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A Case Report of Blood Pressure Variation in Diabetes

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ABSTRACT

Blood pressure is a biological variable that varies with time. A series of factors linked to daily activities and independent neurohormonal mechanisms cause blood pressure to vary significantly within the 24 hours of the day: it increases during physical activity and decreases considerably following acute exercise (post-exercise hypotension); it increases in conditions of physical or emotional distress and tends to decrease after meals and during sleep.1 Blood pressure variation throughout the sleep-wake cycle is well known, with lower values observed during night time sleep than in daytime wakefulness. The advent of non-invasive methods to measure blood pressure for 24 hours such as ambulatory blood pressure monitoring (ABPM) shed more light onto the behaviour of blood pressure. Changes in blood pressure during sleep have also been associated with increased risk of cardiovascular and renal disease in the long term: it is the classical description of inadequate or absent drops in blood pressure during sleep seen in attenuated dippers and non-dippers, respectively, associated with left ventricular hypertrophy, hypertensive retinopathy, and proteinuria.[2] A mathematical formula based on the different blood pressure levels observed in subperiods of the sleep-wake cycle was recently proposed to estimate the early morning rise in blood pressure. Pronounced rises in blood pressure during this time of the day ("early morning surge") have also been used to independently predict mean 24-hour, wake, and sleep blood pressure and the Blood pressure variability[3]

Keywords: Blood pressure, Diabetes

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INTRODUCTION

A recent study indicated that blood pressure variability (BPV) is a risk factor (independent of mean BP values) of mortality, and microvascular and macrovascular complications in type 2 diabetes patients [4.] However, BPV is variously defined, especially in relation to time (i.e. beat-to beat, daytime, night-time, 24 h, day-by-day, visit-to-visit). Both day-by-day BPV and ambulatory BPV, which is assessed by ambulatory blood pressure monitoring (ABPM), have also been shown to be associated with cardiovascular disease [5,6]. In addition, as BPV increases in type 2 diabetes [7], its control might be useful for suppressing complications in type 2 diabetes patients. Although research shows that 24-h BPV reflects baroreflex failure and sympathetic nerve activity [8,9], the mechanisms of day-by-day BPV remain to be demonstrated. Day-by-day BPV seems to include ambulatory BPV because of the period when BPV is measured. Nevertheless, the relationship between day by- day BPV and ambulatory BPV has not been investigated.

CASE STUDY:

We are depicting one of the case where a long-standing diabetes came to our clinic for a regular follow up. A 67-year-old man had diabetes mellitus for 15 years was on amlodipine 5mg BD was maintaining well on BP control. Two years earlier he had been admitted to a hospital for evaluation of blackouts on an off and was developing pedal edema. He was taking 28 units of Glargine for the diabetes mellitus but had not experienced hypoglycemia. The history depicting Hypoglycemia was also considered, but adjusting his insulin regimen did not change the symptoms.

Office blood pressure measurement was less than 140/90 mm Hg. On the day of follow up, presented with complains of headache with brow pain to the OPD. The In-clinic blood pressure was 172/110 mm Hg, was asked to recheck after an hour but BP recording varied on two occasions 140/100 to as low as 120/60. Blood glucose concentration was 267mg/dl. Olmesartan 20 mg OD was added to the patient for the hypertension. At first it was thought that he became hypotensive when sitting. His blood pressure was seen to fluctuate between 120/60 to 180/120 mm Hg. Carotid Doppler: clear Fundoscopic examination was normal. Other examinations revealed normal. Rapid increases of systolic blood pressure up to 180 mm Hg and then decreased to as low as 100 mm Hg. After a week and a half patient presented back to OPD and in clinic BP recording - 134/88mmHg. Diabetes is a global public health issue, affecting 415 million people around the world. It contributes to 10% of deaths worldwide, of which 70% are caused by the main complication of diabetes, namely, cardiovascular disease. Among the approaches advocated in diabetes management guidelines to prevent CVD and premature death is the recommendation to maintain optimal blood

pressure (BP). In addition to absolute BP readings, increasing attention is being paid to the harmful effect of BP variability in the members of the population with diabetes

DISCUSSION:

Analysis of data from a factorial randomized controlled trial (ADVANCE trial) of lowering blood pressure and control of blood glucose in 8811 T2DM patients without major macrovascular and microvascular events revealed that visit-to-visit systolic BPV and maximum SBP were independent risk factors for macrovascular and microvascular complications in such patients and were positively associated with myocardial infarction (MI) and CV death3. There are several possible mechanisms that can explain the link between BPV and macrovascular and microvascular events in patients with diabetes. High BPV in T2DM patients suggests possible deleterious effect of hyperglycaemia on the blood vessels, that is responsible for large BP fluctuations.10 The population based Hoorn Study reported an association between T2DM with increased arterial stiffness in both elastic (carotid) and muscular (femoral and brachial) arteries.[11] Additionally, structural changes such as increased carotid intima media thickness have also been reported.[12]

So, it's vital to reduce the Blood pressure variation in high risk patients like diabetes etc. A meta-analysis of data from 61 prospective observational studies on vascular disease related deaths in individuals without known vascular disease at baseline demonstrated that even 2 mmHg SBP reduction could decrease stroke mortality by 10% and ischemic heart disease or other vascular events by 7%.25 In line with such findings, another observational study with diabetes patients found that 10 mmHg reduction in SBP to be positively associated with reduced risk of diabetes-related complications and deaths[13].

The two studies conducted in a hospital setting in Japan and Taiwan [(11,12)] showed that the risks of CVD and all-cause mortality increased by 40% (95% CI 10–79%) and 4.8% (95% CI 0.5–9.2%), respectively, for every 1 SD increase in the SD of SBP. The variability of BP can be considered as a potential indicator of good-quality care in a population with diabetes.

CONCLUSION:

Given the alarming rise in the prevalence of HT in patients with DM, combined with the observed and increased macro and microvascular risk attributable to HT, effective BP management strategies are paramount for reducing risks of future CVDs. BPV has now emerged as an independent risk factor the development of chronic diabetes related complications. Several antihypertensive drugs are suggested for BPV control. In our case, Olmesartan has found to be effectively controlled the Blood pressure variation in Diabetes patient. More studies are warranted to confirm the significance of olmsesartan reducing the Blood Pressure Variation among Diabetes.

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