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Original Article

Deep Vein Thrombosis in Stroke Patients Presenting to Lady Reading Hospital Peshawar

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Abstract

Objective: The purpose of this study was to ascertain whether stroke patients and deep vein thrombosis were related.

Methods: The general medicine department of Lady Reading Hospital in Peshawar is where this descriptive case series study was carried out. The study was carried out between July 15, 2020, and January 15, 2021. The study included a total of 225 stroke patients of all genders. On the fourteenth day after the stroke, a Doppler ultrasound was conducted to check for deep vein thrombosis in all of the patients. According to the operational definition, deep vein thrombosis was observed.

Results: The study encompassed a 30- to 70-year-old age span, with a mean age of 56.6±7.1 years and a mean weight of 83.8±7.1 kg. 60% of male patients had a stroke, 59.6% had hemorrhagic strokes, and 40.4% had strokes. Ten percent of the patients had deep vein thrombosis.

Conclusion: Patients with higher weights, males, and adults (30–50 years old) were more likely to get deep vein thrombosis. Furthermore, patients with hemorrhagic stroke showed a significant increase in Deep Vein Thrombosis. A prospective investigation comprising further examinations is required to determine the frequency of DVT in stroke patients as well as the pertinent risk variables.

Keywords: Stroke, Hemorrhagic, Ischemic, Deep Vein Thrombosis

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Introduction

Stroke is a leading global cause of mortality and disability. Individuals who have experienced an acute stroke may be susceptible to venous thromboembolism (VTE).[1] The incidence of VTE for both asymptomatic and symptomatic deep vein thrombosis (DVT) among stroke patients who did not get antithrombotic medication during follow-up was 17% in a meta-analysis involving patients with acute ischemic stroke from multiple randomized controlled trials.[2,3] Even though only 1% of patients experience a clinically obvious pulmonary embolism (PE) in the first 14 days following an ischemic stroke, PE can cause up to 25% to 50% of fatalities in this time frame.[4] The first three months following a stroke have been found to carry a heightened risk of VTE, according to population-based research. Since only advancing age and obesity have been consistently linked to VTE among the atherosclerotic risk factors, confounding caused by the existence of common atherosclerotic risk factors appears to be a poor explanation for this association.[5] In stroke patients, deep vein thrombosis occurred 12.4% of the time.[6]

Given that there are about 100 instances of DVT for every 100,000 patient-years in Western countries, there is a significant illness burden related to DVT.[7] Although it has increased recently, Asia's DVT incidence is still lower than that of Western nations.[8] Independent of the age, nature, and intensity of the stroke.[8] For this reason, specialty clinics are crucial to the care of stroke victims.[9] Treatment with the goals of stabilizing the patient's state, managing critical functions, and aggressively treating issues that could impede recovery is recommended for all strokes with chronic neurological impairments. This is the centerpiece of the stroke therapy

regimen.[10]

Acute heart failure, atrial fibrillation, myocardial infarction, neurogenic stressed cardiomyopathy, paroxysmal sympathetic hyperactivity, and abrupt death are among the complications that might arise after an acute stroke.[11] Of stroke patients who have never had diabetes before, 60% develop hyperglycemia. Following a stroke, hyperglycemia is typically linked to significant infarction volume and cortical damage, as well as a poor prognosis for the illness. It is currently not advised to routinely provide insulin infusions to patients who have mild hyperglycemia.[12]

Intravenous administration of recombinant tissue plasminogen activator (tPA) boosts the probability of a positive result approximately eight times in three months if it is done during the first ninety minutes of a stroke, twice in the 91–180 minute window, and 1.4 times in the 181–270 minute window.[13] When tPA[14] is provided up to 270 minutes after the stroke begins, the mortality remains unchanged, but rises with subsequent administration. Hemorrhagic transformation is more common in older individuals (15 years of age and larger strokes).[13]

Although efficacy of putative neuroprotectors has been demonstrated in experimental research, human population data has not supported this. A series of molecular events that result in cell death have served as the basis for the development of numerous neuroprotective drugs. The current clinical status of medications designed as neuroprotective agent is reported below.[14] While hypothermia is a potential neuroprotective strategy, its use is restricted to extreme situations especially in patients experiencing malignant heart attacks and still requires randomized trials. Decompressive neurosurgery, often known as hemispherectomy, reduces mortality and disability in individuals under 60 who have suffered a severe stroke in the middle cerebral artery basin.[15]

