DyAnsys MEASURE

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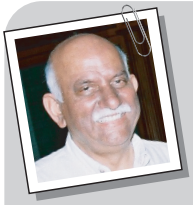
When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind.

- Lord Kelvin (1883)

Director's corner



Greetings!

There has been an ongoing and evolving discussion on the increasing risk of cardio vascular disease, many a time resulting in the death of people with diabetes.

This issue of DyAnsys " Measure" brings to you a case study by Dr. Muralitharan on Autonomic Neuropathy as marker of sudden death. His experiences with 250 patients have been reassessed here.

That minimum consideration has been given to Autonomic Neuropathy has comes as an extremely shocking revelation! The awareness of people is restricted only to Peripheral Neuropathy. However, as Dr. Shaukat Sadikot says, " You lose a limb due to peripheral neuropathy but you lose your life due to autonomic neuropathy ".

It has often been a matter of debate, whether peripheral neuropathy has more focus on it than autonomic neuropathy because the patients who suffer from the former are alive to discuss it as compared to patients with the latter, who have passed on. The attention on autonomic neuropathy is practically non-existent.

Autonomic Neuropathy is the only fatal complication of diabetes. We at Dyansys will persist in our effort to give prominence to this area through our Newsletters. For the first time ever, the detection and reversal of Autonomic Neuropathy has been made easy with the aid of the ANSiscope. As physicians, you can give people with diabetes an assurance of a long and normal life through the early detection and reversal of autonomic neuropathy.

Autonomic Dysfunction is the first stage of Autonomic Neuropathy. Dr.Seshaiah's work (to be published), shows that autonomic dysfunction begins at the pre-diabetes stage. It would thus be very important to use the ANSiscope as early as possible on people who are suspected of having diabetes or known to be in the pre-diabetic stage.

Diabetic Cardiac Autonomic Neuropathy : A Marker of Sudden Cardiac Death

Pro Profile

Eminent diabetologist K. Muralidaran MD; PG D. Diab; M. Diab has more than twenty years of experience in his field of specialization. Innumerable diabetic patients have benefited vastly from his treatment. He completed his graduation and post-graduation specialty training from the Madras Medical College. After identifying his core area of specialization, Dr. Muralidaran established the Indian Diabetes Care & Research Centre at Chennai, Tamil Nadu, India. This clinic boasts of contemporary and state-of-the art facilities and technology to treat multiple diseases and disorders. An expert in his field, he dons many hats. He was the junior resident at JIPMER, Pondicherry and is currently the Chairman of JK Health Mission. As a service to humanity, the Udhavum Ullangal Charitable Trust honoured Dr. Muralidaran for his unsurpassed commitment to the field of medicine. In 2006, he was conferred with the prestigious Dr. K S Sanjivi Award for his relentless service to the underprivileged.

In this issue of DyAnsys 'Measure', Dr. Muralidaran has taken time off from his busy schedule to explain how "Diabetic Cardiac Autonomic Neuropathy can cause Sudden Cardiac Death".

Doc Talk

In Dr. Muralidaran's opinion, the prevalence of autonomic dysfunction as a complexity of diabetes mellitus is believed to be as high as 20-40%. There is a distinct lack of clarity with regard to the symptoms of diabetic autonomic neuropathy (DAN) and hence detection is not an easy task during routine physical examination. By employing various simple non-invasive tests, which may also help in localizing the lesion(s) to specific autonomic pathways, the prompt interpretation of DAN is achievable. DAN can be life threatening in more ways than one and the existence of DAN can result in the failure of multiple organ systems, including cardiovascular, gastrointestinal, genitourinary and/or neuroendocrine systems.

The same metabolic disturbances of somatic peripheral nerve may also be responsible for DAN. Just as in somatosensory neuropathy, a decisive analysis and therapy for DAN was not satisfying enough. Multiple non-invasive techniques have been tried and tested but called for more in depth scrutiny. Moreover quantifying the amount of dysfunction was frequently erroneous.

