CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.1286241

Available online at: http://www.iajps.com ***Research Article***

CAROTID ATHEROSCLEROSIS OCCURRENCE AS A LEADING FACTOR OF ISCHEMIC STROKE AND IMPORTANT DISEASE MARKER

Dr. Farwa Batool, Dr. Wardah Sultan, Dr. Areeba Zulfiqar
Jinnah Hospital, Lahore

Abstract:
Objective: ***To find out the incidences of the rich oxygen blood carrying arteries (Carotid) blockage resulting in stroke by using modern ultrasound techniques.***
Methodology: ***The study was carried out during the 5 months time span (October 2016 to February 2017) at*** *Sir Gangaram Hospital, Lahore* ***with the help of Radiology Department of Medical Unit – II. The subjects with positive identification of stroke after CT scan were selected for the study. Possible risk factors were analyzed for the sample. All the patients were passed through Doppler ultrasound to judge the reduced blood flow in stroke patients according to the study requirement.***
Results: ***A hundred patients sample was selected during the period according to inclusion criteria. Cerebral infarction was found in 66 cases. The risk factors were listed as hypertension, diabetes, smoking and obesity (72%, 35%, 29%, and 20%) respectively. Twenty one percent ischemic stroke patients were observed with carotid atherosclerosis.***
Conclusion: ***The study concluded that Carotid atherosclerosis (plaque inside blood carrying arteries) is the leading factor for ischemic stroke. The patients with carotid atherosclerosis are at a higher risk of ischemic stroke, making it an important pointer and dominant independent risk factor.***
Key Words: *Carotid, Atherosclerosis, Doppler ultrasound.*

Corresponding author:
Dr. Farwa Batool,
Jinnah Hospital,
Lahore

QR code

Please cite this article in press Farwa Batool et al., ***Carotid Atherosclerosis Occurrence as a Leading Factor of Ischemic Stroke and Important Disease Marker,*** *Indo Am. J. P. Sci, 2018; 05(06).*

INTRODUCTION:

Most of the deaths and mental disabilities around the globe are caused by ischemic stroke particularly in old age. Efforts are being made by the specialists to counter this fatal disease and establish a population which is less susceptible to cerebral infarction leading to ischemic stroke. The blockage of blood arteries that carry rich oxygen blood is critical and one of the major causes of ischemic stroke.

The word 'Atherosclerosis' originated from two Greek words; athero (a paste like substance) and sclerosis (resistance). The condition might involve blockage because of fat, cholesterol and other waste cellular materials. Sometimes calcium and fibrin are also observed in the linings of arteries reducing the blood flow. The blockage can prevail in the head, heart, renal areas and other important body parts. When it happens in brain it causes ischemic stroke.

The carotid atherosclerosis can be diagnosed by a variety of techniques. Vascular system diagnostic modalities have been upgraded from old angiography and ultrasound procedures. More reliable non-invasive means of diagnosis such as CT scan, MRI, Color Doppler Ultrasound and MR angiography are now available for better assessment of vascular system [5]. Among these, Ultrasound is becoming popular due to a number of reasons like patient's satisfaction, less complications and obviously low-cost test with accurate picture of carotid atherosclerosis [4]. In 1980s, the color Doppler imaging was developed due to advancement in computer technology [6].

A high frequency (510 MHz) probe is used for artery's ultrasound [7]. Plaque is judged by B mode gray scale image and the inner space of the artery is better evaluated by the use of colors. The abnormal narrowing of the artery is checked by the velocity of the blood flow.

In this study, all the patients with ischemic stroke (confirmed by CT scan) were selected for the evaluation. The arteries which emerge directly from the brain were analyzed with the help of modern color Doppler imaging technique to asses the ischemic strokes cause. The study was focused to find out the relation between the ischemic stroke and the carotid atherosclerosis.

