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Using the ABCD2 Scale and Other Risk Factors to Predict the Risk of Permanent Stroke after Temporary Stroke.

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Abstract

Background: A temporary ischemic attack (TIA) is described as an immediate loss of localized cerebral and ocular function that lasts for 24 hours and is thought to be caused by embolic or coagulant vascular disease after thorough evaluation. **Objective:** our study examined the role of ABCD2 alongside additional risk variables in the capacity to predict the development of TIA to stroke. **Methods:** Cross-sectional research was conducted over a 12-month period, from 12 January 2021 to 24 September 2022, at the emergency department of Baghdad Teaching Hospital, Medical City Complex, which is Baghdad, Iraq. The Department of Emergency Medicine at Baghdad Teaching Hospital and the Emergency Medicine Council on the Arab Board approved the study protocol, which includes a questionnaire for gathering information about the population of interest (name, age, occupation, address, medical condition, smoking, drug use, weight gain, symptoms and signs, examinations, and all medical records) and the outcomes that were considered. The selection of patients was based on the criteria for inclusion and exclusion that were determined. Before including any patients in the study, verbal agreement was acquired from each one of them. **Results:** In this study, 150 stroke patients were included, of whom 94 (62.7%) had no subsequent transient ischemic attack (TIA), and 56 (37.3%) did. According to the study, stroke struck 30 TIA patients (53.6%) in less than a week as opposed to 26 (46.4%) in a period of seven days or more (P 0.001). **Conclusion:** Stroke is more likely to occur in TIA patients who have ABCD2 values of greater than three during seven days of the TIA. In this study, we discovered a strong relationship between weight and a high ABCD2 score as opposed to a low score. The number of antihypertensive medications has also been linked to a high ABCD2 score, which is independently linked to an increased likelihood of stroke post-TIA.

Keywords: Transient Ischemic attack (TIA); Risk Factors of TIA; Smoking; and BMI

Introduction:

A temporary ischemic attack (TIA) is described as an immediate loss of localized cerebral and ocular function that lasts for 24 hours and is thought to be caused by embolic or coagulant vascular disease after thorough evaluation. A more recent definition of TIA refers to a brief episode of neurological dysfunction brought on by a focal disturbance of the brain or retinal ischemia, with clinical symptoms lasting less than an hour and no sign of infarction through DWI MRI. It also refers to a neurological disorder that completely resolves clinically within 24 hours. [1,2]

Stroke and TIA risk factors are major global public health issues. Whenever risk factors are split into two categories, the first of which are immovable, are as follows: Age: After the age of 55, the risk of having a stroke more than doubles; genetics and race: If one grandmother, sister, and brother had had a stroke, the risk of getting one is higher; stroke is more prevalent in males than in women, and men are also more likely to have had a previous strokes, temporary ischemic attack (TIA), which [3] or heart attack. High blood pressure (140/90 mm Hg) is one of the second group of variables that may be altered, treated, or managed. Smoking is a separate risk component for stroke with ischemic attack for both men and women, according to observational research. Blood pressure is closely and directly associated to vascular and total mortality. Patients were

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classified as smoking if they were either still smoking at the time of the initial stroke/TIA or had ceased smoking three months before. [4]

There is no proof that lowering blood sugar levels in people with diabetes mellitus prevents stroke, atrial fibrillation, carotid artery disease, or any other type of heart disease.Sickle cell anemia, elevated cholesterol in the blood, diets that contain cholesterol and saturated fats can elevate blood cholesterol levels, obesity and physical inactivity increase the risk of stroke and transient ischemic attack (TIA), and alcohol misuse increases the risk of various medical problems, including stroke, regardless of existing vascular risk factors. [5]

It's crucial to exclude out metabolic or medication-induced aetiologies while dealing with TIA-like symptoms. Fingerstick, blood glucose for hypoglycaemia, a serum chemical profile with creatinine, coagulation investigations, and complete blood cell counts are among the tests that are deemed urgent [6]. The following tests are frequently beneficial and may frequently be done quickly: The lipid profile, cardiac enzymes, and erythrocyte sedimentation rate. Additional laboratory tests may be performed as needed and based on the patient's medical history. These include tests for hypercoagulable states, toxicology screenings, antiphospholipid antibodies, syphilis serology, hemoglobin, which a process known as serum protein electrophoresis, and cerebrospinal fluid analysis. [7]

