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Research Article

Carotid Doppler in Type 2 Diabetics

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Abstract: Atherosclerosis is more extensive and occurs earlier in diabetic subjects than in general population. Doppler ultrasound of the carotid arteries has become the most widely accepted screening method. Screening is usually undertaken in symptomatic patients, but evidence of beneficial effects of elective carotid endarterectomy in asymptomatic carotid artery stenosis, indicates that screening of asymptomatic diabetics should be widely practiced. The purpose of our study was to evaluate the presence and extent of atherosclerotic carotid disease in Type 2 diabetics who were asymptomatic for presence of cerebro- vascular disease, by screening them with Doppler ultrasonography. 50 Type 2 diabetic subjects with no symtoms of cerebro vascular disease in past or present were evaluated with colour and spectral doppler This examination allowed rapid identification of atherosclerotic plaques and associated areas of flow disturbances. A high prevalence of carotid disease (44%) was found in our study in asymptomatic Type-2 Diabetics. Of these 3 subjects had only evidence of thickened intima more than 8mm. 15 subjects showed plaques and 4 subjects showed significant stenosis of common carotid artery near bifurcation. The result emphasises the need for carotid Doppler evaluation of all Type 2 diabetics as a first measure of stroke prevention, with the hope that timely intervention might avert stroke and its accompanying disability.
Keywords: Carotid Doppler, Type 2 Diabetics.

INTRODUCTION

Diabetes mellitus (DM) is raging rampant worldwide and the numbers are expected to double by the year 2025 [1]. Atherosclerosis is more extensive and occurs earlier in diabetic subjects than in general population [2]. It produces symptoms in a variety of sites in diabetics, Stroke being one of the common presentations and leading cause of premature morbidity and mortality. About 40%- 50% of strokes secondary to atherosclerotic disease are produced by disease nvolving the extra – cranial carotid arteries, usually within 2cm of carotid bifurcation; with associated shedding of emboli or clots [3, 4]. Accurate screening methods are necessary for evaluating the patients at risk. Conventional digital subtraction angiography (DSA) is considered as the "gold standard" for the evaluation of the degree of carotid and cerebrovascular artery stenosis, but it is unable to make any predictions about plaque type, and this time-consuming method remains invasive and is still associated with catheter-related complications [5]. Doppler ultrasound of the carotid arteries has become the most widely accepted screening method [4]. Screening is usually undertaken in symptomatic patients, but evidence of beneficial effects of elective carotid endarterectomy in asymptomatic carotid artery stenosis [6], indicates that screening of asymptomatic diabetics should be widely practiced. The purpose of our study was to evaluate the presence and extent of atherosclerotic carotid disease in Type 2 diabetics who were asymptomatic for presence of cerebro- vascular disease, by screening them with Doppler ultrasonography.

MATERIAL AND METHODS

The study design was cross- sectional based on evaluation of 50 Type 2 diabetic subjects with no sysmtoms of cerebro vascular disease in past or present. These symptoms were as follows:

- Numbness or weakness in extremities
- Amaurosis fugax
- Slurred speech or aphasia
- Diziness , falling or loss of consciousness
- Change in mental status (Amnesia, disorientation or confusion)

Doppler evaluation of the extracranial carotid system in the study group included both colour Doppler and spectral analysis with a dual – frequency probe 9. 5 & 7.5 Mhz. First the common carotid artery (CCA), and the extracranial internal carotid (ICA) and external carotid arteries (ECA) were examined with colour Doppler ultrasound. This examination allowed rapid identification of atherosclerotic plaques and associated areas of flow disturbances. When a region of abnormal flow was found, duplex spectral analysis was used to quantitate the degree of stenosis. Continues variables were expressed as mean value ± SD. Differences were tested for significance by unpaired student 't' test. 'p' value <0.05 was considered significant.

RESULTS

Mean age of the selected patients was 54.52 ± 9.96 years. There were 34 males and 16 females in the study group. All the diabetics were ambulant and their blood-sugars were adequately controlled. The prevalence of diabetic microangiopathic complications in the study group was as follows:-

- Retinopathy --- 33 cases (66%)
- Clinical neuropathy --- 24 cases (48%)
- Nephropathy --- 22 cases (44%)

35(70%) of the diabetics had associated Systemic Hypertension and 11 (22%) had evidence of coronary artery disease on resting ECG. On the basis of Doppler ultrasound evaluation, the study subjects were divided into two groups:

Group 1 (n=28) No evidence of carotid disease.

Group 2 (n=22) Doppler evidence of carotid disease.

