

Association Between Stroke and Hypertension and Deep Vein Thrombosis in Northern Saudi Arabia: Community-Based Study

Ahmad Soud Alzayed^{1*}, Hussain Gadelkarim Ahmed², Faisal Soud Alzayed¹, Kareem Saleh Alshammari¹, Aqeel Jazaa Alshammari¹, Amjad Tallaa Ali Tallaa¹, Abdulaziz Farhan Alharbi¹,
Mohannad Yousef Aljarallah¹, Ziyad Ali Alosayfir¹

¹College of Medicine, University of Hail, Hail, ²College of Medicine, University of Hail, Molecular Diagnostics and Personalized Therapeutics Unit, University of Hail, Hail, Saudi Arabia

*Corresponding author: Ahmad Soud Alzayed. E-mail: Dr.alzayed99@gmail.com Phone number:+966550990686

ABSTRACT

Background: Deep venous thrombosis (DVT) is a serious complication of various medical conditions including acute stroke.

Objectives: We aimed to analyze the association between stroke toward hypertension (HP) and deep vein thrombosis (DVT) in northern Saudi palpatations.

Methods: Cross-sectional study was performed, all incident stroke events during follow-up were identified by searching the hospital discharge diagnosis registry, and previous patient's medical records. Also, we conducted a questionnaire survey among population of North Saudi Arabia including 15 cities.

Results: Our study showed that HP, and DVT which is definitely associated with stroke occurs only in approximately 5% of patients and significantly affects mortality among population from northern Saudi.

Conclusion: Severe HP events with no stroke incidence is associated with increased risk of DVT especially in Male and age group above 55 years. Therefore, it may be reasonable to provide this group of patients with additional care and proper DVT prophylaxis in order to minimize the risk of stroke. Also, those patients with HP should be managed and followed regularly especially elderly patients who are at risk.

Keywords: hypertension, Stroke, Deep vein thrombosis, Soudi Arabia.

INTRODUCTION

Hypertension (HP) is one of the major causes of condition burden all over the world ^[1]. In 2000, it was estimated that about 1 billion cases endured hypertension as well as by 2025, the number is predicted to increase to 1.56 billion ^[2]. It is among the most important risk aspects for cardiovascular disease, stroke, coronary artery disease, as well as sudden death ^[3]. Excessive weight, cigarette smoking and alcohol intake have actually been reported to play vital duties in the threat of uncontrolled and unattended high blood pressure ^[4, 5]. Deep capillary apoplexy (DVT) is a systemic disease with an incidence of 67 per 100,000 of situations yearly ^[6]. DVT, including lung blood clot, is a serious complication of various clinical stroke conditions which is formed mainly within 2 weeks' post-stroke ^[7]. Its occurrence in debilitated post-stroke patients ranges from 10 to 75%, depending upon the diagnostic technique and also time of assessment ^[2, 7]. According to the literary works, the major threat elements of post-stroke DVT are older age and hypertensive patients ^[6, 7].

HP was observed in over 60% of the stroke patients ^[4]. Hence, BP management is highly

suggested. Guidelines advise for intravenous (i.v.) anti-hypertension medicine to streamline treatment, as well as for comfort and also effectiveness ^[3, 4]. Nevertheless, the optimal technique for HP-lowering management continues to be contradictory ^[7]. Furthermore, a high BP is beneficial to preserve blood circulation in the ischemic brain. Nonetheless, it might also be damaging when it comes to brain edema and hemorrhagic stroke ^[6]. We aimed to analyze the association between stroke toward hypertension (HP) and deep vein thrombosis (DVT) in northern Saudi populations.

METHODOLOGY

Cross-sectional study was performed, all incident stroke events during follow-up were identified by searching the hospital discharge diagnosis registry, and previous patient's medical records. Also, we conducted questionnaire survey among population of North Saudi Arabia including 15 cities as shown in table (1). Participants who developed stroke during the specific period contributed in our survey, and included the date to date of diagnosis of the stroke and other concerned diseases (hypertension, and

DVT or venous thromboembolism (VTE) for each participant. Also, the age and gender must be recorded in our study.

Statistical analyses were performed using SPSS version 21.0 to evaluate the association between stroke incidence with hypertension cases and DVT.

The study was done after approval of ethical board of University of Hail.

RESULTS

During follow-up of several years through patient’s records, out of 4243 patients, 64 developed stroke in Northern region of Saudi Arabia, mainly Hail city with (n =27) and superb. Baseline location distribution of patients with stroke of the study participants are shown in table (1).

The mean age, as well as the proportions of men and subjects with hypertension were higher in stroke patients than in those without stroke (tables 2&3). Male (n =42) were the majority stroke patients and patients in group aged between 56-70 years were the most affected group. Result showed that young patients under 25 years were less likely to be stroke patients (n=1) (table 3).