Within 24 hours after the beginning of symptoms, brain imaging should be done as follows: Diffusion-weighted MRI (magnetic resonance imaging) is recommended, but noncontract CT can also be used in its place if MRI is not an option. Urgent imaging of the cerebral vasculature is required, ideally along with imaging of the brain. Carotid Doppler ultrasound of the neck, computerized tomographic angiogram (CTA), or magnetic resonance angiography, also known as (MRA) are all examples of vascular imaging for TIA. [8]

System To distinguish between stroke patients who should get thrombolytic treatment from those who are at elevated risk for stroke and should remain in the hospital for monitoring and from individuals who could be safely released, rapid screening for individuals with probable TIA is required [9,10]. Three scoring systems that consider these risk factors are currently used for triage, as shown in the table below: the California score, the ABCD outcome, as well as a combination of the two (ABCD2). The ABCD score considers age, blood pressure, clinical features (weakness/speech disturbance), transient ischemic attack duration, and diabetes history. The purpose of this study is to identify TIA patients who are at a high risk of stroke [12]. To assist emergency doctors in developing effective stroke prevention methods, our study examined the role of ABCD2 alongside additional risk variables in the capacity to predict the development of TIA to stroke.

Patients and methods:

Cross-sectional research was conducted over a 12-month period, from 12 January 2021 to 24 September 2022, at the emergency department of Baghdad Teaching Hospital, Medical City Complex, which is Baghdad, Iraq. The Department of Emergency Medicine at Baghdad Teaching Hospital and the Emergency Medicine Council on the Arab Board approved the study protocol, which includes a questionnaire for gathering information about the population of interest (name, age, occupation, address, medical condition, smoking, drug use, weight gain, symptoms and signs, examinations, and all medical records) and the outcomes that were considered. The selection of patients was based on the criteria for inclusion and exclusion that were determined. Before including any patients in the study, verbal agreement was acquired from each one of them.

One hundred ninety-seven patients with stroke were assessed, and only 150 patients are within the inclusion criteria, so the total number included in this study was 150 patients. All patients were submitted to full history, physical examination, checking the previous medical records, non-contrast CT scan, which was interpreted by an expert radiologist, and ECG. All patients with single Ischemic Stroke which were preceded by TIA or not. Furthermore, Haemorrhagic Stroke -Atrial Fibrillation-Two and more TIA -Repeated Ischemic Strokes, those patients that we could not get their medical records. The statistical program for social science (SPSS) application for Windows 20th edition was used to enter and analyse patient data. Frequencies and percentages were used to show descriptive data. Chi-square was employed to determine the correlation's significance as well as to calculate the risk as well as the severity of the correlation. P-value, or level of significance, less than 0.05 is regarded as significant. Tables and/or figures were used to convey the results and conclusions together with an explanation. We separated the patients into two groups: group 1, which included solely ischemic stroke patients, and group 2, which also included ischemic stroke patients who had previously had TIA. Then, for those with ischemic stroke that was preceded by TIA, we compute the ABCD2 score to examine the impact

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of risk variables and the interval between the incidence of TIA and the onset of stroke. Patients having scores more than three are thought to have high scores, and those with scores of three or less are seen to have low risk.

The score includes the following:

1- Age. Given 1 point for age ≥ 60 and zero for <60 years old.
2- Blood pressure. Given 1 point for BP ≥ 140/90 and zero for <140/90 old.
3- clinical characteristics. For speech disruption without weakness, you receive 1 point, and for unilateral weakness, you get 2 points.
4- Duration of clinical features. From 10-59 minutes, given 1 point, and duration ≥ 60 minutes, given 2 points.
5- DM. Gave 1 point.

