communication devices such as the Internet, radio and television, people's awareness of the symptoms of diseases, especially heart attacks and stroke, has increased, but hospital emergencies are still witnessing patients with strokes that are referred in more than 12 hours after the onset of symptoms and only 25% of patients referred in less than 4.5 hour and it seems this topic need for more study and general awareness. This study could not reflect the epidemiologic condition of stroke in Iran and for more detail the studies with big sample size could be recommended for done in future.

Conflict of interest: none declared

Ethical Approval: This study financially supported by Ardabil University of Medical Sciences ethical committee and registered by ethical codeIR.REC.ARUMS.1397.016.

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