



Cardiac assessment among young ischaemic stroke patients in Babylon Province

Evaluación cardíaca entre pacientes jóvenes con accidente cerebrovascular isquémico en la provincia de Babilonia

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Abstract

Stroke is the third leading cause of death and the second most frequent cause of morbidity in developed countries. The annual incidence of acute stroke (300/100000) in U.K. Stroke is defined as a focal loss of neurological function of presumed vascular origin, which causes death or last for over 24 hours. Fifty young patients with ischemic stroke are included in this cross-sectional study, collected during the period from 1 January to 30 December 2019 for both sexes. They have been seen as an inpatient for new cases and outpatient clinics in Merjan teaching hospital in Babylon city. A cross-sectional study in which the total number of young ischemic stroke patients were (50) patients divided into two age groups (20-34) years are containing 13(26%) males and 9(18%) females. (35-40) years having 17(34%) males and 11(22%) females, Ischemic stroke patients with early morning events were 8 (16%) hypertensive patients and 3 (6%) non-hypertensive patients compared to 4 (8%) hypertensive patients and 35 (70%) non-hypertensive patients with events occurring at other times, Left-sided hemiplegia found in 31(62%) of patients compared to 19(38%) of patients with right sided hemiplegia. Two or more a risk factors have been found in 28(56%) of patients with is chemical stroke. Most of the embolic stroke associated with seizure, in our study has been found 7(14%) cases, while most of the bleeding stroke preceded with headache in our study has been found 6(12%) cases. Recurrent stroke found in 5 (10%) patients, it has been found that 4 (8%) of them were two to cardiac causes. Elusive diagnosis found in 17(34%) of ischemic stroke patients. The cardiac assessment for any patients it very important firstly in detecting cardiac causes whether congenital (e.g.) patent foramen oval or acquired (e.g.) valvar heart lesion and secondly in management of stroke to prevent recurrence by using anti-thrombotic therapy in Babylon city.

Keywords: Cardiac Assessment, Young Ischemic Stroke, Babylon Province.

Resumen

El accidente cerebrovascular es la tercera causa principal de muerte y la segunda causa más frecuente de morbilidad en los países desarrollados. La incidencia anual de accidente cerebrovascular agudo (300/100000) en el Reino Unido. El accidente cerebrovascular se define como una pérdida focal de la función neurológica de presunto origen vascular, que causa la muerte o dura más de 24 horas. En este estudio transversal se incluyen 50 pacientes jóvenes con ictus isquémico, recogidos durante el período comprendido entre el 1 de enero y el 30 de diciembre de 2019 para ambos sexos. Han sido vistos como pacientes hospitalizados para nuevos casos y clínicas ambulatorias en el hospital universitario Merjan en la ciudad de Babylon. Estudio transversal en el que el número total de pacientes jóvenes con accidente cerebrovascular isquémico fue (50) pacientes divididos en dos grupos de edad (20-34) años que contenían 13 (26%) hombres y 9 (18%) mujeres. (35-40) años que contenían 17 (34%) hombres y 11 (22%) mujeres, los pacientes con accidente cerebrovascular isquémico con eventos temprano en la mañana eran 8 (16%) pacientes hipertensos y 3 (6%) pacientes no hipertensos en comparación con 4 (8%) pacientes hipertensos y 35 (70%) pacientes no hipertensos con eventos que ocurrieron en otros momentos. Se encontró hemiplejía del lado izquierdo en 31 (62%) de los pacientes en comparación con 19 (38%) de los pacientes con hemiplejía del lado derecho. Se han encontrado dos o más factores de riesgo en 28 (56%) de los pacientes con accidente cerebrovascular químico. La mayoría de ictus embólico asociados a convulsiones, en nuestro estudio se han encontrado 7 (14%) casos, mientras que la mayoría de ictus hemorrágicos precedidos de cefalea en nuestro estudio se han encontrado 6 (12%) casos. Accidente cerebrovascular recurrente encontrado en 5 (10%) pacientes, se ha encontrado que 4 (8%) de ellos fueron dos por causas cardíacas. Diagnóstico esquivo encontrado en 17 (34%) de los pacientes con accidente cerebrovascular isquémico. La evaluación cardíaca para cualquier paciente

