

INTRODUCTION

Essential hypertension specially isolated systolic hypertension (HTN) is a common clinical condition. As such it is not considered as a disease but a trait which affects the outcome of many co morbid diseases which are responsible for major morbidity and mortality i.e. cardiovascular (CVD), cerebrovascular (CV) and kidney diseases. That is why it is called as silent killer. Diabetes mellitus (DM) which is serious public health issue. The HTN and DM together are named as deadly duo. DM is leading cause of new blindness, end stage renal diseases, and non traumatic amputations, never the less the CVD is the major cause of mortality in patients of DM. HTN is also a risk factor of micro vascular complication such as nephropathy and retinopathy. Optimum control of HTN in patient of DM has been proved to be highly beneficial in regard to mortality and morbidity outcome shown in many cohort large trails, studies and has been accepted by majority of guidelines. Hence this important clinical situation is been discussed here. However it is very difficult to achieve target control of HTN in clinical practice.

HTN AND TYPE I & II DM

As such HTN is common problem in patients of type I & II DM. The incidence of HTN increases as age advances in patients of type I diabetes. Interestingly the prevalence is closely related to the degree of proteinuria. BP begins to rise when albumin excretion rate enters the microalbuminuria stage ($< 30 \text{ mg} / 24 \text{ h}$). Whereas situation is different in type II DM, in a series of about 3500 newly diagnosed DM patient about 40 % are already having HTN and half of them are having albuminuria, further HTN is associated with obesity.

HYPERTENSION AND METABOLIC SYNDROME

HTN is closely related to insulin resistance. There is a suggestion that insulin is an endothelium dependent vasodilator, releasing nitric oxide (NO) from endothelium which relaxes the smooth muscles, the blunting action contributes to increase peripheral vascular resistance, in due course increases HTN in patients of DM. Insulin also retain sodium and water by stimulating distal renal tubules, leads to increase in sodium and water level causing HTN. Stimulation of sympathetic outflow by insulin may induce HTN. Insulin stimulates the proliferation of vascular smooth muscles which leads to medial hypertrophy and increases peripheral vascular resistance.

BENEFITS OF EARLY TREATMENT AND GOALS

Early treatment of HTN is particularly important in DM to prevent CVD morbidity and mortality and minimize the progression of renal diseases and diabetic retinopathy. Evidence of benefit from treating HTN in DM has come from multiple trials, including UKPDS, ADVANCE AND HOT, as well as meta- analyses of these and other trials.

There is near consensus in various guidelines and hypertensive societies about the definition of HTN. As per European society of hypertension BP exceeding 140/90 should be considered as HTN. Once it was believed that aggressive reduction in BP is highly beneficial and guidelines were favor to intensive lowering of BP to below 130/80 in patients of DM, but subsequently a consensus started developing that more aggressive lowering does not change the mortality outcome after THE ACTION TO CONTROL CARDIOVASCULAR RISK IN DIABETES BLOOD PRESSURE TRIAL (ACCORD BP). In this trial randomly selected DM patients with cardiovascular disease, or more than two risk factor for CVD and HTN were treated in two groups, one arm aggressive BP control below 120/80, other standard 140/90. It was found that there is no significant difference in the annual rate of composite outcome of non fatal myocardial infarction, nonfatal stroke or death from CVD between the aggressive and standard therapy group. Serious adverse drug events were noted in aggressively treated group.

SCREENING FOR HYPERTENSION IN DIABETES

The HTN and DM are so closely associated. All diabetes patients must be regularly screened for hypertension and vice versa annually. BP should be measured in supine and sitting position, using an accurate sphygmomanometer and a cuff of appropriate size. BP should be checked in standing position to rule out postural hypertension in elderly and diabetes with autonomic neuropathy patients. Many time ambulatory BP checks up is of help in ruling out white coat effect and investigates diurnal variability to titrate the doses and timing of drugs. 24 hours ambulatory BP monitoring may help diagnosing the night dip in few patients. Many recent studies have shown that more than 25% of all diabetes has nocturnal hypertension especially obese and those having obstructive sleep apnea and they are prone have target organ damage in future. In future carotid femoral pulse wave velocity and changes in central hemodynamic as marker of arterial stiffness may become the common than today.

There are following aims to investigate the hypertensive diabetic patient:

- i. To exclude the causes of secondary hypertensive.
 - ii. To assess the extent of damage to end organ because of hypertension and or diabetic.
 - iii. The CVD morbidity and is selected to HTN & DM so it is also the aim to detect any other potential risk factor exists which can be add to increase mortality due to vesicular disease.
- a. The detail clinical history and physical examination is hallmark in patients of HTN with DM,

The HTN and macro vascular diseases are less common in Native Americans (Pima Indians) and Mexican American.