We try to evaluate other risk factors in relation to patients that were developed TIA before stroke; these include:

1. Smoking. regular smoker Patients were classified as smoking if they were either still smoking at the time of the initial stroke/TIA or had ceased smoking three months before.
2- BMI >29 kg/m2 regarded as obese patient.
3- Multiple drugs for DM and HT.
4- Aspirin use. Daily use

Results:

Fig. (1) Shows the clinical distribution of patients was one hundred fifty Stroke patients enrolled in this study; of them, 94 patients (62.7%) had a stroke not preceded by TIA (group1), and 56 patients (37.3%) had stroke proceeded by TIA (Group 2).

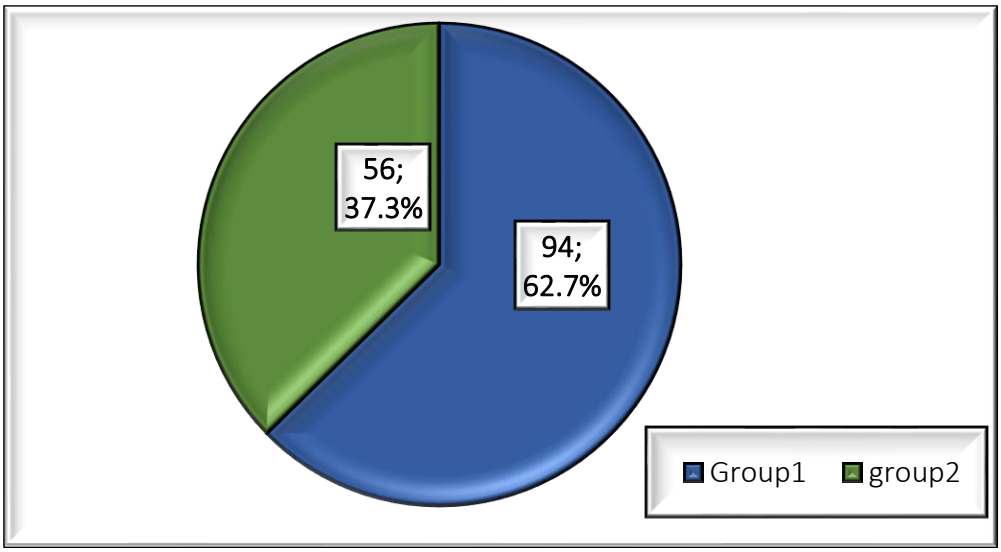

Figure 1. Distribution of patients according to clinical status.

The sociodemographic information about the patients is shown in Table 1, where the age distribution of the group 1 patients indicated that 41 (43.6%) of them were under 60 and 53 (56.4%) were 60 or older, as opposed to 34 (60.7%) with 22 (39.3%) of the group 2 patients, respectively. The change was not statistically significant, though (p-value = 0.063). Regarding gender, obesity, or smoking habits, there was no statistically significant difference between the two groups (P>0.05).

Table 1: Patient socio demographic information

ISSN NO: 2770-2936
Date of Publication:06-05-2023

Variable		Group1 patients N=94		Group 2 patient N=56		P-value
		No.	%	No.	%	
Age (years)	< 60	41	43.6	34	60.7	0.063
	≥ 60	53	56.4	22	39.3	
Gender	Male	67	71.3	44	78.6	0.33
	Female	27	28.7	12	21.4	
Obesity	Yes	44	46.8	24	42.9	0.64
	No	50	53.2	32	57.1	
Smoking	Yes	34	36.2	17	30.4	0.47
	No	60	63.8	39	69.6	

When comparing to 4 patients in the low-risk group and 20 patients with high risk TIAs, obesity was strongly related with the latter group in Table 2 (P 0.05). Regarding smoking, there was no discernible difference between the TIA groups with high and low scores (P > 0.05).