es muy importante, en primer lugar, en la detección de causas cardíacas, ya sea congénita (p. Ej.) Foramen oval permeable o lesión cardíaca valvular adquirida (p. Ej.) Y, en segundo lugar, en el tratamiento del accidente cerebrovascular para prevenir la recurrencia mediante el uso de terapia antitrombótica en la ciudad de Babilonia.

Palabras clave: Evaluación cardíaca, accidente cerebrovascular isquémico joven, provincia de Babilonia.

Introduction

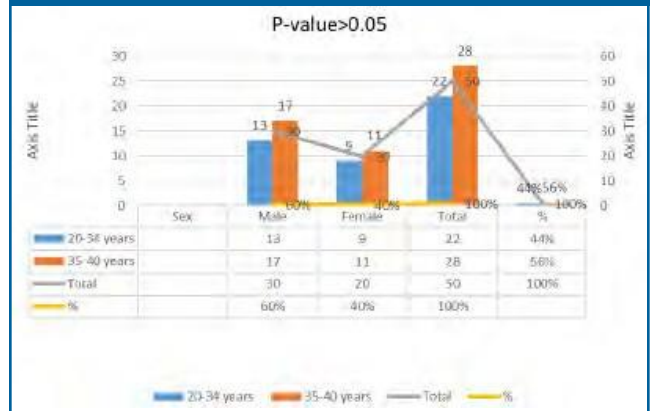
Stroke is the third leading cause of death and the second most frequent cause of morbidity in developed countries¹. the annual incidence of acute stroke (300/100000)² in U.K. Stroke is defined as a focal loss of neurological function³ of presumed vascular origin, which causes death or lasts for over 24 hours⁴. Stroke is either ischemic infarction (80-85%) or it is hemorrhagic stroke (15-20%)⁵. Spectrum of underlying causes and risk factors in young individual aging (20-40) years differs significantly from their counterpart older ones. The reasons are more varied, and even after extensive investigations, they remain elusive in (20-50%)^{1,4,6} of the young patients with ischemic stroke. The primary causes for ischemic stroke in the young are premature atherosclerosis, cardioembolic causes, cerebral venous thrombosis and pregnancy-related strokes, vascular inflammation and malformation (extracranial and intracranial), hematological causes and others^{6,7}. Cardio-embolic sources include rheumatic heart disease, arrhythmias, mural thrombosis in new myocardial infarction and cardiomyopathies, inflammatory endocarditis, mitral valve disorders, foramen oval, atrial and ventricular septal defects with paradoxical embolization⁸. Approximately 20 per cent of strokes in young adults are due to cardiogenic causes⁹. The main objective of the study is to assess and ascertain the role of cardiac causes as a risk factor for ischemic stroke in the young in Babylon city, to know the critical cardiac causes of stroke and how we can approach and manage the stroke in Babylon city and know the prevalence of cardiac diseases causing ischemic stroke in Babylon city.

Method: Fifty young patients with ischemic stroke are included in this cross-sectional study. These cases were collected during the period from 1 January to 30 December 2019 for both sexes. They have been seen as an inpatient for new cases and outpatient clinics in Merjan teaching hospital in Babylon city. These patients with age (20-40 years) presented acute neurological deficit (hemiplegia, confusion, speech impairment, etc.) were not recovered within 24 hours (transient ischemic attacks were excluded). They were submitted to detailed neurological history and examination about risk factors, particularly, the cardiac causes. The available investigations (E.C.G., Transthoracic echocardiography and/or Doppler study were performed by using G3 Logic 3 machine model AY15 CUI, CT