According to some research, individuals with cerebral bleeding who have enlarged ventricles and occlusion of the third and fourth ventricles should have a recombinant tissue plasminogen activator introduced directly into the ventricular system, as this can improve the functional outcome.[16] Heparin is not advised during the acute period of a stroke; using it results in a marginal reduction in the incidence of subsequent strokes, an undefined decrease in death, and a disability with an increase in intracranial hemorrhages.[17] The purpose of the study was to ascertain how frequently stroke patients who come to Lady Reading Hospital in Peshawar also had deep vein thrombosis.

Methods

This six-month descriptive case series study was carried out at the general medicine department of Lady Reading Hospital in Peshawar, Pakistan, from July 15, 2020, to January 15, 2021. Using the WHO sample size calculator, a sample size of 225 was determined, with a 95% confidence interval, a 2% margin of error, and a 2.4% frequency of deep vein thrombosis.[18] To select patients, a non-probability consecutive sampling strategy was employed. Individuals between the ages of 30 and 70, regardless of gender, who met the specified criteria for stroke, were added to the study. Exclusions from the study included patients with a history of brain tumor, cerebral venous thrombosis on CT scan, transient ischemic attack (weakness, numbness, or paralysis in face, arm, or leg, usually on one side of the body), and previous history of violent transfusion encounters. Prior to starting the trial, the hospital gave its ethical permission. Before being recruited for this study, patients and attendees also had to sign consent forms. The study comprised patients who met the inclusion criteria from the General Medicine Department at LRH, Peshawar. The patient attendant received a thorough explanation of the study's participation requirements, and an informed consent form outlining the benefits and hazards was signed. Basic demographics were recorded, including age, gender, and weight on a scale.

On the fourteenth day after the stroke, a Doppler ultrasound was conducted to check for deep vein thrombosis in all of the patients. At two-centimeter intervals, the transverse planes of the calf's deep veins were carefully inspected. The patient was assessed in a supine position, with a more proximal evaluation extending from the level of the inguinal ligament to the adductor canal. The popliteal vein was examined at its trifurcation in the upper calf. The remaining calf veins were examined up to the malleolus. According to the operational definition, deep vein thrombosis was identified. A consultant radiologist with three years of post-fellowship experience conducted the ultrasound. The researcher personally recorded information about deep vein thrombosis on specifically created proforma.

A statistical analysis program (SPSS V. 23 software) was used to analyze the data. For qualitative variables including gender, kind of stroke, and Deep Vein Thrombosis, frequency and proportion were examined. For quantitative factors like age and weight, the mean ± SD was shown. Stratification was used to control effect modifiers such age, gender, type of stroke, and weight. A chi square test was used for categorical data and a p-value of less than 0.05 was deemed statistically significant.

Results

A total of 225 patients were recruited with age range from 30 to 70 years with mean age of 56.6±7.13 years and mean weight was 83.8±7.19kg. Among total 225

patients, in which male were 60% (n=135) and female were 40% (n=90). Stroke patients were categorized in two groups; hemorrhagic (59.6%, n=134) and Ischemic (40.4%, n=91). Among total, 10.2% (n=23) patients were observed with Deep Vein Thrombosis (Table 1).

Table 1: *Gender-wise, Type of Stroke, and Deep Vein Thrombosis distribution of patients.*

Gender	Frequency %(n)
Male	60 (135)
Female	40 (90)
Type of Stroke	
Hemorrhagic	59.6 (134)
Ischemic	40.4 (91)
Deep Vein Thrombosis	
Yes	10.2 (23)
No	89.8 (202)

All the recruited patients were categorized in different categories. Age-wise patients were classified in which 12.5% patients with Deep Vein Thrombosis were observed in age group 30-50 years and 9.7% patients were found in 51-70 years age group with Deep Vein Thrombosis and the p-value was found 0.600. Among total, 12.5% Deep Vein Thrombosis patients were found male patients which is non-significantly more than 6.7% female patient's number. A significant association (p-value 0.001) was observed between the Hemorrhagic stroke and Deep Vein Thrombosis which was found 15.7% Deep Vein Thrombosis patients while Ischemic stroke patients were 2.2% patients. It is observed that patients with lower weight than 80kg were non-significantly more affected with Deep Vein Thrombosis as compared to weight of greater than 80kg with 7.9%.

