

Incidence of Cardiac Autonomic Neuropathy in Type-2 (Non-Insulin Dependent) Diabetic Subjects

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Abstract: Forty Diabetics (DM Type-2) were studied to assess Cardiac autonomic dysfunction by a series of five simple non-invasive tests in order to determine the incidence of sympathetic and parasympathetic nerve dysfunctions. Out of 40 DM Type-2 subjects, 23 (57.5%) patients had cardiac autonomic neuropathy. Incidence of parasympathetic autonomic neuropathy was 57.5 % in comparison to sympathetic autonomic neuropathy, which was 20%, suggesting that parasympathetic pathway may be more sensitive for detection of cardiac autonomic neuropathy. Highest incidence of cardiac autonomic neuropathy has been observed between the age group of 51 to 60 years and as the duration of disease increases the incidence of cardiac autonomic neuropathy also increases.

Key Words: Diabetes Mellitus Autonomic dysfunction, Cardiac

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I. Introduction:

During last two decades, there has been an increased awareness of the involvement of the autonomic nervous system in diabetes mellitus, since Rundles first described it in 1945. Several reports are available documenting the occurrence of autonomic dysfunction in long-standing diabetic subjects^(1,2,3). Diabetic autonomic neuropathy can involve both sympathetic and parasympathetic nervous system.

Hoskin et al. (1978), Ewing et al. (1980) suggested that parasympathetic neuropathy may emerge earlier than sympathetic neuropathy because parasympathetic fibers are longer and more liable to damage⁽⁴⁾. Sympathetic innervation may remain intact even in presence of severe parasympathetic damage. Early detection of cardiac autonomic neuropathy is of prognostic importance.

There are five simple bedside tests, three reflecting parasympathetic and two reflecting sympathetic functions^(5,6,7,8)

Present study was designed to evaluate the incidence and sensitivity of various tests for cardiac autonomic neuropathy in subject with long-standing diabetes.^(12,13)

MATERIAL& METHODS: The study was conducted on 40 documented DM Type-2 subjects with long standing diabetes. Patients were selected from medical wards and diabetic clinic. All patients were clinically in stable state. Those DM Type-2 patients with history of HT, IHD, cirrhosis, valvular heart disease, heart failure and known autonomic neuropathy of other etiology were excluded. In each case following tests were carried out in order to detect cardiac autonomic neuropathy –

a) Tests reflecting parasympathetic damage –

1. Heart rate response to Valsalva maneuver.
2. Heart rate response to deep breathing.
3. Immediate heart rate response to standing.^(5, 8)

b) Tests reflecting sympathetic damage –

1. Blood pressure response to standing.^(5, 6)
2. Blood pressure response to sustained handgrip.^(5,7)

II. Results:

The incidence of cardiac autonomic neuropathy in DM Type2 subjects was 57.5%. The incidence of parasympathetic autonomic neuropathy was 57.5% in comparison to sympathetic autonomic neuropathy observed in 20% only. The results are depicted in the table No: 2. Dizziness on standing up was the most commonly encounter symptom, it was present in 40 % cases.

It was also noticed that as the duration of the disease increased, the incidence of cardiac autonomic neuropathy increased. Highest incidence of cardiac autonomic neuropathy was seen in 51-60 and 41-50 years of age group.

Results of various tests are depicted in Tables No 1:

III. Discussion:

Diabetes mellitus is one of the major health Problems today. Diabetic patients are susceptible to a series of complications that Causes morbidity and pre-mature mortality.⁽¹⁰⁾

Autonomic neuropathy may present in a variety of ways. There may be esophageal dysfunction with difficulty in swallowing, delayed gastric emptying, constipation or diarrhea. Orthostatic hypotension and frank syncope may occur. Cardio respiratory arrest, sudden deaths are thought to be solely due to autonomic neuropathy. Cardiac autonomic dysfunctions are assessed by a series of five simple non-invasive tests, which can be applied bedside. In this, three tests reflect parasympathetic and two reflect sympathetic functions.

Incidence of parasympathetic autonomic neuropathy was 57.5% in comparison to sympathetic autonomic neuropathy, which was present only in 20 % cases.

The results are in confirmity of reports of SAU et al., Majumdar et al., PAL et at. (J.Diab. Asso. Ind. 1984) who observed cardiac autonomic neuropathy in 20% patients of DM of which 12 (60%) were found to have parasympathetic autonomic neuropathy. Tankhiwale et al., Pazare et al., Kudrimodi et al (J. Dab Asso. Ind. Vol.31, 1992) reported incidence of cardiac autonomic neuropathy in DM TYPE2 to be 30% with more involvement of parasympathetic nervous system.