Results

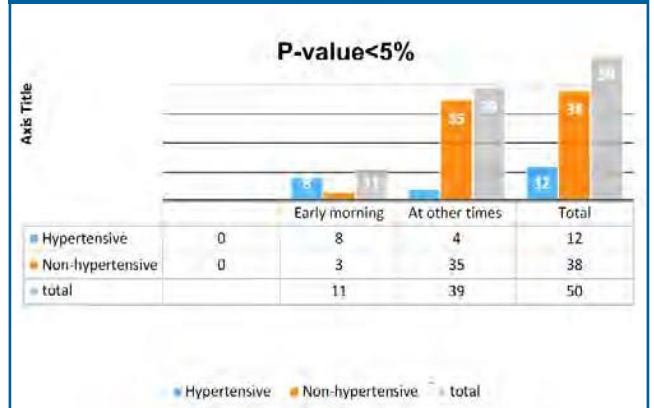
The total number of young ischemic stroke patients was 50 patients divided into two age groups (20-34) years containing 13(26%) males and 9(18%) females. (35-40) years are having 17(34%) males and 11(22%) females. They were 20 females and 30males as in the following Figure (1).

Figure 1 relation of age group to sex among young ischaemic stroke patients



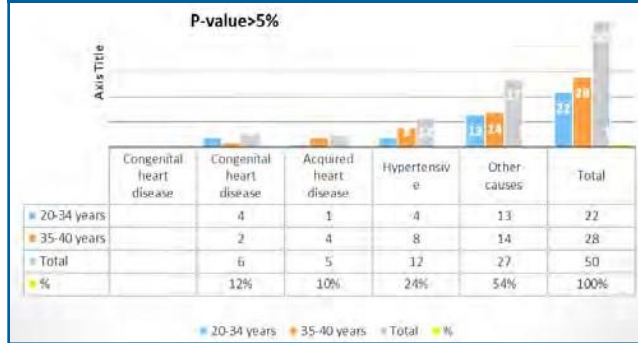
Ischemic stroke patients with early morning events were 8 (16%) hypertensive patients and 3 (6%) non-hypertensive patients compared to 4 (8%) hypertensive patients and 35 (70%) non-hypertensive patients with events occurring at other times as in figure (2).

Figure 2 Comparison of hypertensive and non-hypertensive patients with ischaemic stroke according to time occurrence



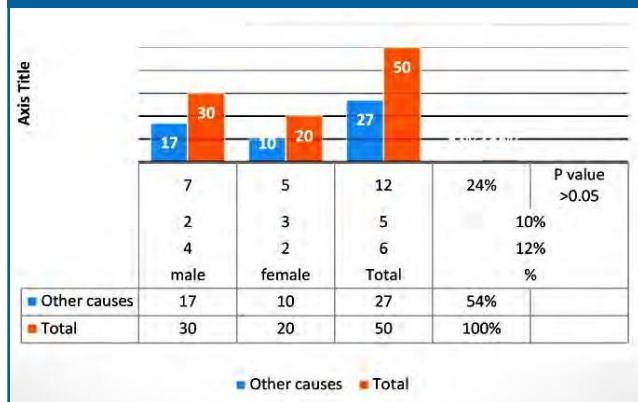
In age group (20-34) years, they were 4(8%) patients with congenital heart disease, 1(2%) case of acquired heart disease, 4(8%) cases hypertensive, 13(26%) cases due to other causes of stroke. These compared to age group (35-40) years with 2(4%)cases of CHD, 4(8%)acquired heart disease, 8 (16%)cases hypertensive and 14(28%)cases due to other causes as in the following Figure (3).