DCAN AND Sudden Cardiac Death

The accuracy of the theory that CAN, in all probability could be the sole reason for sudden death has been challenged lately. An observation during the case study of Diabetic Neuropathy revealed that sudden death among individuals whether diabetic or not there existed severe coronary artery disease. It was recommended that although CAN could have been a reason for sudden death, it was not an evidential independent one. However, heart failure is a common phenomenon among patients with diabetes. Heart failure can be seen in patients with diabetes by the existence of neuropathy and even in those without evidence of coronary artery disease. Symbolic conclusions in relation to autonomic dysfunction comprises of exercise intolerance, orthostatic hypotension and cardiac dysfunction to rest or exercise. Severe autonomic neuropathy may be responsible for spontaneous respiratory arrest and unexplained sudden death.

Sudden Cardiac Death – How does it happen?

Many a time arrhythmias, also known as, abnormal heart rhythms, is the reason for sudden death. Ventricular fibrillation, an erratic, disorganized firing of impulses from the ventricles (the heart's lower chambers) is the most predominant arrhythmia. When this occurs and if left untreated, the heart is unable to pump blood and death will occur within minutes.

Possibilities of Sudden Cardiac Death

The risk of a sudden cardiac arrest and instant death in a person can be due to many reasons. To name a few,

Previous heart attack with a large area of the heart damaged (75% of SCD cases are linked to a previous heart attack).

A person's risk of SCD is higher during the first 6 months after a heart attack.

Coronary artery disease (80% of SCD cases are linked with this disease).

Risk factors for coronary artery disease include smoking, family history of heart disease, and high cholesterol.

Caution!!

For those with coronary artery disease certain changes in lifestyle are recommended to reduce high blood pressure and cholesterol levels and manage your diabetes and weight, thereby reducing your risk of sudden cardiac death. These changes can be followed by even those people who do not suffer from this ailment.

A person can benefit if he/she,

Quits smoking

Loses excess weight

Routine exercise and physical activity

Follows a low-fat diet

Manages diabetes

Manages other health conditions

Objective

To analyse the risk indicators of sudden cardiac death related to the degree of Cardiac autonomic Neuropathy.

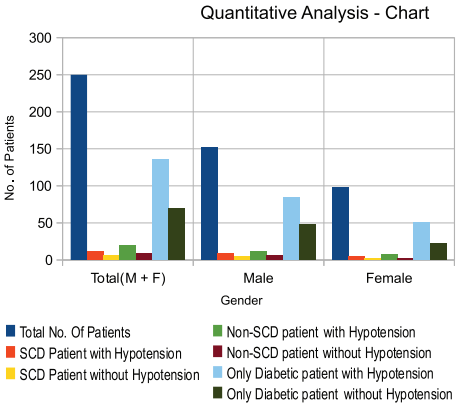
ANSiscope – A Medical Miracle

In recent times significant clinical trials were done to study the relationship between sudden cardiac death (SCD) and heart rate variability(HRV) in people with and without Type2 diabetes and to assess whether low HRV can foretell SCD in Type2 diabetes. HRV was calculated from the 12-lead ECG as the coefficient of variance for 100 R-R intervals (CV(R-R)). The well timed inception of ANSiscope by DyAnsys changed the whole procedure. The ANSitest on patients who were over 50 years of age was done with the help of ANSiscope. The HRV was calculated from the 5-lead ECG as the coefficient of variance for 571 R-R intervals. A simple bedside test with the ANSiscope, that measured 5-6 minute HRV during deep breathing was a good predictor of all-cause mortality for 166 patients (66.4% with diabetes and hypotension).The ANSiscope (Autonomic functional testing) is a valuable tool in identifying DAN and also the subgroup of post-MI patients who are at a high risk of death. CAN represents a significant cause of morbidity and mortality in diabetic patients and is associated with a high risk of cardiac arrhythmias and sudden death, possibly related to silent myocardial ischemia. As such, it has important clinical and prognostic relevance.

A prompt and crucial evaluation of this topic will help physicians to understand in a much better way, how to assess the complexity of conditions present in patients with diabetes so that safe treatment targets can be established. Higher glucose levels were also associated with the risk of SCD both in the absence and presence of hypotension.

