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(Original Article)

Role of computed tomography in evaluation of cerebrovascular accidents in Taif city

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ABSTRACT

Background: Stroke is a syndrome caused by either (a) a blocked blood vessel or (b) a ruptured blood vessel that blocks blood flow to a part of the brain, resulting in cell damage and loss of brain function.

Objectives: The aim of this study was to evaluate cerebrovascular accident (CVA) patients with computed tomography (CT) and CVA-associated factors.

Methods: Data were collected from Taif hospitals from December 2021 to March 2022. A sample of 105 residents was taken. A series of 5x5mm axial sections were used in the imaging procedure (coronal and sagittal). They were most common in the age group (53-64 years), comprising 22.9% of the population. Also, age group (77-88).

Results: The incidence of infarcts was higher (86 patients (81.9%)) than hemorrhages (6 patients (5.7%)). Age was extremely significant in the Chi-Square test, but gender was not significant.

Conclusion: A CT scan is quick and simple; it is considered the gold standard for CVA.

1. INTRODUCTION

The 3rd leading cause of death in the U.S. is stroke or (CVA), which accounts for about or close to 1 in 6 deaths (17.5%)and 39.5 per 100,000 deaths annually, in addition to being a major

cause of adult disability (NCHS, 2022; Urja et al., 2024). A cerebrovascular accident is a syndrome caused by an interruption of blood stream to portion of the brain because of either (a) vascular blocking (infarct stroke, found in most of the cases); and (b) A ruptured blood vessel results in cellular injury and a loss of cerebral function. Currently, Venous thrombolytic therapy with recombinant tissue-type plasminogen activator termed alteplase is the only Stroke treatment certificated in the U.S and the European Communities (Sacco et al., 2013); (George et al., 2017). Although intravenous thrombolysis offers an advantage, its advantages gradually fade Time from onset of symptoms (Hacke et al., 2004), i.e. timeframe for intervention becomes as small as three hours. The patient's selection must therefore be done precisely and in an exceedingly due to the high number of patients with conditions aside from Brain ischemia is characterized by similar clinical results (Hacke et al., 2005). Using different imaging modalities to exclude hemorrhage or other mimicking lesions is crucial to finding a cure (Srinivasan et al., 2006).

In recent years, magnetic resonance imaging (MRI) has become less popular than computed tomography (CT) for the evaluation of stroke victims, since it is less widely available outside of major stroke centers and as well as being limited by patients' contraindications and intolerances (Tomandl et al., 2003). Furthermore, CT is fast and easy to perform in critically ill patients who rely on monitoring devices and support systems. In recent years, through the use of extra CT techniques like insertion CT and CT X-ray photography, the amount of data provided by medical specialists has increased. Infarct detection has been improved by combining nonenhanced CT, insertion CT, and CT X-ray photography with multimodal CT analysis (Ezzeddine et al., 2002; Wintermark et al., 2006) , give the ability to evaluate the extent of the collateral circulation, the infarct core, and the extent of vascular occlusion; and assessing the salvageable brain tissue (Tan et al., 2007). The nonenhanced CT alone requires only 10–15 minutes in this multimodal approach (Parsons et al., 2005). Major tertiary centers develop these imaging techniques under the expert guidance of neuroradiologists. Despite this, insertion CT and CT angiography are regularly used in stroke units worldwide, and it is vital that the resultant pictures be taken by the general physician who is on call at all times. However, even though this additional work and responsibilities can appear to be burdensome, we have found that perfusion CT and CT angiography are often helpful allies for a comparatively inexpert specialist, since the findings are frequently easy to construe than subtle signs on nonenhanced CT. A multimodal CT protocol for acute stroke will be discussed in the present article, with an emphasis on data gathering, processing, and analysis as carried out by the overall radiologist within casualty department (Parsons et al., 2005). The aim of this study was to evaluate cerebrovascular accident (CVA) patients with computed tomography (CT) and CVA-associated factors.

2. MATERIALS AND METHODS

2.1 Data collection and protocol

The data was conducted in Taif hospitals from December 2021 to March 2022, a sample of 105 residents of Taif city from different age was taken. Inclusion: males and females from 17 years and older. Exclusion: males and females under 17 years. Patients were diagnosed of CVA and send to department of the radiology for a CT scan. The scans from the anterior fossa floor to the tap of the head. A series of 5x5mm axial sections were used in the imaging procedure (Coronal and sagittal). In our research, we looked at patients who had a history of stroke. If the patient had an acute stroke, which is defined as a localized or global loss of brain function lasting more than 24 hours and occurring within two weeks of the patient's admission to the hospital, the study was classified a case of (CVA).

2.2 Ethical Approval

The institutional ethics and research committee approved the study to assure its compliance with the national and international ethical guidelines.

3. RESULTS

CT is an essential tool in the evaluation of patients with suspected stroke. It is rapid, widely available, and provides crucial information for guiding initial management. However, it should be complemented by other imaging modalities

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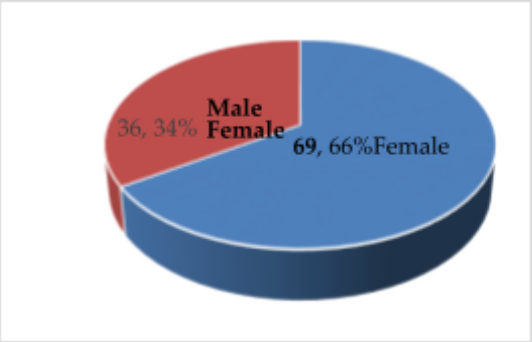
for a comprehensive stroke assessment. This study evaluated CVA patients with CT and CVA-associated factors in Taif City. Figure 1. Summarise the characteristics of the participants. The figure shows 69 (69.66%) males and 36 (36.34%) females. Table 1 presents the distribution of patients' gender among age groups. More than two-thirds of the patients are above 53 years old. Their ages ranged from 17 to 105 years, with mean age and standard deviation (SD) of 65.31 ±17.66 years. In the age group (53-64), 20 males and four females represent 22.9% of the population. Also, the age group (77-88) represents 22.9%, with 24 Subjects, 17 males and seven females. The age group (100>) years was the most minor (1%) of the population. Table 2 (A) shows CT findings of