CARDIAC FUNCTION

A standard 12 lead ECG to detect ischemia and arrhythmia or LVF.

Echocardiography to detect LVH and ventricular dysfunctions, in few cases holter monitoring or stress test may be of some use to detect ischemia and arrhythmia.

RENAL FUNCTION

A fresh urine sample should be tested RBC and WBC cast, microscopic hematuria and microalbuminuria. serum urea, creatinine and glomerular filtration rate needs to be checked. USG of kidney and urinary fact to exclude any additional pathology in kidney responsible for HTN. Sometimes we may require specialized investigation like isotopes renogram for renal artery stinosis.

BLOOD TEST

Complite hemogram to exclude anemia should be done. High WBC count may be indicator of sum infection of kidney and urinary tract. Fasting blood sugar and lipid profile should be done and if found to be high in repeated time lipoprotein subclass is recommended.

Serum electrolyte to find out significant renal disease or monitoring the effect of drugs i.e. diuretics and ACE inhibitors.

MANAGEMENT OF HYPRTENTION IN DIABITISE

The aggressive and early initiations of controlling BP in patients of DM are undoubtly beneficial and helpful in preventing cardiovascular disease and minimizing the progression of CBD and renal disease.

NON PHARMCOLOGICAL METHODS

The life style modification is hallmark of treatment that includes weight reduction, increase consumption of fresh fruits, vegetables, low fat dairy products, salt restriction and alcohol restriction in diet. Cessation of smoking is highly beneficial, smoking not only accelerate the progression of atherosclerosis, but also impairs in insulin sensitivity. Treatment with nicotine supplement for 4-6 weeks (Patch form) a drug like bupropion varenicline are of some use.

Successful life style modification is very useful and

reduces the need of drug doses and number of anti-hypertension agents.

PHARMACOLOGIC TREATMENT

The drug therapy in hypertensive diabetic patients is unequivocally protective as HTN places diabetic patient at high risk of cardiovascular complication all patients with persistence BP above 140/ 90 mm hg should be started on drug therapy.

One meta- analysis compared effect of one anti-hypertensive with another and concluded that no group of antihypertensive were superior to the others. There are extra benefits by one over other in special situation. i.e. ACE inhibitors are better in patient when associated with microalbiminuria.

Calcium channel blockers reduces the risk of stroke compared to other agents and beta-blockers increases the risk of stroke to other agents.

The choice of antihypertensive agents in diabetic patients is based upon their ability to do followings:-

- i. Prevent mortality
- ii. Prevent adverse cardiovascular events such as myocardial infection, stroke and heart failure.
- iii. Prevent the progression of renal disease if present.

In hypertensive with type I DM ACE inhibitors are drugs of choice with or without alburminuria. Diuretics, calcium antagonist and β -selective blocker can be used as second line drug to achieve goal of BP.

In type 2 DM BP control is more important than the choice of drug. ACE inhibitors are drug of choice and other drugs are selected on their additional beneficial effects on co-existing conditions.

B- Blockers and calcium channel blocker for angina and arrhythmia, ARB and B blocker for heart failure, spironolactone is useful in elderly obese, female patients with HTN and hypervolemia, alpha blocker in elderly patients with prostate hyperplasia and dyslipidemia (TG).

A combination therapy is needed in majority of patients. It is beneficial to use combination to reduce the need of doses and to minimize adverse effects. In non- Caucasians and African American. B receptor blocker and ACE inhibitors are less effective because of low RAAS activity; diuretics and calcium channel blocker is drug of choice.

CONCLUSION

HTN and DM are very serious public health problems individually. The association together should be double whammy. There is substantial overlap between and diabetics and hypertension, Obesity, inflammation oxidative stress and insulin resistance are thought to be common pathways mechanism of disease.

All patients of type 2DM should be treated aggressively for HTN if BP is above 140/ 90 mm of Hg to bring it down less than 140/ 90.

Most of the patients need more than one drug to achieve

286 the goal less than 140/ 90 mm Hg in spite of life style modification.

ACE inhibitors have shown the effect of cardio protection and ARB has shown nephron-protection but there is no consensus on choice of drug in all patients as most of the studies have shown that it is BP lowering per say is more important than the drug used.

Newer drugs are constantly been introduced and should be tested for both efficacy and tolerability.

In future the application of CV genomics may substantially change the approach to treating HTN in DM as the genetic architecture of HTN has now been mapped, with the possibility of tailoring antihypertensive treatment

according to genotype of individual patients. So long as we are ready to use newer technology, we shall be dependant on available armamentarium of drug and life style modification to take care of this challenge of HTN in DM.

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