The Role of Spiral Computerized Tomography in Diagnosis of Stroke

تقييم كفاءة المفراس الحلزوني في تشخيص الجلطة الدماغية

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المستخلص :

الهدف : تهدف الدراسة إلى معرفة كفاءة المفراس الحلزوني في تشخيص وتحديد أنواع الجلطة الدماغية .

المنهجية : تم فحص (١٦٢) مريضا (٩٩ من الذكور و ٦٣ من الإناث) وكانت أعمارهم تتراوح بين (١٣ – ٨٠) سنة وجميعهم كانوا يعانون من الجلطة الدماغية . جمعت العينات بطريقة عشوائية من وحدة المفراس الحلزوني في مستشفى بعقوبة التعليمي خلال الفترة من نوفمبر ٢٠١٠ – ديسمبر ٢٠١١ وتم فحص جميع المرضى سريريا" ومن ثم اجري الفحص بواسطة جهاز المفراس الحلزوني .

النتائج : من خلال هذه الدراسة تم التوصل الى نتائج تفيد إن الجلطة الدماغية تصيب مختلف العمرية وكلا الجنسين ولكن الذكور أكثر عرضة للإصابة بالجلطة الدماغية من الإناث . اظهرت نتائج الفحص بواسطة جهاز المفراس الحلزوني ان ٩٧ مريضا (٥٩،٩ %) مصاب بالجلطة الخثرية و٦٥ مريضا (٤٠،١ %) مصاب بالجلطة النزفية .

التوصيات : أوصت الدراسة بالتأكيد على إجراء الفحص بواسطة جهاز المفراس الحلزوني إذا لا توجد أية خطورة على المريض عند الفحص لأنه ذو دقة وكفاءة عالية في تشخيص الجلطة الدماغية وكذلك أوصت الدراسة بضرورة اعداد برامج توعية لتحسين معلومات الأشخاص حول عوامل الخطورة والعلامات السريرية المبكرة للجلطة الدماغية لكي تساعد في التشخيص والعلاج في وقت مبكر .

Abstract:

Objective: The aim of this study is to determine the role of spiral Computerized Tomography in the diagnosis and detection the types of stroke.

Methodology: One hundred sixty two patients (162) (99 males and 63 females) their ages ranging from (13 – 80) year, all of them are suffering from stroke. They were collected randomly from spiral Computerized Tomography unit in Baquba Teaching hospital during the period from November / 2010 to December / 2011 .All the patients were examined clinically and then done spiral Computerized Tomography examination.

Results : The results of this study showed that the stroke effected different age groups and both sex but males is more affected than the females .The results of spiral Computerized Tomography examination were 97 patient (59.9 %) have ischemic stroke and 65 patient (40.1 %) have hemorrhage stroke .

Recommendation: The study recommended that great focusing to do the examination by spiral computerized tomography if the patients have no contraindications for during examined with it because it has high accuracy and efficiency in diagnosis of the stroke, also recommended to do an educational programs to improve awareness of society about the risk factors and early clinical features to help of early diagnosis and management of stroke.

Keywords: Stroke, ischemic stroke, hemorrhage stroke, spiral Computerized Tomography.

Introduction:

Spiral Computerized Tomography is an x- ray procedure that combine many x-ray image with the aid of computer to generate cross – sectional views of the internal organs and structures of the body [1] .The principle of spiral Computerized Tomography is based on continuous movement of the patient and the scan beam moving a long helical path in relation to the patient , image reconstruction can be performed for any plane with three dimensional display and can detect small abnormal lesion [2] . Computerized Tomography is used in medicine as a diagnostic tool and as a guide for interventional procedures [3].

Stroke is the rapid loss of brain cell function in a localized area due to disturbance in the blood supply to the brain [4]. The brain is an extremely complex organ that controls various body function, blood is carried to the brain via a complex network of arteries and vessels, a stroke occurs when one of these arteries becomes blocked or ruptures and blood flow can't reach the region that controls a particular body function, the effect of stroke depend on where the brain was injured as well as how much damage occurred. A stroke can impact any number of areas including the ability to move, see, remember and speak [5]. Stroke can be classified into two major categories:

1. Ischemic stroke: It's occur when a blood vessel going to the brain becomes blocked also it's occur when arteries become narrow and clogged with plaque, plaque is a mix of cholesterol and other fatty stuff that thick to the wall of blood vessels and the blood can't get where it's supposed to be then this leading to dysfunction of the brain tissue in that area [6].