CVA. 13 cases were found to be Normal (12.4%) of the cases. Six patients with bleeding (5.7%) of the cases. 86 patients had infarcts (81.9%). Table 3 shows the Chi-Square test of the effects of age and gender in (CVA) patients. The chi-square test showed a highly significant difference in age and a non-significant difference in gender. Table 3 shows the Chi-Square test of the effects of age and gender in (CVA) patients. The chi-square test showed a highly significant difference in age and a non-significant difference in gender. Figure 2 shows A CT image of an infarct in a patient 80 years old, while Figure 3 shows a CT scan of a 62-year-old patient with hemorrhage.

Figure 1: Gender of the patients.

Table 1: Distribution of patients gender among age groups

Age group	Gender		Total	Percentage
	Male	Female		
17 – 28	1	2	3	2.9%
29-40	3	1	4	3.8%
41-52	14	5	19	18.1%
53-64	20	4	24	22.9%
65-76	12	11	23	21.9%
77-88	17	7	24	22.9%
89-100	2	5	7	6.7%
>100	0	1	1	1%
Total	69	36	105	100

Table2(B): Crosstabulation of patients age and CT findings CT findings

Patients age (years)	Normal	Haemorrhage	Infarct	Total
17-28	3	0	0	3
29-40	2	0	2	4
41-52	7	2	10	19
53-64	1	3	20	24
65-76	0	0	23	23
77-88	0	1	23	24
89-100	0	0	7	7
>100	0	0	1	1
Total	13	6	86	105

Table2(C). Crosstab of patient's gender and CT findings

Count		CT findings			Total
		Normal	Haemorrhage	Infarct	
Patient Gender	Male	7	4	58	69
	Female	6	2	28	36
Total		13	6	86	105

Table 3. Chi -Square test of the effects of age and gender in (CVA) patients

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Variables	Chi-square	P-value
Gender	0.929	0.628
Age(years)	52.206	<0.001

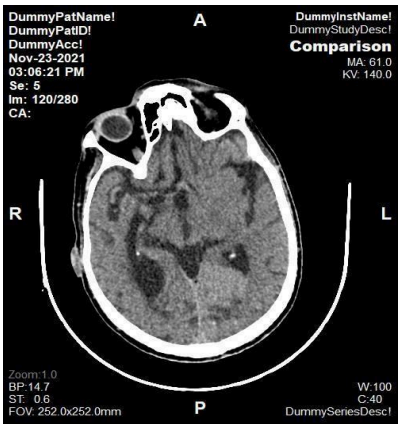

Figure 2: A CT image of infarct in a patient of 80 years old

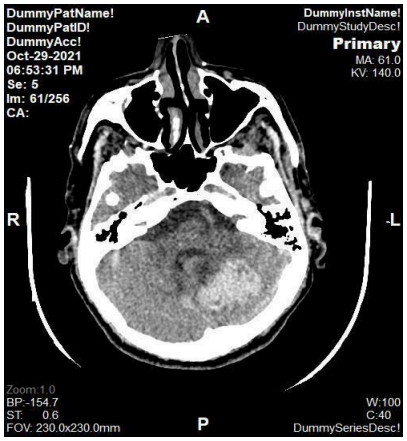

Figure 3: A CT scan of a 62 years old patient with hemorrhage.

4. DISCUSSION

CT can help distinguish between different types of strokes and aid in the early detection of cerebrovascular events (Parsons et al., 2005; Sinha & Karim, 2017). In senior patients, cerebrovascular accidents are the third leading cause of death and morbidity. Physicians relied heavily on history, physical examination, and other methods before the advent of CT scans. However, the accuracy of the diagnostic was less than 100 percent. In the study by Sinha and Karim (2017), CT scans have been shown to be useful in distinguishing between the types of strokes. The highest ratio of conditions in this research is infracted, whose percentage is (81.9%), as well as The research outcomes by Sinha and Karim (2017) and Kumar et al. (2016). Another high ratio of CT findings in this study is the Normal condition (12.4%), while that is different in Sinha and Karim's (2017) and Radha et al.'s (2019) studies.

In this research, hemorrhage is the lowest ratio (5.7%) in the distribution of patients with clinically suspected CVA, unlike the studies by Sinha and Karim (2017), Kumar et al. (2016), and Radha et al.(2019), which differ in the ratio levels. Also, in this study, the males are prone to stroke more than females, with an amount of 69.66%, which is the same situation in the other studies. In this study, the most common age that is prone to infract and hemorrhage strokes is the group of (77- 88) years, and that varies with the other three studies that we looked at which all of the studies agreed with the group of (60-69) years as the most common group of age that is prone to infract and hemorrhage strokes in their studies.

5. CONCLUSION

CT scanning is a crucial approach for diagnosing acute stroke since effective stroke management relies on correct diagnosis. It should be performed in all cases. Regardless of the CT limitations, because CT may not detect small ischemic lesions in the early stages of stroke and does not provide information about brain function or blood flow, CT scans are quick and straightforward to perform and are considered the gold standard for CVA for the initial evaluation of patients with suspected stroke. It plays a pivotal role in determining the type of stroke and guiding immediate management and prognostication.

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CONFLICTS OF INTEREST:

The authors declare no conflicts of interest.

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