

Carotid artery disease in Sudanese diabetic patients asymptomatic for cerebrovascular disease

Elrayah M. Mustafa¹,
Rabab I. Elhassan²

¹Department of Radiology, National University, Khartoum, Sudan, ²Dubai Health Authority, Medical Fitness, Headquarter, Dubai, UAE

Abstract

Introduction: Diabetes is a risk factor in the development of atherosclerosis and likewise carotid artery disease which can be detected using carotid ultrasound examinations. **Methodology:** The study undertaken in a group of asymptomatic type 2 Sudanese diabetic patients to assess the prevalence of carotid artery disease. Intima-media thickness (IMT), the presence and degree of carotid artery stenosis were assessed by ultrasonography in 63 diabetic subjects. The findings of ultrasound examinations were correlated to the patients' clinical information. **Results:** Abnormal IMT found in 65% of the studied subjects a degree of carotid artery stenosis in 31.7%. More than 50% carotid artery stenosis in 14.3%. The results also showed association between the abnormal findings increasing age, female gender, prolonged duration of the disease. Presence of carotid artery disease in diabetic patients asymptomatic for cerebrovascular disease, the increasing frequency of these abnormalities with increasing subject's age, and duration of illness was also investigated and it was found to decrease when the concentration is increased.

Key words: Cerebrovascular, diabetes, Doppler sonography, Sudanese

INTRODUCTION

Diabetes adversely affects cerebrovascular arterial circulation. Patients with diabetes have more extra cranial atherosclerosis. Diabetes particularly affects the risk of stroke among younger patients and increases the incidence of atherosclerosis in women, equalizing the age-adjusted rates.^[1]

Doppler sonography is the most common imaging study for the diagnosis of carotid disease. B-mode gray scale sonography allows for imaging of atherosclerotic plaques and intima-media thickness (IMT). Colour Doppler sonography allows simultaneous real-time visualization of vascular lesions and associated flow abnormalities.

Examination and recording of pathologic findings on gray scale and colour Doppler sonography are followed by spectral Doppler hemodynamic analysis.^[2]

MATERIALS AND METHODS

A total of 63 patients were selected from a group of type 2 diabetes patients attending the diabetic clinic in Omdurman Military Hospital, Sudan, with no prior history of stroke or any symptoms related to carotid artery disease. Carotid sonographic examinations performed using a 7.5 MHz transducer and carotid examination machine settings. In addition to frequency analysis a multivariate analysis was performed to assess whether there was any significant correlation between the carotid abnormalities and duration of the disease as well as the age of the patient.

RESULTS

The prevalence of abnormal (>0.8 mm) IMT and carotid artery stenosis is shown in Table 1. The female subjects

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Address for correspondence:

Dr. Elrayah M. Mustafa, Department of Radiology, National University, Khartoum, Sudan.
Email: elrayah62@hotmail.com

have a higher incidence of carotid artery disease than men constituting 62.2% and 55% of subjects with abnormal IMT and carotid stenosis respectively.

Table 2 shows the percent stenosis in 20 patients with carotid artery stenosis. Table 3 shows the age of the studied subjects and carotid artery disease. High prevalence of carotid stenosis found in younger age groups (30-50 years) but more than 50% stenosis rates were correlated more to older age group (40-60 years) [Table 4].

Table 1: Prevalence of carotid disease

Gender	No.	Abnormal IMT (%)	Stenosis (%)
Females	39	28 (62.2)	11 (55)
Males	24	17 (37.8)	9 (45)
Total	63	45 (100)	20 (100)

IMT = Intima-media thickness

Table 2: Percentage of stenosis in 20 diabetic patients with carotid stenosis

Degree	Stenosis No.	Percentage
>50%	9	45
<50%	11	55
Total	20	100

Table 3: Age of patients and carotid artery disease

Age	No. of patients	Stenosis (%)	Abnormal IMT (%)
30-40	6	3 (50)	5 (83.3)
41-50	20	8 (40)	13 (65)
51-60	22	6 (27.2)	15 (68.1)
61-70	15	3 (20)	12 (80)

IMT = Intima-media thickness

Table 4: Age of 9 diabetic patients with >50% carotid stenosis

Age	No. of patients	>50% stenosis (%)
30-40	6	0 (0)
41-50	20	6 (30)
51-60	22	2 (9)
61-70	15	1 (6.7)

Table 5: Duration of diabetes and carotid artery disease

Duration of diabetes (years)	No. of patients	Stenosis (%)	Abnormal IMT (%)
1-5	3	0 (0)	2 (66.7)
6-10	28	1 (3.6)	20 (71.4)
11-15	19	10 (52.6)	14 (73.7)
16-20	13	9 (69.2)	9 (69.2)

IMT = Intima-media thickness

Table 5 shows the atherosclerotic changes and the carotid artery disease. There is a strong positive correlation between the duration of diabetes and the presence of carotid artery disease.

DISCUSSION

This study acknowledges the importance of carotid arteries sonographic examination as a quick and reliable non-invasive cost-effective method for examining carotid artery disease that in an expert hand could detect those patients who are eligible for further investigations and probably direct surgical management.^[2]

The carotid artery disease including both increased IMT and stenosis are found in high percentages in diabetic than the general population as reported by multiple studies.^[2-4] This study also confirmed the presence of the abnormalities in these group of patients without having any symptom related to these diseases, and hence being asymptomatic does not eliminate or reduce the risk of having a significant degree of carotid stenosis reaching 99% or near occlusion.^[3]

The female being considered protected against atherosclerotic disease in the general population, loses its effect in the context of diabetes and the incidence of atherosclerosis equalizes between genders diabetes mellitus, in fact this study in agreement with other previous reports found a higher prevalence of carotid artery disease in diabetic female than males.^[5,6]

It is well-known that the duration of diabetes and the age of the patients had a positive correlation with the incidence of macro vascular disease in type 2 diabetic patients.^[5] In addition to confirming these reported results, this study also found a high percentage of carotid artery disease in young diabetics a finding, which may confirm the a finding which is in line with the previously reported highest risk of stroke found in diabetic patients in young African Americans (35-44 years).^[7]

This study by aiming to sonographically examining the asymptomatic diabetic subjects, emphasize the importance of incorporating the carotid artery screening in the diabetic care. The age of subjects and duration of the disease could be included in the criteria of patients' selection for this examination.

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