PATIENTS AND METHODS:

This study was carried out at Sir Gangaram Hospital, Lahore during the timeframe of October 2003 to February 2004. Radiology department of Medical Unit II was utilized for color Doppler imaging. The hospital had been providing multi dimensional medical services to all the local and referred patients mostly coming from the Sind province. The patients were selected according to the inclusion criteria. The sample consisted of sixty-two males and 38 females. The male to female ratio was calculated to be 1.6:1. The patients' demographic characteristics were disregarded in this research.

A pre-set questionnaire was filled by each patient to establish the patients' profiles. Possible risk factors were kept in mind and all the patients were thoroughly examined though ECG, X-Ray, CT scans and by other available means according to study protocol.

The patients with cerebral infarction and no association of any heart related embolization were selected for color Doppler imaging to check the carotid arteries. The worthy radiologist opinion was obtained in each case. Longitudinal analysis was done to study the development of plaque inside artery. The plaque was analyzed in detail including the possible morphology aspects and specifically the extent of narrowing of vessel was noted. The arteries were examined in different anterior and posterior positions to check for the free lumen inside the arteries. For this purpose, internal free lumen space and the diameter of the artery at the same point was measured to assess the stenosis of the vessel.

Like Angiography, Doppler ultrasound technique was used in this case to measure the diameter stenosis. SPSS software was used for data analysis. The current study was limited to multiple factors frequency divisions therefore no statistical significance was validated in this research.

RESULTS:

The study protocol was applied to 100 selected patients during the tenure of the research. The composition of the sample included both males (62 cases) and females (38 cases). The 66% patients were suffering from cerebral infarction. Mean age of the sample was 55 ± 8 years. The patients in the current research were of different ages; 2% were below 30 years, 5% were between 30-40 years, 21% patients fall between 40-50 years, 28% were between 50-60 years, 28% were in the age range of 60-70 years and 16% patients were above 70 years. Twenty eight percent carotid patients were alert when they reported, 22% were feeling lethargic, 26% were arousal whereas

24% patients were feeling completely exhausted.

The patients presented with left sided weakness (35%), right sided weakness (58%) and no weakness reported (7%) due to the reason that the patients were senseless or the brain motor area was not involved in cerebral infarction. Associated risk factors observed were hypertension (72%), diabetes (35%), smoking (29%), obesity (20%), previous stroke history (16%), cardiac disease (6%) and one patient with Takayasu's arteritis. After the CT scans reports, it was confirmed that 66% patients were suffering from cerebral infarction and 34% had the proof of minor bleeding. Most of the patients were seen with temporal parietal junction (TPJ) involvement.

Table – I: Stroke Risk Factors (100)

Risk Factors	Number	Percentage
Hypertension	72	72
Diabetes	35	35
Smoking	29	29
Obesity	11	11
Valvular Heart Disease	6	6
Previous CVA	6	16