Figure 3 distribution of risk factors according to age group



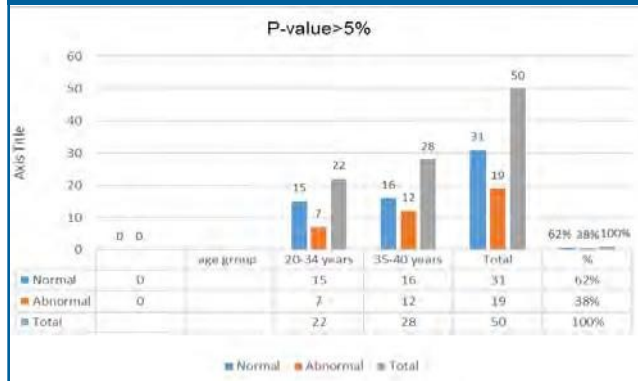
In sex distribution to risk factors for stroke, the males were 4 (8%) CHD, 2(4%) acquired heart disease, 7(14%) hypertensive patients and 17(34%), 3 (6%) acquired heart disease, 5(10%) hypertensive and 10 (20%)cases due to other causes for stroke, as in the following Figure (4)

Figure 4 distribution of risk factors according to gender



E.C.G. findings in age group (20-34) years, 15(30%) cases with normal E.C.G. and 7 (14%) cases abnormal E.C.G. (arrhythmia, ectopic, etc.). Compared to age group (35-40) years, 16(32%) cases normal E.C.G. and 12(24%) cases abnormal E.C.G. as in figure (5) and associated table below.

Figure 5 Comparison of ECG finding according to age group in ischaemic stroke patients



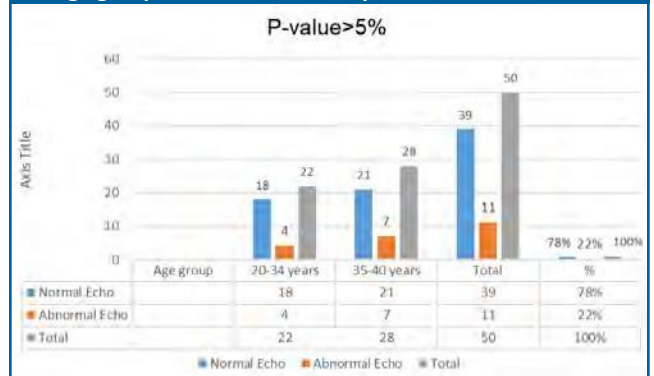
Associated table with the Figure (5) above.

E.C.G. (n = 91)	Positive no (%)
Sinus rhythm	91 (100)
Atrial fibrillation	0
Endured myocardial infarction	0
Disturbed repolarization	7 (7.7)
Left ventricle hypertrophy	7 (7.7)
Left bundle-branch block	1 (1.1)
Congenital cardiac anomaly	2 (2.2)

Echo findings in age group (20-34) years, 18(36%) cases with normal Echo and 4(8%)cases abnormal echo (dyskinesia, valve lesion, etc.).

Compared to age group (35-40) years with 21(42%) normal echo patients and 7(14%) abnormal echo patients as in figure (6) and associated table below.

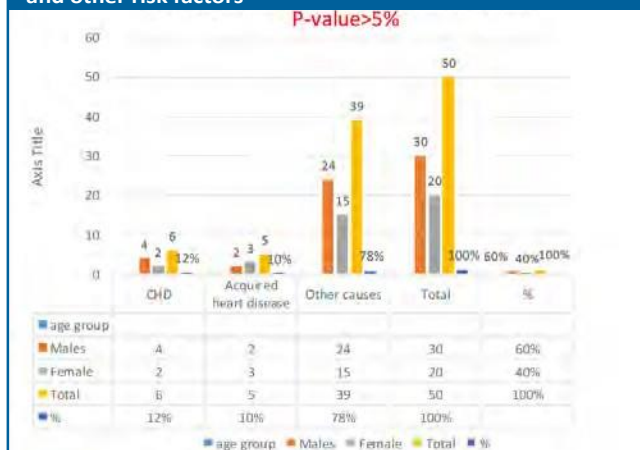
Figure 6 echocardiographic comparison of finding according to age group in ischaemic stroke patients