Lily John et al., Sharma et al., George John et al. (API V01.34, 1985) studied 75 DM Type 2 subject of which 30 (40%) had cardiac autonomic neuropathy and parasympathetic dysfunction alone was seen in 51 (68%) while in 9 patients (12%) have both sympathetic and parasympathetic involvement.

Heskin et al. (1974), Hilsted (1978), Ewing et al. (1980) suggested that parasympathetic neuropathy may emerge earlier than sympathetic neuropathy in diabetics. Young et al. (1983) opined that checking the integrity of parasympathetic pathway might be more sensitive for early detection of autonomic neuropathy.

The assessment of autonomic functional status is of great prognostic importance as silent MI and Cardio respiratory arrest during anesthesia or surgery are encountered in the presence of severe autonomic dysfunction. We suggest that a minimum of three tests based on cardiovascular reflexes be carried out in all diabetic subjects to document these changes.

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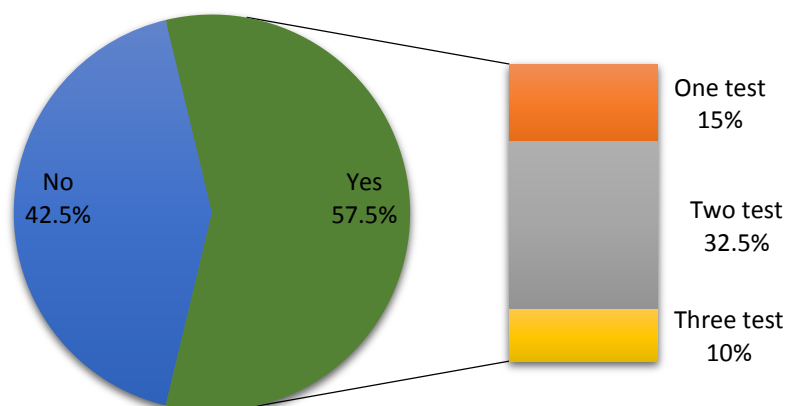
Table - 1 Abnormal Cardiovascular Reflex Test In Dm Type 2 Subjects

One abnormal cardiovascular reflex test		Two abnormal cardiovascular reflex tests		Three or more abnormal cardiovascular reflex tests	
No. of cases with abnormal test	% of cases	No. of cases with abnormal test	% of cases	No. of cases with abnormal test	% of cases
6	15%	13	32.5%	4	10%

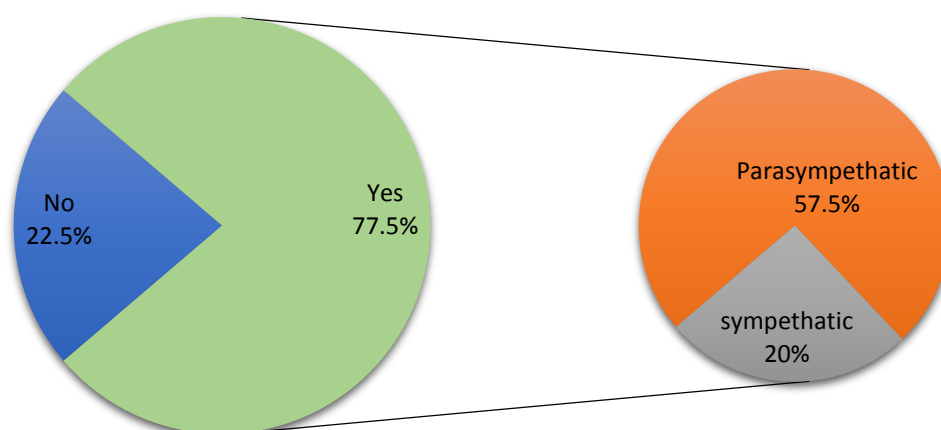
Table- 2 Incidence of Parasympathetic and sympathetic autonomic Neuropathy in DM Type 2 Subjects

S No	Types	No: of Patients	No: of patients with parasympathetic & sympathetic autonomic neuropathy	Percentage
1	Parasympathetic autonomic neuropathy	40	23	57.5%
2	Sympathetic autonomic neuropathy	40	8	20%

Abnormal Cardiovascular reflex test in DM type 2



Autonomic Neuropathy among DM type 2 subjects



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