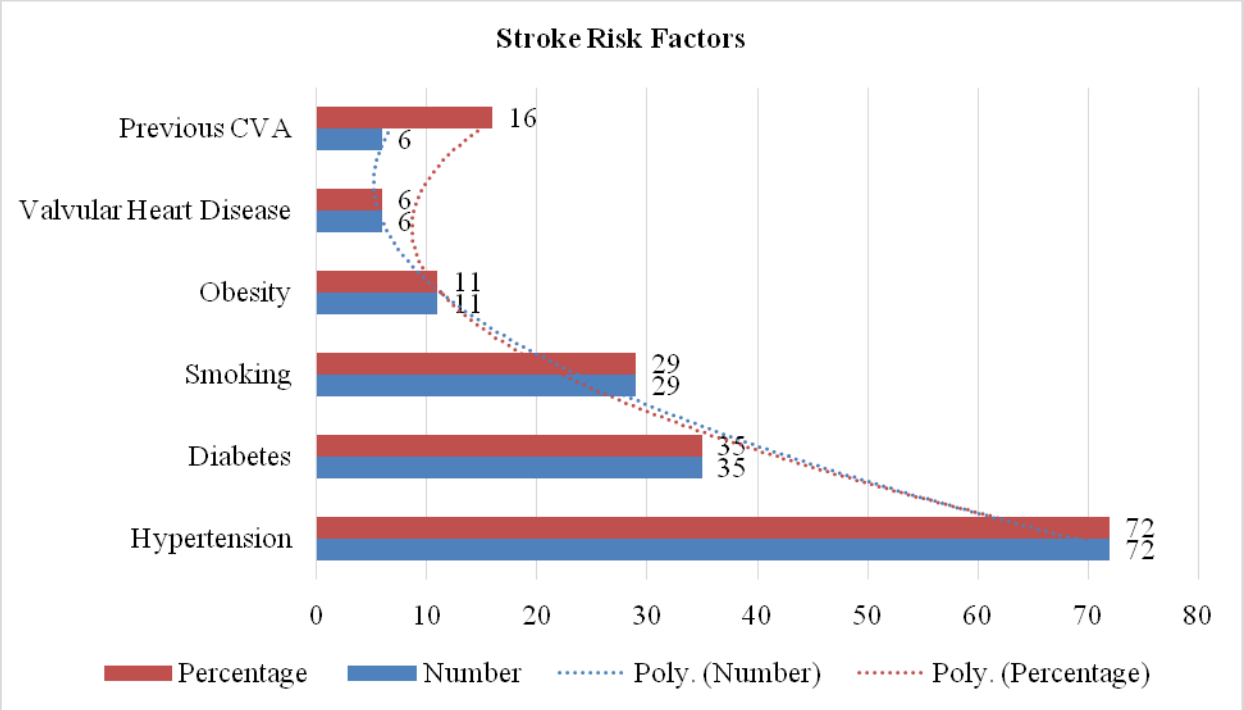
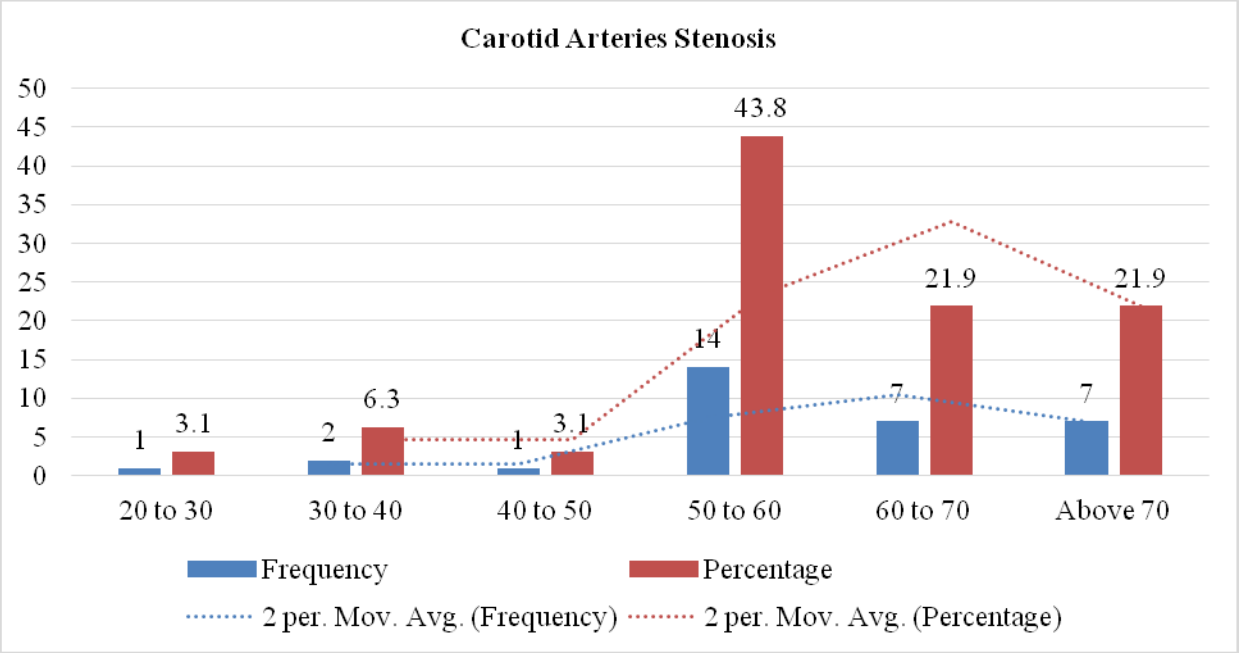


