

## Effect of antihypertensive drug classes in metabolic syndrome

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### Abstract

**Background:** Metabolic syndrome (MetS) affects approximately 35% of the adult population of United States as well as categorized by the synchronized existence of hypertension, hyperglycemia, obesity and dyslipidemia. Now a days, this is the main cause of leading CVD (cardiovascular disease) risk in an individual. Raised blood pressure is the record common component of this syndrome and this incidence increases with age.

**Objective:** This research was carried out to recommend the characterizations for the metabolic syndrome along with the occurrence of hypertension in this disorder. Additionally, indications concerning the properties of metabolic of the diverse antihypertensive drug modules and their consequence on metabolic syndrome will be demonstrated.

**Methods:** A comprehensive trial in different patients were performed to identify data from clinical investigations for the occurrence, patho-physiology and treatment of hypertension in MetS.

**Results:** Hypertension existing in almost 79% Pakistani patients along with metabolic syndrome. The usage of thiazide diuretics, and beta-blockers salts, is dejected in the present community; though, latest signs recommend its use under precise circumstances. The Ca. channel inhibitors appear to apply a unbiased outcome on Metabolic syndrome. Whereas, renin angiotensin scheme inhibitors are supposed to be of the utmost advantage. Even though, variances occur among various agents of this class.

**Conclusion:** Debate still exists about the ideal anti-hypertensive treatment in Metabolic syndrome. Due to the huge occurrence of hypertension in Pakistani community, still, further investigations and data is in dire need for this treatment.

**Keywords:** Hypertension; Ca. Channel blockers; Thiazide diuretics; Beta blockers

### 1. Introduction

The MetS (Metabolic syndrome) is considered by the immediate occurrence of precise aberrations, such as obesity especially abdominal, dyslipidemia, hypertension as well as glucose intolerance and ultimately amplify the risk for cardio-vascular events. This syndrome was initially introduced during 1988 as “Syndrome X” by Reaven [1], where the resistance of insulin was the chief patho-physiologic as well as diagnostic feature. However, the 1<sup>st</sup> effort to describe it with precise standards was performed in 1998 by WHO. The 1<sup>st</sup> effort to set the standards for the finding of Metabolic Syndrome was printed by the World Health Organization in 1998 [2]. The existence of three or more from atherogenic dyslipidemia, central obesity, , hypertension or elevated fasting plasma glucose was essential for the findings of diagnosis [6].

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After four years, two other diverse explanations for the metabolic syndrome were familiarized. One by the AHA (American Heart Association) and the NHLBI (National Heart, Blood & Lung, Institute) was like the ATP III criteria [11]. Also all the variables were found to be identical, although have few modifications. Minor stages, for impaired fasting glucose, were accepted. Furthermore, it was known that lower cutoffs for waist boundaries could be linked with Metabolic syndrome, particularly in community of Asia or when other danger-factors co-existed, for example NAFLD (non-alcoholic fatty liver disease), ovary disease with polycystic ovaries, albuminuria or raised values of the C-reactive protein. Lastly, patients taking anti-hypertensive, antiglycemic and hypolipidemic medications were involved in the diagnostic standards [8, 22]. As cited earlier, the occurrence of raised hypertension is one of the compulsory standards for the diagnosis of the MetS [22]., although indication recommend that blood pressure combat very often in people with Metabolic syndrome.

### **1.1. The control of hypertension in metabolic syndrome**

The Heart Association of America (AHA), and the ESC (European Society of Cardiology) alongwith European Hypertension Society (ESH) printed nearly instantaneously strategies to treat the hypertension during the previous years [3, 10]. Dissimilar descriptions and unlike areas of treatment were set by these strategies. The guidance defined by AHA describe the occurrence of blood pressure as SBP  $\geq 130$  & DBP  $\geq 80$  mmHg. Whereas, anti-hypertensive dealing should be applied in persons showing values of BP when there is well-known cardio-vascular disease as a 2<sup>nd</sup> prevention or as 1<sup>st</sup> inhibition when the assessed ten year atherosclerotic cardio-vascular illness (ASCVD) risk is from 10% to advanced. The last direction also applies to those with diabetes mellitus. Such individuals with an estimated ten-year ASCVD danger under 10% must obtain antihypertensive treatment having values of SBP  $\geq 140$  & DBP  $\geq 90$  mmHg.

