ORIGINAL ARTICLE

North American Symptomatic Carotid Endarterectomy Trial (NACEST) High Grade Carotid Artery Stenosis in Patients with First Ischemic Stroke

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ABSTRACT

Aim: To determine the frequency of NACEST high grade carotid artery stenosis in patients with first ischemic stroke.

Methods: This cross-sectional study was carried out at Department of Medicine, Akhtar Saeed Medical * Dental College Lahore from 1st January 2015 to 30th June 3015. Two hundred and forty patients of 18-80 years age and both sexes presenting with first ischemic stroke (sudden focal or global neurological dysfunction lasting more than 24 hours) were included. NACEST high grade stenosis was assessed by carotid Doppler ultrasound showing ≥70 % to near occlusion of internal carotid artery.

Results: Two hundred and forty patients were included with mean age of 64.41±7.65 years. One hundred and seventeen patients (48.8%) were male and remaining 123 patients (51.3%) were female. In our study, 55 patients (22.9%) had NACEST High grade carotid artery stenosis out of total population of 240 patients with first ischemic stroke. There was no effect of age, gender, BMI and smoking in patients with and without stenosis.

Conclusion: The frequency of NASCET high grade carotid artery stenosis in patients with first ischemic stroke is quite high (22.9%). All patients with first ischemic stroke should be screened for it.

Keywords: NACEST High grade stenosis, Carotid artery stenosis, Ischemic stroke, Cardiovascular accident, Doppler carotid scan

INTRODUCTION

Cerebrovascular events constitute a major part of the cases presenting in the medical emergency. Stroke is the leading cause of physical disability and the third leading cause of death worldwidr[1]. Life time prevalence of stroke in Pakistan's population older than 35 years is alarmingly high 19.1%[2]. Cerebral infarction accounts for 70 to 80% of cases of stroke[3]. Carotid artery stenosis (CAS) is a major risk factor for stroke and for the symptomatic cerebrovascular disease. Symptomatic carotid artery stenosis of greater than 70% carries an annual risk of stroke of approximately 15%[4]. North American Symptomatic Carotid Endarterectomy Trial (NASCET) proved that carotid endarterectomy is of highest benefit in patients with 70-99% stenosis. NACEST used angiographic standard for patient selection for endarterectomy[5,6]. In 2003 the Doppler criteria was refined by consensus panel of Society of Radiologists[7].

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Carotid endarterectomy is now being performed in many good centers in the country. In 2007, Khan et al[8] demonstrated the frequency of >70% stenosis/ulcerated nonstenotic plaque to be 18.18%. The study included patients with both ischemic and hemorrhagic strokes. In 2009 Ahmad et al[9] demonstrated the frequency of 70 % carotid artery stenosis to be 6.6%. These two studies have a greater than 12% difference in estimated frequency of high grade carotid artery stenosis. As the frequency of NACEST high grade stenosis has not yet been determined in patient with first ischemic stroke, a new local study with standardized Doppler criteria is required to determine the disease burden in our population. This may help the clinicians to prioritize among the patients needing carotid endarterectomy.

SUBJECTS AND METHODS

This cross-sectional study was carried out at Department of Medicine, Akhtar Saeed Medical Dental College Lahore from 1st January 2015 to 30th June 3015. Two hundred and forty patients of 18-80 years age and both sexes presenting with first ischemic stroke (sudden focal or global neurological dysfunction lasting more than 24 hours) were included. Patients with history of previous stroke,

fatty liver disease determined by fatty infiltration on ultrasonography, ESRD determined by serum creatinine greater than 2.0 were excluded. NACEST High grade stenosis was assessed by carotid Doppler ultrasound showing ≥70 % to near occlusion of internal carotid artery. Patients with high grade stenosis were managed. Data was analyzed by using SPSS version 17.