Table – II: Carotid Arteries Stenosis

Stenosis	Frequency	Percentage
20 to 30	1	3.1
30 to 40	2	6.3
40 to 50	1	3.1
50 to 60	14	43.8
60 to 70	7	21.9
Above 70	7	21.9



The modern Doppler ultrasound was carried out for 66% patients suffering from cerebral infarction and it was observed that 48.5% patients were having artery blockage. Among these, 10 cases were having the atherosclerosis in right artery, 13 cases were marked with left artery blockage and 13 cases were having the blockage in both arteries. On deep examination of the patients 14 cases were marked as high risk with 60% stenosis of the lumen which is the cut off point.

DISCUSSION:

The sample mostly consisted of people from middle and lower class. The research sample was comprised of 100 subjects with an ischemic or hemorrhagic indication confirmed by CT scan reports. The majority of the sample was male (62%) and the results for the male population was comparable to many national and global studies. The male to female ratio in most of the national studies were almost similar to the study under discussion. The male to female ratio in a study done by A M Siddiqi et al at Lahore was 1.5: 1 [8]. Numan et al reported a ratio of 1.6:1 [9], Piravej K in a study at Thailand reported male to female ration of 1.2:1 [10]. The majority of the subjects in our study were between the ages of 50-70 years (56) which is in line with the earlier studies' statistics. Most of the studies (Ansari et al, Vohra E et al, Intiso D et al and Piravej K) concluded that the majority of the patients were old and the results were unpleasant in case of old patients [10, 13].

The risk factors of the sample were noted with a major portion of the sample (72%) hypertensive followed by diabetes (35%), smoking (29%) and obesity (20%). Risk factors of stroke patients are given in Table-1 in detail. The increased number of hypertensive patients is relatively comparable with other national studies as compared to international researches on the topic. The national studies with high frequency of hypertension include Numan A et al, Zaidi K et al, Ansari AK et al and many others [9, 10, and 14]. The high incidences of hypertension may be due to inactive desk bound jobs and poor diet plans. Some international studies (Baena Diez et al and Intiso D et al) showed the high rates of risk factors which were seen in our study [13, 15].

34% hemorrhage cases in our study are consistent with other studies carried out at national level [8, 9, 16]. The high rate of hemorrhage is perhaps associated with the high incidences of hypertension. Hemorrhage is more prevalent in eastern part of the world particularly Asian countries [10].

Doppler imaging techniques verified the carotid atherosclerosis in 48.5% of patients with cerebral infarction. Twenty-one patients were at higher risk of stenosis. The results are comparable to Razzaq study in which 25% cases of cerebral infarction were suffering from extreme stenosis [17]. The rate was even higher for some international researchers like Bogousslavsky et al (20%), Pessin et (39%), Balow et al (33%) and Colin P Derdeyn (30%) [18 – 21].
All the patients with clear indications/symptoms and

without symptoms of carotid atherosclerosis should be filtered through invasive Doppler ultrasound method to investigate the severity of stenosis. The normal ultrasound is not helpful in these cases because it does not cater for blood flow in the vessel.

CONCLUSION:

The study concluded that Carotid atherosclerosis (plaque inside blood carrying arteries) is the leading factor for ischemic stroke. The patients with carotid atherosclerosis are at a higher risk of ischemic stroke, making it an important pointer and dominant independent risk factor.

