

Variation Of Radiological Features of Stroke Patients In Different Age Groups And The Risk Factors Involved: An Observational Study

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Abstract

Stroke is the most common cause of disability worldwide and in the case of morbidity, it follows myocardial infarction. We performed an observational study determining which area is most commonly involved in stroke patients according to age and the risk factors associated. All patient data were obtained from the Capital hospital Islamabad stroke database between January 2017 and October 2017. Ethical review of the study was taken from the institutional review board and the ethical committee of Capital Hospital Islamabad. The patients with symptoms of stroke were included in the study. Patients with stroke on CT but pronounced dead on arrival were excluded. CT scans were performed using a single slice spiral scanner (General Electric® Synergy Plus). Each CT scan was read by a radiologist on duty with a consultant review. The scans were checked for hemorrhage and ischemia. The extent and chronicity of hemorrhage and ischemia were noted. The infarct location was assessed by CT findings. Lacunar infarct was seen as a small lesion less than or equal to 25 mm [14]. The cerebral cortex has a frontal lobe, a temporal lobe, a parietal lobe, and an occipital lobe. The area of the stroke involvement was noted according to the lobe involvement. Also, brain stem stroke, cerebellar stroke was included in the study. The total number of participants in the study was 102. The final total number of participants after the implementation of the inclusion and exclusion criteria was 102 (71 males, 31 females). The median age of the participants was 64 years. The average age was 61 years with a male preponderance. As expected, many patients had multiple co-morbidities, including hypertension and diabetes. Most of the patients (45%). LH stroke was more common than RH stroke (79% and 21% respectively). A total of 82 Ischemic strokes and 20 hemorrhagic strokes were present. Stroke is a disabling disease causing a major burden on society. Modifiable health behaviors can help reduce their incidence. Hypertension, diabetes, smoking, and other factors need to be properly managed by modifying lifestyle and proper medications which may avoid and postpone stroke.

Introduction

Stroke is the most common cause of disability worldwide and in case of morbidity it follows myocardial infarction [1]. Stroke is a disease which is disabling and distressing and at times fatal [2, 3, and 4]. Usually left cerebral hemispheres are more affected as compared to the right ones in young individuals with stroke. The difference may be due to the vessel wall, flow of blood in the left carotid artery that lead to changes in the left carotid artery leading to left hemisphere stroke

Materials and Methods

All patient data were obtained from the Capital hospital Islamabad stroke database between January 2017 and October 2017. The patients with symptoms of stroke were included in the study. CT scans were performed using a single slice spiral scanner (General Electric® Synergy Plus). Each CT scan was read by a radiologist on duty with consultant review. The scans were checked for hemorrhage and ischemia. The extent and chronicity of hemorrhage and ischemia were

[5, 6, and 7]. The right and left cerebral hemisphere strokes also have different severity and outcomes [8, 9, and 10]. Noncontract computed tomography (CT) is a gold standard for patients with stroke [11, 12]. Computed tomography (CT) can help differentiate hemorrhagic and ischemic stroke. Normal CT scan excludes hemorrhage and infarction, hemorrhagic stroke appears white on a CT [13].

noted. Infarct location was assessed by CT findings. Lacunar infarct was seen as a small lesion less than or equal to 25 mm [14]. Cerebral cortex has a frontal lobe, a temporal lobe, a parietal lobe, and an occipital lobe. Area of the stroke involvement was noted according to the lobe involvement. Also, brain stem stroke, cerebellar stroke was included in the study.

Results: The total number of participants in the study was 102. The final total number of participants after the implementation of the inclusion and exclusion criteria was 102 (71 males, 31 females). The median age of the participants was 64 years. The average age was 61 years with a male preponderance. As expected, many patients had

multiple co-morbidities, including hypertension and diabetes. Most of the patients (45 %). LH stroke was more common than RH stroke (79 % and 21 % respectively). A total of 82 Ischemic strokes and 20 hemorrhagic strokes were present.

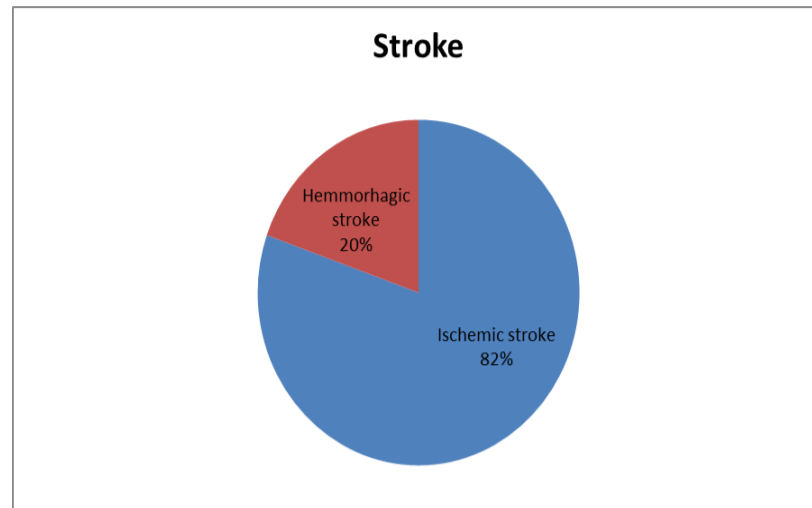


Figure 1: The type of stroke ischemic or hemorrhagic.