Table 2: The relation of smoking and obesity between high and low ABCD2 score TIA patients

Variable	High ABCD2 score (n=37)		Low ABCD2 score (n=19)		Total		P-value
	No.	%	No.	%	No.	%	
Obese	20	54.1	4	21.1	32	42.1	0.033*
Smoking	16	43.2	1	5.3	17	30.4	0.26

According to Table 3, there wasn't not a statistically significant distinction in the prevalence of DM and hypertension between the two groups under study (P=0.33). There were statistically significant differences between the two groups in terms of the number of antihypertensive medications used; those who did not use the medication made up patients in group 1 (8.5%) vs. patients in group 2 (19.5%), whilst those who did used the medication made up 38 patients (40.4%) vs. 22 patients (39.3%), two drugs users represented 28 patients (29.8%) vs. eight patients (14.3%)and three drugs users represented ten patients (10.6 %) vs. four patients (7.1%), these findings indicating that an overall inverse correlation between the occurrence of TIA with the number of drugs used, P=0.025.

ISSN NO: 2770-2936
Date of Publication:06-05-2023

Table 3: Frequency distribution of chronic diseases and medications used by patients.

Variable		Group1 patient N=94		Group2 patient N=56		P value
		No.	%	No.	%	
Hypertension	Yes	84	89.4	47	83.9	0.33
	No	10	10.6	9	16.1	
Anti-Hypertension drugs	Non	8	8.5	11	19.6	
	One drug	38	40.4	22	39.3	
	Two drugs	28	29.8	8	14.3	
	Three drugs	10	10.6	4	7.1	0.025 *
Diabetes	Yes	45	47.9	18	32.1	0.06
	No	49	52.1	38	67.9	
Anti-Diabetes drugs	Non	0	0	0	0	0.07
	One drug	41	43.6	14	25.0	
	Two drugs	4	4.3	4	7.1	
Aspirin taking	Yes	41	43.6	22	39.3	0.60
	No	53	56.4	34	60.7	

When comparing the age differences between the two groups in Table (4) for both genders, there was no discernible difference (P>0.05). The distribution of frequency of the result for group 2 is shown in Table (4). Thirty patients (53.6%) with TIA experienced stroke within seven days or less, in contrast to 26 (46.4%) during seven days or more.

Table 4: Outcome in Group2 patients (N=56)

Outcome	N	%
Stroke < 7 days	30	53.6

ISSN NO: 2770-2936
Date of Publication:06-05-2023

Stroke > seven days	26	46.4
Total	56	100.0

Table (5) shows most of the patients (66.1%) were a high ABCD^2 score of > 3, and 19 (33.9%) patients were a low score (≤3) among 56 patients who developed stroke preceded by TIA. By analysis of the correlation between the risk and duration to develop stroke, it had been significantly found that most patients (28) had a score of >3 (93%) were developing stroke after TIA; in contrast, 17 (65.4%) of the patients whose score was ≤ 3 developed stroke at > 7days (P< 0.001). By estimating the risk, the correlation between the ABCD2 score and the duration to develop stroke was highly significant; as the score increased, patients were more liable to develop stroke, and the time to develop the stroke was decreased; this indicates an inverse correlation between the ABCD^2 score and the time to develop stroke, all these findings demonstrated in table (3.5).

Table 5: Time to stroke between 56 patients in group 2 and the association with ABCD2 score.

Score	Time interval of TIA patient to evolve to stroke				Total		
	Less than seven days		More than seven days				
	N	%	N	%	N	%	P value
> 3	28	93.3	9	34.6	37	66.1	<0.001
≤ 3	2	6.7	17	65.4	19	33.9	<0.001
Total	30	100.0	26	100.0	56	100.0	

Discussion:

It is now understood that TIA is a precursor of approaching stroke as TIA and stroke constitute two distinct symptoms of the same illness. Unfortunately, it is difficult to predict when the next occurrence in certain patients will take place. The ABCD2 rating is a technique for determining the likelihood that a stroke will occur following a TIA. In this study, we discovered that 37.3 percent of stroke patients in the emergency room of our hospital had a TIA prior to their stroke (Fig. 1), according to Matthew S. Siket [13].