REFERENCES:

1. Balow J, Alter M, Resch JA. Cerebral thromboembolic stroke; clinical appraisal of 100 cases. Neurology 1996; 16:559-64.
2. Collin P, William JP, Moran CJ, Cross DT, Allen BT. Role of Doppler ultrasound in screening for carotid atherosclerotic disease. Radiology 1995; 197:635-43.
3. Hennerice M, Aulich A, Sandmann W, Freund HJ. Incidence of asymptomatic extra cranial arterial disease. Stroke 1981; 12:750-58.
4. Alexandrova NA, Gibson WC, Maggisano R. Carotid artery disease and peripheral vascular disease. Stroke1995; 26:175.
5. Ahn SS, Baker JD, Walden K, Moore WS. Which asymptomatic patients should undergo routine screening carotid duplex scan. Am J Surg 1991; 162:180-3.
6. Luisiani L, Visona A, Pagnan A. A non-invasive study of arterial hypertension and carotid atherosclerosis. Stroke 1990; 21:410-14.
7. Pujia A, Rubba P, Spencer MP. Prevalence of extracranial carotid artery disease detectable by echo-Doppler in elderly population. Stroke 1992; 23:818-22.
8. Christopher RB, Meritt MD. Doppler color imaging. Churchill Livingstone Inc 1992;1-95.
9. Roger CS, Clinical sonography: a practical guide. 3rd ed, 1998.
10. Siddiqi AM, Ali A, Masrur S, Monga MA, Tauqeer A, Rehman KU. Clinical audit of patients with CVA in medical unit-I. Ann King Ed Med Coll 2001;7(2):79-82.
11. Numan A, Nasrullah M. An audit of stroke patients and total admissions in year 2000 Neurology Department. Pak J Neurol 2001;7(1):1-5.
12. Piravej KW, Watkul W. Risk factors for stroke in Thai patients. J Med Assoc Thai 2003; 86:291-8.
13. Ansari AK, Akhund IA, Sheikh A. Stroke in elderly; Identification of risk factors. J Ayyub Med Coll. Abottabad 2001;13(3):11-3.
14. Vohra E, Ahmad W, Ali M. Aetiology and prognostic factors of patients admitted for stroke. J Pak Med Assoc 2000;50(7):234-6.
15. Intiso D, Stampatore P, Zarrelli MM, Guerra GL, Arapia G, Simone P et al. Incidence of first ever ischaemic and hemorrhagic stroke in a well-defined community of Southern Italy, 1993-1995. Eur J Neurol 2003;10(5):559-65.
16. Zaidi K, Ara J. Stroke in young patients. Pak J Neurol 2001;7(2):43.
17. Baena DJM, Toma PJ, Mersino AM, Arboix A, Ellacuria TA, Garcia LM, et al. Modifiable risk factors for non-cardioembolic transient ischaemic attacks. Case control studies in general population. Rev Neurol 2003;37(3):206-10.
18. Akhtar M, Ahmad M, Shahid M, Sial H, Naheed T. Risk factors in stroke. Pak J Neurol 1998;4(1):55-8.
19. Razzaq A, Jadoon C, Baig S. Carotid Doppler ultrasonography in young stroke patients. J Pak Med Assoc 1999;49(4):97-9.
20. Bogousslavsky J, Hachinski VC, Boughner DR, Fox AJ, Vinnela F, Barnett JM. Cardiac and arterial lesions in carotid ischemic attacks. Arch Neurol 1986; 43:223-8.
21. Pessin MS, Duncan GW, Mohr JP, Poskanzev DC. Clinical and angiographic features of carotid transient ischemic attacks. N Engl J Med 1977; 296:358-62.
22. Ali L, Hamida J, Alam S. Risk factors in stroke. J Coll Phys Surg Pak 1996;7(1):7-10.
23. Allen CMC, Leuck CJ. Cerebrovascular disease. Haslett C, Chilvers ER, Hunter JAA, Boon NA. Davidson's Principles and Practice of Medicine.18th ed. London: Churchill Livingstone; 1999;974-83.
24. Charles RAC. Cerebrovascular disease and stroke. In: Kumar P, Clarke M, Jane A, Lawrence RI, Nigel B, Carol M, et al. Clinical Medicine. 5th ed. London: WB Saunders 2002.1163-73.
25. Taylor KJW, Burn PN, Wells PNT. Clinical application of Doppler ultrasound. Raven Ltd. New York 1995;1-128.
26. Pohl MI. Carotid artery disease. Optom-Clin 1994;3(4):157-74.