Table 1: Stroke Patients distribution according to location

location	Stroke		Total
	Yes	No	
Hail	27	1746	1773
Baggaa	2	106	108
Ajfar	3	144	147
Turba	1	107	108
Shinan	2	146	148
Simira	1	149	150
Rodah	3	185	188
Gazala	1	185	186
Jubah	0	126	126
Om-algiban	0	91	91
Hayt	1	291	292
Solyimi	8	367	375
Ogla	2	199	201
Saayra	0	143	143
Gaaed	13	194	207
Total	64	4179	4243

Table 2: Stroke Patients associated with age

Age	Stroke		Total
	Yes	No	
< 25 years	1	1011	1012
26-40	2	1128	1130
41-55	16	979	995
56-70	30	705	735
71+	15	356	371
Total	64	4179	4243

Table 3: Stroke patients according to Gender

Sex	Stroke		Total
	Yes	No	
male	42	2098	2140
Female	22	2081	2103
Total	64	4179	4243

HP among participants without and with incidence of stroke are higher than those patients with hypertension as shown in table (4). In participants without stroke, 2022 HP events were identified during our study. Patients suffering from hypertension with stroke (n =28) were less than those having stroke but no event of hypertension (n =34) (table 4). In the other hand, stroke patients without hypertension were higher in our study (n=1994).

Table 4: Hypertension in present of stroke

Hypertension	Stroke		Total
	Yes	No	
Yes	28	1994	2022
No	34	2151	2185
Total	62	4145	4207

Deep venous thrombosis (DVT) is a complication of stroke. One of our aims was to determine the frequency of DVT in patients with stroke. A total of 64 consecutive patients with stroke were enrolled. Deep venous thrombosis was found in only 9 patients out of 64. Those with stroke but no DVT were the majority which was 54 patients (table 5).

Table 5: Stroke incidence associated with DVT

DVT	Stroke		Total
	Yes	No	
Yes	9	56	65
No	54	4108	4162
Total	63	4164	4227

DISCUSSION

Hypertension was already verified previously as the first risk factor for stroke. In our study, incidence of stroke patients among hypertensive patients were lower than those having no symptoms of hypertension. DVT occurred in <10% of patients with stroke and did not significantly affect the population according to our results. A number of potential research studies have addressed the organizations between stroke, DVT and hypertension where patients with hypertension have been discovered with 2-fold enhanced probability of developing DVT^[8]. In the current research, the outcomes of meta-analysis in each subgroup have revealed that hypertension may promote the formation of DVT after orthopedic surgery. In addition, high blood pressure has actually been found as an independent predictor of venous thromboembolism (VTE) in the basic populace^[9]. In one more research study, after a prospective pc registry of 5451 patients with DVT, **Goldhaber *et al.***^[10] have discovered that 50% of patients have comorbidities with high blood pressure. **Kaisorn *et al.***^[11] have actually likewise reported that high blood pressure could independently boost the risk of establishing operative DVT.

Age is a high frequency of asymptomatic DVT which has actually been recognized in patients over 80 years^[12]. A previous research with 102 consecutive patients of follow-up located that age greater than 65 years, body mass index (BMI) > 30 kg/m², and cigarette smoking were threat factors for DVT^[13]. In a current research study comprising 87574 individuals found that obesity was a causal threat aspect for DVT^[14]. Taking a look at on VTE, **Chamberlain *et al.***^[15] discovered that low-density lipoprotein cholesterol was not a risk factor of VTE. One more study with 855 men (65 VTE occasions) determined that smoking cigarettes as well as waist area were danger variables for VTE, whereas high cholesterol as well as hypertension were not^[16]. On top of that, a Copenhagen City Heart Study explained that weight problems, cigarette smoking, and high blood pressure was essential threat elements for VTE, whereas total/high-density lipoprotein/low-density lipoprotein cholesterol, triglyceride, and also diabetic issues were not^[17].

In a recent large trial by **Dennis *et al.***^[18] an overall of 2518 acute stroke patients randomized to thigh-length finished compression stockings for DVT prevention (n = 1256) or routine care (n =

1262) were examined with a compression ultrasound test at 7- 10 days after stroke as well as preferably at 25- 30 days after enrollment. In the initial exam, the ratio of combined symptomatic and asymptomatic DVT was 10.0% in the study group as well as 10.5% in the control group, which is totally consistent with our outcomes. In an additional USG-based research, De Silva *et al.* examined the incidence of DVT in 105 acute ischemic stroke Asian patients. At the very first evaluation executed 7- 10 days after stroke they found DVT in 30% of patients. On follow-up evaluation, carried out 25- 30 days after stroke, DVT was detected in 45% of patients. Those outcomes may suggest that Asian populace is extra vulnerable to establish DVT, when compared with Caucasians^[19].

CONCLUSION

Our study showed that HP, and DVT which is definitely associated with stroke occurs only in approximately 5% of patients and significantly affects mortality among population from northern Saudi. Severe HP events with no stroke incidence is associated with increased risk of DVT especially in males and age group above 55 years. Therefore, it may be reasonable to provide this group of patients with additional care and proper DVT prophylaxis in order to minimize the risk of stroke. Also, those patients with HP should be managed and followed regularly especially elderly patients who are under risk.

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