According to reports, around one-third of individuals who have TIAs do so because a stroke is about to happen. For a 2-year retrospective community-based database of all cerebrovascular events involving 176 participants during April 1, 2007, and March 31, 2009, Iacopo Cancelli et al. found that there was an elevated risk of stroke in 105 people (62%) with ABCD2 scores of higher than 3 who also experienced TIA. According to (20), group two's results in this study were 37 patients (66.1%), as opposed to 19 patients (33.9%), who had an ABCD2 score of equal to or less than 3. This was also supported by Katrin Holzer et al. in 2010, who assessed the prognostic significance for the ABCD2 [14] rating follow-up after TIA in 176 consecutive patients admitted to the stroke unit. They discovered that an ABCD2 score of over three was linked to a higher likelihood of

ISSN NO: 2770-2936
Date of Publication:06-05-2023

stroke in 117 patients (68%) (P 0.005). In our study, we found a relationship between ABCD2 score as well as time to stroke following TIA. Thirty patients (53.6%), of which 28 of them (93.3%) with scores in excess of three (p 0.001), experienced strokes within seven days of their TIA (table 5). In contrast, among those who experienced a stroke longer than seven days, 26 patients (46.4%) did so following a TIA, nine of whom had a high likelihood of stroke (ABCD2 in excess of 3), and 17 of whom had moderate risk. When Rothwell [16] explored this relationship in a population-based cohort research in 2005, he found that 45% of people with high ABCD2 levels experienced a stroke in seven days. Seven days following a TIA, the risk of stroke appears to be quite predictable. Furthermore, ABCD2 scores of four or higher increased the risk of stroke to 5.4 percent at the second day and fluctuated between 6.3% to 13.2% at seven days, according to research done by Kaushal H. et al. in 2008 in the USA. Scores below four were associated with a low probability of stroke (less than 2%) within two to seven days and may be candidates for returning home with critical outpatient evaluation. (23) 5.9% of all ABCD2 low-risk patients in Amy Fothergill [17] et al.'s study experienced a stroke seven days after their TIA. We both concur that this rate is greater than those that were reported in the preceding series. Despite the fact that our study demonstrated the value of the ABCD2 score in assessing the likelihood of stroke in TIA patients, Latha G. Stead et al. (2011) found that the ABCD2 score did not add additional value above an ED workup involving CNS and coronary imaging in the capacity to risk divide those with TIA in our group and methods of practice which involve brain as well as carotid artery imaging. In retrospective research conducted in 2011, this was additionally agreed upon with M.F. Giles [18] in order to support the idea of a tissue-based classification of TIA or stroke, at least in terms of predictive factors. later stroke was found in 28.2% of TIA patients who had a score >4 in Jie Yang et al.'s multivariate Cox regression study of TIA patients over a three-year period in 2010, indicating that it is a distinct risk factor for later stroke. Additionally, ABCD2 is a helpful tool for predicting long-term stroke risk following a TIA or mild ischemic stroke, in addition to predicting the immediate risk of stroke. We discovered that obesity, which was not included into the score, was significantly related with an elevated ABCD2 score, with 20 patients (54.1%) having a high score in comparison to four individuals (21.1%) having a low score (table 2). Whereas in Rexrode KM [19], (P 0.05). A clear correlation between weight increase and overall stroke risk (P 001) was found in a retrospective cohort study of 11600 US females conducted in 1997. During the 16 months of afterwards, 866 overall strokes (which includes 403 ischaemic strokes and 269 haemorrhagic strokes) were reported. (Which was in line with our study (28). Winter in Yaroslavl [20]. Waist circumference is a stronger predictor of cerebrovascular events than body mass index (BMI), according to case-control research conducted in 2013 on 1137 patients. The study indicated a substantial connection between the amount of abdominal fat and waist circumference and stroke/TIA, irrespective of other risk variables.

Conclusion:

Stroke is more likely to occur in TIA patients who have ABCD2 values of greater than three during seven days of the TIA. In this study, we discovered a strong relationship between weight and a high ABCD2 score as opposed to a low score. The number of antihypertensive medications has also been linked to a high ABCD2 score, which is independently linked to an increased likelihood of stroke post-TIA.

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ISSN NO: 2770-2936
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