Table 2: *Classification of Deep Vein Thrombosis according to Age, Gender, Type of Stroke, and Weight of Patients*

Age (years)	Deep Vein Thrombosis		P-value
	Yes %(n)	No %(n)	
30-50	12.5 (05)	87.5 (35)	
51-70	9.7 (18)	90.3 (167)	0.600
Total	10.2 (23)	89.8 (202)	
Gender			
Male	12.6 (17)	87.4 (118)	0.151
Female	6.7 (06)	93.3 (84)	
Type of Stroke			
Hemorrhagic	15.7 (21)	84.3 (113)	0.001
Ischemic	2.2 (02)	97.8 (89)	
Weight (kg) of Patients			
. . .	7.9 (06)	92.1 (70)	0.410
>80	11.4 (17)	88.6 (132)	

Discussion

According to this study, men were more likely to get DVT. A Japanese study, found that among patients with cerebral hemorrhage, a larger proportion of females developed DVT[19], which contradicts the findings of my study. Both the Asian and Caucasian cohorts of ischemic stroke patients showed similar outcomes, despite the trend not reaching a significant level.[20,21] Deep vein thrombosis (DVT) was more common in the general population in the male patient, which indicates that the differences in DVT prevalence between the gender can be explained by the heterogeneity in the study populations.[22] 10.2% of the participants in this study had deep vein thrombosis. According to a study by Liu et al., 12.4% of stroke patients had deep vein thrombosis.[23] A different study by Rinde et al., revealed that 2.4% of stroke patients had deep vein thrombosis.[24] According to research, oral contraceptives (OCPs) are the main factor contributing to thrombosis in young women, with a four-month increase in thrombosis risk following the initiation of OCPs.[25] In addition, the HERS experiment evaluated the association between hormone replacement therapy (HRT) and venous thromboembolism (VTE) and discovered that HRT usage doubled the risk of VTE, with the greatest effect occurring in the first year of treatment.[26] However, because OCPs and HRT were rarely used in our sample due to older age or cultural differences, these phenomena are hardly sufficient to explain the greater incidence of DVT among female stroke patients.

Additionally, a different study confirmed and strengthened the link between obesity and DVT[27]. Being overweight might limit venous return because fat in the body obstructs healthy blood flow. Additionally, fatty tissue displayed a hypofibrinolytic, prothrombotic, and proinflammatory function. It has been discovered that the risk of DVT is directly correlated with body weight, with underweight people generally having a lower risk and obese subjects having a much higher risk.[28] Interestingly, Pomp et al., found that compared to women with a normal BMI who did not use OCPs, obese women who took these agents had a thrombotic risk that was 24 times higher.[29] However, there is conflicting evidence about the relationship between VTE formation and propensity in settings including smoking, hypertension, and ischemic heart disease. Another well-known cause of DVT is cancer. Twenty percent of patients with symptomatic deep vein thrombosis have an active cancer that is known to exist.30 Deep-vein thrombosis incidence has been shown to be more frequently asso-

ciated with patients with the hemorrhagic stroke subtype.[31] Even after adjusting for stroke severity, these findings are congruent with our analysis.

Our study has some important limitations; complications and the DVT's origin were noted. A comprehensive multivariate analysis on DTV predictors would have required a larger number of DVT-positive patients (n = 23), however this was not the case. A prospective investigation involving further examinations is required to determine the frequency of DVT in stroke patients and to pinpoint the critical risk factors.

Conclusion

In summary, the first 14 days following an acute stroke are highly predictable in terms of DVT risk. Acute stroke patients with low, intermediate, and high risk of deep vein thrombosis can be identified by combining data on demographics, significant comorbidities, and the severity of the stroke at admission. Giving these patients particular attention and the proper DVT prophylaxis may be justified in order to avert possibly fatal thrombotic effects.

Ethical Approval: The IRB/EC approved this study via letter no. 480/LRH/MTI dated 16-06-2020.

Conflict of Interest: None

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