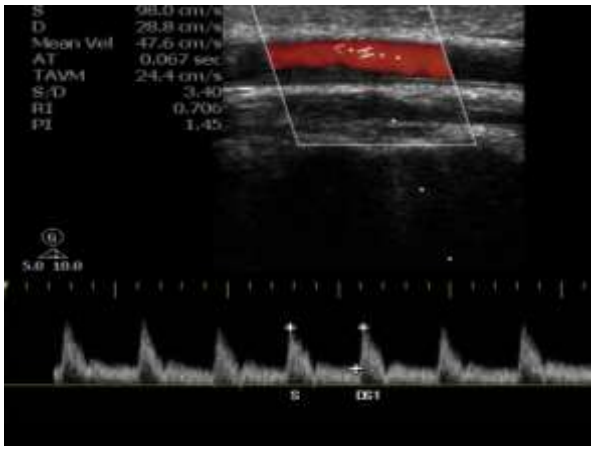

Fig. 1: Smooth hypoechoic plaque

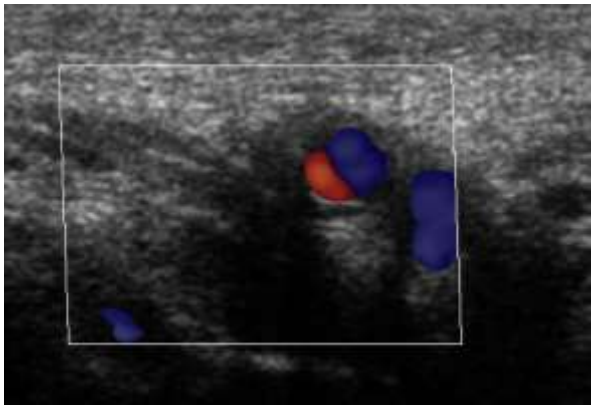

Fig. 2: Calcified plaque in carotid bulb

Doppler findings in Group 2 Diabetics subjects

22 diabetic subjects (44%) revealed evidence of carotid artery disease on Doppler examination. Of these 3 subjects had only evidence of thickened intima more than 8mm (Fig. 3). 6 subjects showed echogenic plaques (Fig. 2), 9 subjects showed hypoechoic plaques (Fig. 1) and 4 subjects showed significant stenosis of common carotid artery near bifurcation (Fig. 5). 8 diabetic subjects (16%) in Group 2 had evidence of bilateral carotid disease.

Fig. 3: Intima thickening

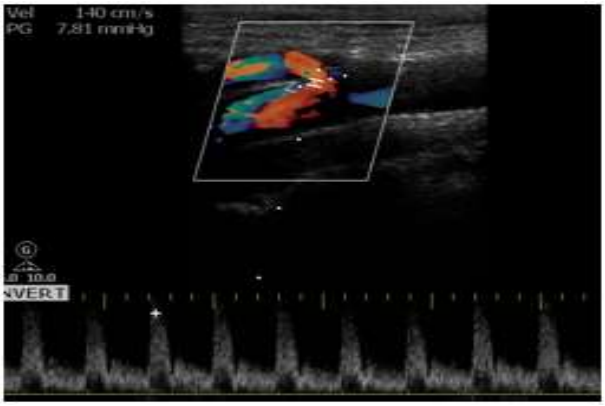

Fig. 4: ICA plaque with raised velocities

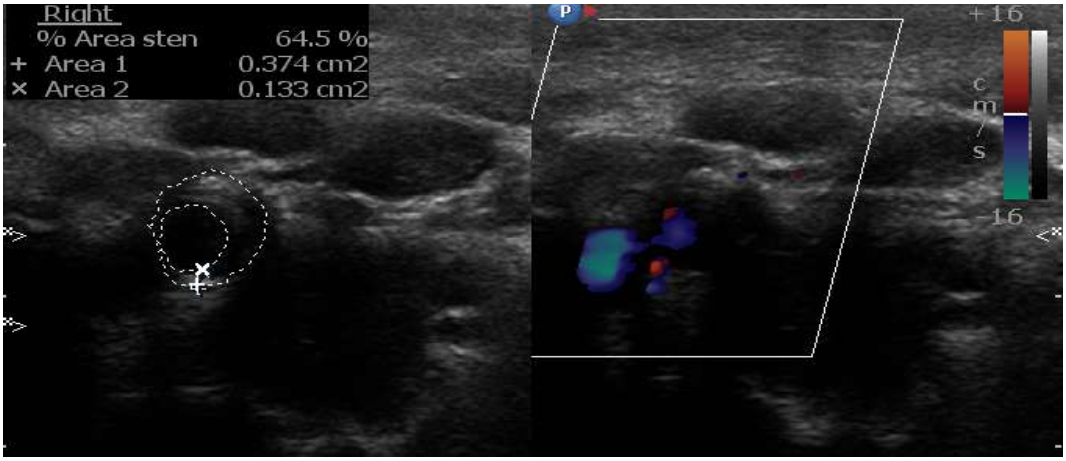

Fig. 5: Carotid Artery Stenosis 64%

DISCUSSION

Accurate screening methods are necessary for evaluating diabetic patients at risk of Stroke. And to reduce the cost and morbidity associated with conventional carotid angiogram. Duplex Doppler ultra sonography has become widely accepted noninvasive screening method [4]. Usually the symptomatic patients are referred for carotid duplex examination. But recent data shows that patients with asymptomatic carotid artery stenosis of 60% or more have a reduced 5-yrs risk of ipsilateral stroke on elective carotid endarterctomy [6]. In the light of these findings, it has now become imperative to evaluate carotid artery disease in all Type 2 Diabetics, whether sysmptomatic or asymptomatic for cerebro vascular disease. This will help in risk stratification and planning the management.

A high prevalence of carotid disease (44%) was found in our study in asymptomatic Type-2 Diabetics, 4 pateints (8%) showing critical carotid artery stenosis. The result emphasises the need for carotid Doppler evaluation of all Type 2 diabetics as a first measure of stroke prevention, with the hope that timely intervention might avert stroke and its accompanying disability. High prevalence of carotid disease in our study can partly be explained by high prevalence of associated risk factors for atherosclerosis e.g Hypertension, coronary artery disease. Furthur long term studies in asymptomatic Type 2 Diiabetics are needed for studying the natural course of carotid atherosclerotic disease using dopler examination and defining the clinical rationale for its use.

CONCLUSION

The prevalence of atherosclerotic carotid disease in diabetic patients is high. Our study emphasizes the importance of Carotid Doppler evaluation as a screening tool in asymptomatic type 2 diabetic subjects.

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