Quantitative Analysis Results

In a potential move, 250 patients with Type 2 diabetes and who had survived acute myocardial infarction (MI), aged ≤ 70 years were enrolled. During follow-up, 152(60.8%) subjects were men and 98(39.2%) women. 45(19.2%) patients died before the age of 66. Of these, 18 deaths were sudden cardiac deaths and 27 gradual cardiac deaths. The mean age at death was 63-65 for men and 65-67 for women. Risk factors and continual interpretations included hypertension and congestive heart failure. Records showed that 70% were overweight or obese. Measurements for HbA1c, cholesterol, triglycerides, HDL and diastolic blood pressure were documented for patients. There was an advanced risk of SCD along with higher levels of glucose both in the presence and absence of micro vascular disease after adjustment for current smoking status, systolic blood pressure, anti-diabetic treatment, and history of myocardial infarction and congestive heart failure. 18 cases of sudden cardiac death were identified over 6 years of follow up. A total of 250 patients [Male-152(60.8%) and Female-98(39.2%)] were enrolled at the time of acute MI between 2006 and 2011. Mean age at entry was 60 ± 11 years, and the cohort was followed until 2012. At entry into the report, diabetes with hypotension was present in 135 (54%) patients [Male-84 patients and female-51patients] and the primary endpoint was SCD with hypotension present in 12(4.8%) patients [Male-8 and Female-4]. SCD without hypotension was present in 6(2.4%) patients,[Male-4 and Female-2], and the secondary endpoints were non-SCD with hypotension present in 19(7.6%) patients [Male-12 and Female-7]. Non-SCD without hypotension was present in 8(3.2%) patients [Male-6 and Female-2] and only diabetes without hypotension was present in 70(28%) patients [Male-48 and Female-22]. Among the total number of patients the men were found to have high number of SCD.



Blood Glucose Level, Hyperglycemia and SCD

This report established the fact that an escalated level of blood glucose was connected to a higher risk of SCD, a relationship that was present among those with and without clinical evidence of micro vascular disease. Several factors may explain the relationship of hyperglycemia and SCD. Hyperglycemia can augment micro vascular disease that was not clinically visible or noted and that could be a reason for SCD. Hyperglycemia may be a surrogate for other health markers such as poor health behaviour or medical care that may be linked to the risk of SCD. It can be said that hyperglycemia can cause jeopardy through alternative yet unknown mechanisms. This argument goes in favour of a tight control of blood glucose level even in more severe diabetes.

CONCLUSION:

The ANSiscope with its accurate gauging helps in the prevention of complications and premature death in patients with diabetes. Merely asking questions on lifestyles or measuring blood pressure, is not enough. There are simple bedside tests to diagnose CAN (with the ANSiscope), responses to breathing, the Valsava manoeuvre, and standing. Functional abnormalities and imbalance that exists between the sympathetic and parasympathetic nervous system are perceived with respiratory modulation of different-frequency oscillations in HRV. ANSiscope is an effective tool to screen and observe the reversion of autonomic dysfunction among diabetic patients in both pre-symptomatic and post-symptomatic stages. ANSiscope measures autonomic dysfunction as a lack of coupling between the sympathetic and parasympathetic systems. Measurement of 571 RR intervals using ANSiscope may be more sensitive and reliable in detecting CAN than single tests for the patients with type 2 diabetes as there is a higher risk for SCD after MI as compared to non-diabetic patients.

Literature review

CAN and Myocardial Infarction

Niakan E et al [1986, Issue of Pub Med - indexed for MEDLINE] did a consecutive study on seventy-three adults affected with diabetes to examine the presence of cardiovascular autonomic neuropathy and electrocardiographic evidence of myocardial infarction (MI). Twenty-five (34.2%) patients demonstrated cardiovascular autonomic neuropathy, and ten (13.7%) patients had electrocardiographic evidence of MI. Of the ten identified with MI, seven were asymptomatic (silent) by history. The incidence of silent MI was significantly higher (P less than .04) in patients with cardiovascular autonomic neuropathy. There has been an affirmation that sudden death in diabetic patients with cardiovascular autonomic neuropathy may be due to silent MI.