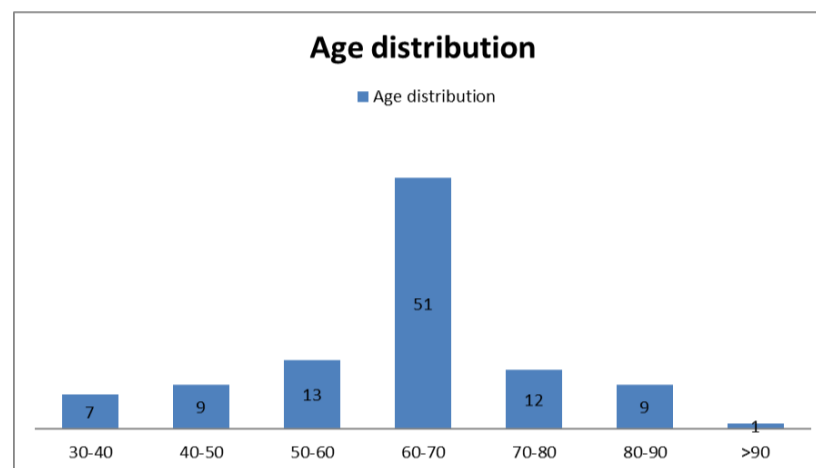


Figure 2: Age distribution of the patients.

Table 1: Area of involvement on CT scan.

Area of involvement	Frequency
Frontal lobe	08 (0.07%)
Temporal lobe	23 (12.7%)
Parietal lobe	47 (46%)
Occipital lobe	07 (16.6%)
Brainstem	12 (11.7%)
Cerebellar lesion	05 (0.4%)

Table 2: Factors assessed are: Total 82 ischemic strokes, 20 were hemorrhagic.

Factors	Lacunar infarct	Non lacunar infarct	Hemorrhagic stroke
Age ≥ 60 years	39	20	15
Male gender	31	30	18
Hypertension	32	20	13
Smoking	43	45	19
T2DM	22	23	3
Hypertension+T2DM	12	11	1
Alcohol intake	00	00	00
Abdominal obesity	12	8	2
Hypercholesterolemia	05	02	1

Table 3: Area of involvement with respect to age.

Age	Area most commonly involved
30-40	Temporal involvement (66%)
40-50	Brain stem (52%)
50-60	Temporal (54%)
60-70	Parietal (59%)
70-80	Parietal involvement (81%)
80-90	Parietal (66%)
> 90	Parietal (79%)

Discussion

Stroke is a disabling disease, causing a burden on the economy. Incidence increases with age. It has a prevalence of 795,000 and a mortality of 145,000 deaths per year [4]. The involvement of various hemispheres in stroke affects the outcome [15, 16]. Usually, the left hemisphere involvement is most common and carries a bad prognosis as compared to lesions involving the right hemisphere. The cause lies in the left middle cerebral artery involvement in the left hemisphere large vessel strokes. A retrospective study stated the Right hemisphere is more commonly involved [17]. Whereas our study states that the left hemisphere is more commonly involved as compared to the right hemisphere. The left hemisphere has more metabolic demand than the right hemisphere in children [18]. This might result in more delayed recovery in the left hemisphere involving strokes even in adults [19, 20]. Age is a non-modifiable risk factor for ischemic stroke [21, 22, and 23]. Left cerebral hemispheric (LH) lesions are common than right in young adults because the left hemisphere has more metabolic demand [24-26]. Our results are consistent with a previous study indicating the stroke incidence increases with age [27]. In Framingham, women were affected late in life by stroke as compared to males which may be due to increased activity [28]. This was consistent with our study, our observations were that males are more frequently affected. Women had more

disability as compared to men and were admitted more frequently to nursing home [29]. Recent studies show ischemic strokes occur more commonly than hemorrhagic ones as shown in our study too [30, 31]. In the Chinese population hemorrhagic stroke is more common as stated by a study [32]. A study in Kolkata stated that the thalamic region was the most common site of hemorrhagic infarct and the subcortical region was most commonly involved in ischemic stroke [33]. Our study showed the most area involved in Ischemic and hemorrhagic stroke was parietal. Ischemic stroke contributes to about 80% of the strokes and hemorrhagic making the rest [34]. In a population-based study, young patients with stroke were 8.8% which was consistent with the western population [35, 36]. Lacunar infarct constitutes 20 to 25 % of all ischemic strokes, the same as our results [37, 38, and 39]. Horowitz stated data of patients with lacunar infarct hypertension was present in 68 %, diabetes in 37 %, and both in 28 % which is consistent with our study too [40]. Hege Ihle-Hansen et al stated two risk factors for stroke smoking and hyperlipidemia and Femi et al stated hypertension and smoking as prime risk factors [41]. He stated that 18% of strokes may be caused by cigarette smoking. Alcohol on the other hand increases the risk of hemorrhagic stroke [42, 43].

Conclusion

Stroke is a disabling disease causing a major burden on society. Modifiable health behaviors can help reduce their incidence. Hypertension, diabetes, smoking, and other factors need to be

properly managed by modifying lifestyle and proper medications which may avoid and postpone stroke.

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