2.Hemorrhagic stroke : It's occur when a blood vessel in the brain ruptures and bleeds into surrounding brain tissue, the blood flow is lost to some cell as well , blood is very irritating and can causes swelling of brain tissue [7] . Both types of stroke result in a lack of blood flow to the brain [8].

Risk factor for stroke includes [9]:

Hypertension, cardiovascular disease , smoking, excess alcohol consumption and diabetes mellitus. The objective of these studies was to determine the role of spiral Computerized Tomography in the diagnosis and detection the types of stroke.

Methodology:

One hundred sixty two patients (162) (99 males and 63 females) their ages ranging from (13 – 80) year. they were collected randomly from spiral Computerized tomography unit in Baquba Teaching Hospital during the period from November / 2010 to December / 2011 .The studied variables were collected (age , gender , types & site of stroke and risk factors) , all patients were diagnosed clinically as stroke by neurologist and then done spiral Computerized Tomography examination , examinations of patients include preparing the patient to be examined ,told the patient to remove any metal objects from the head to avoid artifacts on the film and then patient is placed in supine position on the table , it is moved during the scanning , the head should be examined without any movement to reduce the artifacts .

The position of examine include: axial view &Coronal view. The results were statistically evaluated by using SPSS version 14, A P- Value of (0.05 or less) is considered significant ($P \leq 0.05$). The person chi – square (x^{2}) was also performed by using the same program software in addition to find the descriptive statistics used frequencies and percentage.

Results:

Table 1. Distribution of the Patients According to Age Groups

Age (year)	F	%
13 – 19	4	2.4
20 – 29	11	6.8
30 – 39	16	9.9
40 - 49	27	16.7
50 – 59	34	20.9
60 – 69	55	34
70 – 80	15	9.3
Total	162	100

F: Frequency , %: percentage

Table – 1 – Shows that the highest percentage of the study sample (34 %) was in age group (60 – 69) year ,while the lowest percentage of the study sample (2.4 %) was in age group (13 – 19) year.

Table 2. Relationship of Age with Gender of Patients

Age (year)	Males		Females	
	F	%	F	%
13 – 19	2	1.2	2	1.2
20 – 29	5	3.1	6	3.7
30 – 39	10	6.2	6	3.7
40 - 49	18	11.1	9	5.6
50 – 59	21	12.9	13	8
60 – 69	40	24.7	15	9.3
70 – 80	3	1.9	12	7.4
Total	99	61.1	63	38.9

F: Frequency , %: percentage

Table – 2 – Shows that the large number of affected age group between (60 – 69) year , they were 55 patient divided into 40 patient (24.7 %) were males and 15 patient (9.3 %) were females .

Table 3. Age Distribution of Patient with Types of Stroke

Variables	Types of stroke		Total	Comparison Significance
	Ischemic stroke	Hemorrhagic stroke		
Age (year)				HS P = 0.000 df = 5 X^2 = 37.852
13 – 19	3	1	4	
20 – 29	8	3	11	
30 – 39	7	9	16	
40 - 49	16	11	27	
50 – 59	20	14	34	
60 – 69	34	21	55	
70 – 80	9	6	15	
Total	97	65	162	
Gender				HS P = 0.003 df = 1 X^2 = 8 . 914
Male	66	33	99	
Female	31	32	63	
Total	97	65	162	

HS: Highly significant , p : probability level , df : degree of freedom , X^2 : chi-square

Table – 3 – Shows that there is high significant relationship between age and incidence of stroke (p = 0.000) also there is high significant difference in the incidence of stroke among males than that females (p = 0.003) .