Associated table with Figure (6) above

Echocardiographic findings (n=78)	Positive no (%)
Patent foramen ovale	5 (6.4)
Atrial septal defect	1 (1.3)
Mitral stenosis	0
Mitral insufficiency	5 (6.4)
Atrial fibrillation	0
Endured myocardial infarction	2(2.6)
Endocarditis	0
Intracardiac thrombus	0
Atrial myxoma	0
Prosthetic valve	2(2.6)
Non-ischemic dilated C.M.P.	1(1.3)
Left ventricular akinesia	2(2.6)
Congenital cardiac anomaly	1(1.3)

They were 4(8%) cases with congenital heart disease (CHD) males, 2(4%) cases with acquired heart disease and 24(48%) cases due to other causes for stroke. All of these were compared to females with 2 (4%) cases CHD, 3(6%) cases acquired heart disease and 15(30%) cases due to other causes for stroke. Acquired causes include 1(2%)mitral stenosis,1 (2%) mitral valve prolapses, 2(4%) cardiomyopathy, 2(4%) atrial fibrillation due to cardiac causes and 1(2%)combined mitral valve disease. All of them were 5 (10%) cases as in figure (7) below.

Figure 7 congenital and acquired heart disease and other risk factors

The examination demonstrated that Left-sided hemiplegia found in 31(62%) of patients compared to 19 (38%) of patients with right-sided hemiplegia. Two or more a risk factors have been found in 28 (56%) of patients with is chemical stroke. Most of the embolic stroke associated with seizure, in our study has been found 7(14%) cases, while most of the bleeding stroke preceded with headache in our study has been found 6(12%) cases. Recurrent stroke found in 5 (10%) patients, it has been found that 4 (8%) of them were two to cardiac causes. Elusive diagnosis found in 17(34%) of ischemic stroke patients.

Discussion

The male to female ratio in this study 1.5:1, which is similar to Yang study⁴. Also in this study, we found that ischemic stroke incidence increased with increasing age and this similar to another study, said that atherosclerosis more in the age group above 35 years while ischemic stroke due to other causes was more in age group less than 35years especially in female⁹. The early morning surge in blood pressure, especially. In hypertensive patients is synchronous with an increase in the risk of catastrophic cardiovascular events including acute myocardial infarction, sudden death and stroke¹⁰⁻¹⁴. This goes with our study finding that most hypertensive patients (67%) significantly presented early in the morning. See figure 2, figure 3 and figure 4. Acquired and congenital cardiac causes are one of the commonest etiological factors in young ischemic stroke patients, accounting up to one-third of cases¹⁵.

Meschia says that contrast echocardiography permits better visualization of right to left shunts. Patent foramen oval is associated with cryptogenic stroke due to paradoxical embolization. This should be accepted only if the stroke occurs in association with deep vein thrombosis, pulmonary embolism or pulmonary hypertension¹⁶. In our study, this is explained by 12% of cases due to CHD mostly patient foramen ovale and 10% of cases due to

acquired heart disease, especially mitral valve lesion. All of those constitute 22% of cases due to cardiac causes. See figures 3,4,6 and associated table with figure 6. Cerebral embolism due to valvar heart lesions and atrial fibrillation occurs in 14%-19% of patients. More recently recognized cause is mitral annulus calcification^{17,18}. In our study, it was found that 4% of males and 6% of females where they were collectively 10% of cases due to valvar lesions see figure 6 and the associated table.

Ziegler stated that 28-65% of patients with ischemic stroke had E.C.G. changes compared to 50-98% of patients with intracranial hemorrhage¹⁹. It was mentioned that alteration and changes in E.C.G. is a direct result of alteration in autonomic nervous system control and increasing catecholamine's secretion leading to an alteration in the electrolyte and cardiac physiological electricity.

The data from human autopsy series suggest that 8-12% of stroke and head injury had focal mayo cytolysis which is often seen in a myocardial infarction, Akiyama²⁰ first reported it.

The physician should consider beta-blockers therapy in those patients with E.C.G. changes consistent with myocardial ischemia, although there are no definite data for supporting.