RESULTS

In our study population 240 patients with mean age of 64.41±7.65 ranged from 48 to 79. Seventy patients (31.3%) were below 60 years of age while rest of 165 patients (68.8) were either 60 years or above in age. Only 55 patients (22.9%) were having carotid artery stenosis out of 240. One hundred and seventeen patients (48.8%) were male and remaining 123 patients (51.3) were female. Ninety one patients had body to mass index above 29.9kg/m^2. Seventy six patients (31.7%) were smoker while rest of 164 (68.3%) were non-smoker (Table 1). When age group was compared according to carotid artery stenosis, there was statistically non-significant (p=0.351) difference that between carotid artery stenosis and ages (Table 2). On cross tabulating gender with carotid artery stenosis, the result showed non-significant (p=0.175) statistically equal distribution in both male and female patients (Table 3). When we cross tabulated BMI> 29.9kg/m^2 with carotid artery stenosis and applied chi square test results came up non-significant (p=0.319). 31 patients out of 55 were having BMI above 29.9kg/m^2 while remaining 24 were having 29.9kg/m^2 (Table 4) When we cross tabulated current smoker with carotid artery stenosis and used chi square test results came up non-significant (p=0.351) that showed statistically equal distribution of patients in both (above and below 60years) smoker and non-smokers (Table 5)

Table 1: Demographic information of the patients

Variable	No.	%
Age (years)		
Below 60	75	31.3
60 and above	165	68.7
Gender		
Male	117	48.8
Female		51.2
Carotid artery stenosis		
Yes	55	22.9
No	185	77.1
Body Mass Index >29.9 kg/m^2		
No	149	62.1
Yes	91	37.9
Smoking		
No	164	68.3
Yes	76	31.7

Table 2: Comparison of age according to carotid artery stenosis

Age (years)	Carotid artery stenosis		Total
	No	Yes	
Below 60	55	20	75
60 and above	130	35	165
Total	185	55	240
Using chi square test = 0.351(non-significant)			

Table 3: Comparison of gender according to carotid artery stenosis

Gender	Carotid artery stenosis		Total
	No	Yes	
Male	89	28	117
Female	96	27	123
Total	165	55	240
Using chi square test = 0.175(non-significant)			

Table 4: Comparison of body mass index (BMI) >29.9kg/m^2 according to carotid artery stenosis

BMI (>29.9 kg/m^2)	Carotid artery stenosis		Total
	No	Yes	
No	118	31	149
Yes	67	24	91
Total	165	55	240
Using chi square test = 0.319 (non-significant)			

Table 5: Comparison of current smoking according to carotid artery stenosis

Current smoking	Carotid artery stenosis		Total
	No	Yes	
No	122	42	164
Yes	63	13	76
Total	165	55	240
Using chi square test = 0.145 (non-significant)			

DISCUSSION

Carotid artery stenosis is a risk factor for stroke and cerebrovascular events and patient become prone to increased disabilities as age progress.[10,11] Ultrasonic detection of carotid artery stenosis is possible by simple non-invasive duplex scan.[12,13] Early intervention may save many chronic disabilities like stroke. A stroke is the acute neurologic injury that occurs as a result of one of these pathologic processes. Approximately 80 percent of strokes are due to ischemic cerebral infarction and 20 percent to brain hemorrhage.[14,15] In our study, 55 patients (22.9%) had NACEST High grade carotid artery stenosis out of total population of 240 patients with first ischemic stroke. This is too high as compared to previous literature. In 2007, Khan et al[8] demonstrated the frequency of >70% stenosis/ulcerated nonstenotic plaque to be 18.18%. Similarly in 2009 Ahmad et al[9] demonstrated the frequency of 70% carotid artery stenosis to be 6.6%. The difference may be secondary to the age of included patients and defined criterion of NACEST High grade stenosis.

In the present study, mean age was 64.41±7.65 years ranged from 48 to 79. Seventy five patients (31.3%) were below 60 years of age while rest of 165 patients (68.8) were either 60 years or above in age. When the age was compared with carotid artery stenosis, statistically showed non-significant (p=0.351). It showed that there is no effect of age on development of NACEST high grade carotid artery stenosis.

One hundred seventeen patients (48.8%) were male and remaining 123 patients (51.3) were female. On cross tabulating gender with carotid artery stenosis, the difference was non-significant (p=0.175). It implies that there is no effect of gender on development of NACEST high grade carotid artery stenosis in our sampled population.

CONCLUSION

It is concluded that frequency of NASCET high grade carotid artery stenosis in patients with first ischemic stroke is quite high (22.9%). All patients with first ischemic stroke should be screened for it.

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