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## **2. Materials and method**

The present study was investigated in CCU, Allied Hospital/Faisalabad Medical University, Faisalabad (Pakistan, 38000). Research was applied on 200 patients suffering from metabolic syndrome (MetS). The said patients were treated with thiazide diuretic and beta blockers with the hypothesis as these drugs are the valuable tools in case of hypertension in Metabolic syndrome. Among 200 patients, data of 10 patients was excluded due to non-cooperation while their routinely follow-up. The obtained data was analyzed on percentage (%) basis.

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## **3. Results and discussion**

### **3.1. Thiazide Diuretics**

This salt already proved to be equally valued tool for best treatment of hyper-tension also during the past, this medicine was prescribed as a 1<sup>st</sup> line factor for the proper managing this illness [11]. This approval derived primarily to avoid heart attack. Chlor-thalidone found higher in avoiding these health issues [14].

On an average, hydrochlorothiazide is linked with a advanced occurrence of new-onset DM and this outcome greatly depends on dose & apparent even in the lesser managed doses. Also the atherosclerosis danger in societies did not take a higher risk for DM in patients getting thiazide diuretics when compared to untouched hypertensives problem [26]. Inversing the diuretic evoked hypokalemia, it is one of the reasons of hyperglycemia because of in-direct lessening in insulin discharge. The grouping of thiazide diuretics along with potassium sparing diuretics appears to alleviate this hyperglycemic consequence. The similar implements to the blend of above said diuretics with the blockers of the renin-angiotensin classification.

### **3.2. Use of Beta Blockers in hypertension**

The SNS (Sympathetic nervous system) and para sympathetic nervous system activation has been planned as a crucial machinery involved in the pathogenesis of hypertension in Metabolic Syndrome. Consequently, obstruction in sympathetic system can propose as a rational method for the treatment of hypertension in community. Though, the use of beta blockers in syndrome is uncertain as it appear to create a adverse metabolic effects including increase in weight [7], glucose impatience and dyslipidemia. Its use also connected with new onset diabetes [23]. As a result, the usage of b beta blockers has been dejected for handling with hypertension in patients with Metabolic Syndrome. Though, even though these conclusions concern old-style beta blockers.

More specifically, Nebivolol is a beta blocker with a synchronized alpha adrenergic receptor blocking effect, showed an improved metabolic profile compared to old-styled agents of this group. The medicine, labetalol is a non-selective beta blocker also linked with blockage the receptors of the alpha adrenergic. Outcomes concerning the effect of labetalol on

the metabolic syndrome missing [21] However, in general, labetalol is probable to apply a neutral effect on the metabolism of glucose and lipid. Furthermore, nebivolol is a cardio-selective beta blocker that brings the synthesis of nitric oxide as well as works as a vaso dilating agent also. Lastly, in distinction with metoprolol the nebivolol also have capacity to decrease and oxidative stress and insulin resistance in hypertensive patients after few months of treatment.

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#### 4. Conclusion

From the study and investigations all over the world, it was concluded that both the hypertension and MetS have a strong connection. The occurrence of Metabolic Syndrome (MetS) and Hypertension, both looks to boost the rise of end-organ injury. Hence, to attain the control, of hypertension, is a big importance in Pakistani Population. The continuous practice of thiazide diuretics salt is also connected with negative metabolic properties, even though the indication concerning the effect of this research in cardiac & general death is unpredictable. Health professionals associated in the supervision of patients, with metabolic syndrome, must familiar with diverse system of pathophysiology, drug related characteristic and expected negative impact of the various types of anti-hypertensive drugs. However, more research and data is needed in this field for further clarifications while choosing an antihypertensive drugs.

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#### Compliance with ethical standards

##### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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