In our study, found that 14% of cases had abnormal E.C.G. below age 35 and 24% of cases had abnormal E.C.G. above 35 years where it was collectively 34% of cases in our study which is consistent with the Ziegler's study. In the echocardiography study, we found that 8% of cases with ischemic stroke had abnormal echo finding below age 35 years, but above age 35 years, we found that 14% of cases had abnormal echo study (wall dyskinesia, septum thickening, thick wall, abnormal valve lesion). This explains the increase in the incidence of impaired cardiac function with increasing age due to the effect of risk factors (see figure 5 and associated table).

We agree with Poli that the E.C.G. is mandatory for all patients. Serial E.C.G. and cardiac enzymes should be ordered for most stroke patients, especially the elderly to rule out concomitant myocardial infarction²¹ to differential the E.C.G. changes due to primary myocardial ischemia or due to cerebral insult.

Poli stated in their studies that among young stroke left infarcts were predominant (62.5%) compared to right infarcts (37.5%) but in higher age group (>40 years), the incidence of left and right infarcts were comparable 50.51% and 45.36% respectively²¹. In our study, left-sided infarcts 31 (62%) compared to right-sided infarcts 19 (38%) of cases with ischemic stroke

Akiyama stated that approximately 58% of ischemic stroke in young adults had two risk factor or more and the most prevalent risk factors were smoking in males and combined oral contraceptive pills in females²⁰. In our study, we found that 56% of the cases had two or more risk factors.

Meschia stated that stroke in young is associated with seizure in about 10-25% of embolic stroke and headache preceding stroke found to be more in hemorrhagic C.V.A., but it was associated with 15-25% of ischemic stroke¹⁶. In our study, it was found that the seizure associated with 14% of cases with ischemic stroke and headache associated with 12% of patients with ischemic stroke.

Ziegler stated that recurrence, though often not fatal, causes heavy disability and occurs in 10-15% of young ischemic stroke¹⁹. In our study, it was found that 14% of cases had a recurrent stroke, and 8% of all cases were due to cardiac causes. It was also stated in his study that it had been estimated that even stroke-oriented neurologists inadequately investigate one in five young ischemic stroke patients. The major problem appears to be a restriction of investigations to neuroimaging alone, e.g. C.T brain scanning. Additional investigations to be performed in young stroke patients may include M.R.I., M.R.A., antiphospholipid antibody, syphilis serology, drug screen 24-hour E.C.G. recording transesophageal echocardiography and cerebral angiography²². In our study, it has been found that 34% of ischemic stroke had an elusive diagnosis due to the limited facilities in our hospital and city. In other study¹² found that Tran esophageal echo more important in detecting congenital causes for stroke 3 folds than acquired causes, and this Figure is highly significant.

Transcranial Doppler study is a highly sophisticated and very highly significant and advanced investigation in stroke patients. In statistical data analysis for our study, we were used chi-square and p-value at the level of significant 0.05. from six tables in our study, only one table had significant p-value<0.05 and the other non-significant values, although they were statistically insignificant due to small size and limited time, but this is not mean that it is clinically insignificant.

Conclusions

The cardiac assessment for any patients it very important firstly in detecting cardiac causes whether congenital (e.g.) patent foramen oval or acquired (e.g.) valvar heart lesion and secondly in management of stroke to prevent recurrence by using anti-thrombotic therapy in Babylon city.

The prevalence of cardiac causes in Babylon city was 22% of all ischemic stroke patients, and this Figure is higher than the figures for cardiac causes for stroke in international studies, which is 18-20%. This is maybe due to inappropriate primary prevention, so to decrease this prevalence, we need to recommend on primary prevention and use of a sophisticated investigation by using trans-esophageal echo and transcranial Doppler. All patients with cardiac problems must use these tools to increase detection

of potential cardiac sources of emboli (P.C.S.E) and make the therapeutic approach more efficient.

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