Table 4. The Relationship between Types and Site of Stroke

Site of stroke	Types of stroke			
	Ischemic stroke		Hemorrhagic stroke	
	F	%	F	%
Right lobe	28	17.3	19	11.7
Left lobe	52	32.1	33	20.4
Both lobes	17	10.5	13	8
Total	97	59.9	65	40.1

F: Frequency , % : percentage

Table – 4 – Shows that the highest percentage of incidence the ischemic and hemorrhage stroke was in the left lobe (32.1 %, 20.4 %) respectively, and the lowest percentage of incidence the ischemic and hemorrhage stroke was in the both lobe (10.5 %, 8 %) respectively.

Table 5. The Incidence of Risk Factors in Different Types of Stroke

Risk factor of stroke	Ischemic stroke Total = 97		Hemorrhagic stroke Total =65		Comparison Significance
	F	%	F	%	
Hypertension	47	29	30	18.5	HS P = 0.000 df = 5 X^2 = 37.852
Diabetes Mellitus	33	20.4	16	9.9	NS P = 0.963 df = 5 X^2 = o.989
Smoking	25	15.4	13	8	
Cardiovascular disease	19	11.7	6	3.7	
Alcoholism	4	2.5	6	3.7	

HS : Highly significant , NS : non significant , p : probability level, df : degree of freedom , X^2 : chi-square

Table – 5 – Shows that the strong risk factor of stroke was hypertension and the lowest risk factor of stroke was alcoholism.

Discussion:

Age distribution : The majority of patients with stroke that involve in this study at the age between (60 – 69) year, they were (55 patient 34 %) , that mean the patient more susceptible to the stroke at this age because the risk factors increase with age (the older person has a higher risk of stroke)[10] . The results indicated that significant relationship between age and incidence of stroke (p = 0.000) .These results are in agreement with [11].

Gender distribution: In the present study noted there was a significant difference between both sex (p = 0.003) , the incidence of stroke among males more than that females. This phenomenon was accepted due to protective females hormones .This study agrees with [12].

Site of stroke : 97 patient (59.9 %) with ischemic stroke they are divided into : 28 patient (17.3 %) with ischemic stroke in the right lobe , 52 patient (32.1 %) with ischemic stroke in the left lobe and 17 patient (10.5 %) with ischemic stroke in the both lobes while 65 patient (40.1 %) with hemorrhage stroke they are divided into : 19 patient (11.7 %) with hemorrhage stroke in the right lobe , 33 patient (20.4 %) with hemorrhage stroke in the left lobe and 13 patient (8 %) with hemorrhage stroke in the both lobes .There is no relationship between the site and incidence of stroke .

Risk factors of stroke : The most important modifiable risk factors in stroke was hypertension, there was significant difference in the incidence of hypertension among types of stroke being present more in ischemic stroke (29 %) than hemorrhage stroke (18.5 %) , blood pressure was a strong risk factor for all types of stroke [13]. High blood pressure can damage blood vessel walls, causing scarring that promotes the build up of fatty plaque, this build up can narrow and eventually block blood vessel, Very high blood pressure can cause blood vessels in the brain to burst [14] . There was no significant difference in the incidence of Diabetes Mellitus, Smoking, Cardiovascular disease and Alcoholism, among types of stroke (**P** = 0.963).

Spiral Computerized Tomography finding :It is the best initial modality for diagnosis and detection the types of stroke, one hundred sixty two patient showed positive finding of stroke when investigated by spiral Computerized Tomography , 97 patient (59.9 %) diagnosed with ischemic stroke and 65 patient (40.1 %) diagnosed with hemorrhage stroke. Ischemic stroke is the most common type of stroke due to the ischemic stroke is caused by a blood clot that forms in an artery directly leading to the brain or occur when a clot develops somewhere else in the body and travels through the blood stream to the brain while hemorrhage stroke caused by the sudden rupture of an artery within the brain, blood is then compressing brain structures [15].

Recommendations:

The study recommended that great focusing to do the examination by spiral computerized tomography if the patients have no contraindications for during examined with it because it has high accuracy and efficiency in diagnosis of the stroke , also recommended to do an educational programs to improve awareness of society about the risk factors and early clinical features to help of early diagnosis and management of stroke .

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