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Review Article

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A REVIEW ON SIMULTANEOUS ESTIMATION OF ANTIHYPERTENSIVE DRUG BY HPLC METHOD

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ABSTRACT

The main objective of this review is to unify and interpret widely scattered information of reported studies on potential, reliable and efficient analytical methodologies which can estimate all the major components of antihypertensive drugs. The information and suggested outlined below may facilitate and guide further needed studies to optimize the use of analytical techniques like High Performance Liquid Chromatography (HPLC), High Performance Thin Layer Chromatography (HPTLC), Gas Chromatography (GC) etc. for determination of antihypertensive analytes in formulation. Presented work is focused on the use of different analytical methods for the estimation of antihypertensive drugs in API as well as formulation. The first, Hypertension, Antihypertensive drugs their mechanism were described. From the reviewed literature it is obvious that HPLC is a commonly available method of testing in pharmaceutical laboratory so this method should be of choice for complete determination of all the components.

KEYWORDS: Hypertension, specificity, accuracy, precision, instruments, HPLC and sensitivity.

INTRODUCTION

Hypertension

Hypertension is considered to be present when a person's systolic blood pressure is consistently 140 mm hg or more, and/or their diastolic blood pressure is consistently 90 mm hg or more.[1] Recent 'global burden of hypertension' data showed that more than a quarter of the world's adult population (nearly 1 billion) had hypertension in 2000 and this is expected to increase by about 60% (1.56 billion) in 2025; the population burden being greater in developing countries.[2] In United States, a total of 68.9% of people With hypertension were aware of the diagnosis, 58.4% received treatment, and only in 31.0% the blood pressure was controlled.[3] Hypertension is already a highly prevalent risk factor for cardiovascular dieses throughout the world. It is becoming an increasingly common health problem worldwide because of contributing factors such as obesity, physical inactivity and an unhealthy diet.[4,5,6] Hypertension plays a major etiologic role in the development of cerebrovascular disease, ischemic heart disease and renal failure. Treating hypertension has been associated with about a 40% reduction in the risk of stroke and about a 15% reduction in the myocardial infarction.[7]

Although hypertension has been shown to prevent Cardio Vascular Disease (CVS) and to extend and enhance life, hypertension remains inadequately managed everywhere. In addition, hypertension often coexists with other cardiovascular risk factors' such as tobacco use, diabetes, hyperlipidemia and obesity, which compound the cardiovascular risk attributable to hypertension. Worldwide, these coexistent risk factors are inadequately addressed in patients with hypertension, resulting in high morbidity and mortality.[8] Globally data indicated that about 62% cerebrovascular disease and 49 % of ischemic heart disease are attributed to the treatment of suboptimal blood pressure (systolic blood pressure >115 mm hg). A global capacity assessment survey conducted by World Health Origination (WHO) shows that there is wide variation in the capacity for management of hypertension in various countries. Of the 167 countries surveyed, national hypertension guidelines were not available in 61%, health professionals were not trained to manage hypertension in 45%, antihypertensive were not affordable in 25%, and basic equipment and drugs for the management of hypertension were not available in primary healthcare in 8 and 12% of countries, respectively.[9]

History of antihypertensive drugs

In the 1930s and 1940s, three antihypertensive treatments were developed: sympathectomy, very low sodium diet and pyrogen therapy. Sympathectomy, which involved cutting nerves to blood vessels, lowered blood pressure in some patients, but it required more than ordinary surgical skills, often produced life-

threatening complications. Low sodium diet also was unpleasant because they limited food choices, but they were effective in lowering blood pressure. Pyrogen therapy was based on the observation that fever lowers blood pressure. Fever was induced by intravenous infusion of bacterial products. The treatment transiently reduced blood pressure but required hospitalization and had many unpleasant side effects.[9-12] The first successful drug treatment for hypertension were introduced after World War II. By that time, researchers had learned that blocking the sympathetic nervous system could lower blood pressure.

In 1946, tetramethylammonium was introduced as treatment of hypertension. Hexamethonium, an improved version of tetraethylammonium, was available for use by 1951.[13] Another effective blood pressure lowering drug, hydralazine, resulted from the search for anti-malarial compounds. It was diverted to the treatment of hypertension when it was found to have no anti-malarial activity but to lower blood pressure and increase kidney blood flow. They were reasonably effective in lowering blood pressure but often caused severe side effectives.[14,15] The final drug developed in those early days, reserpine, was derived from rauwolfia serpentine, a plant used for centuries by physicians and herbalists on the indian subcontinent.[16,17] Success in treating hypertension has been aided by the development of progressively more effective, more specific and more easily tolerated drugs. Both laboratory and clinical research in academia and industry played pivotal roles in the development of these drugs.

Role for different analytical methods

Analytical methods development and validation play important roles in the discovery, development, and manufacture of pharmaceuticals. Pharmaceutical products formulated with more than one drug, typically referred to as combination products, are intended to meet previously unmet patients need by combining the therapeutic effects of two or more drugs in one product. These combination products can present daunting challenges to the analytical chemist responsible for the development and validation of analytical methods. This review contains the various simultaneous estimation methods (spectrophotometric, High Performance Liquid Chromatography (HPLC), & High Performance Thin Layer Chromatography (HPTLC) which are employed for the quantitative estimation of drug products containing antihypertensive analytes. The official test methods that result from these processes are used by quality control laboratories to ensure the identity, purity, potency, and performance of drug products.

CONCLUSION

Presented work is focused on the use of different analytical methods like High Performance Liquid Chromatography (HPLC), High Performance Thin Layer Chromatography (HPTLC), Gas Chromatography (GC) etc. for determination of antihypertensive analytes in formulation as well as in API. First, Hypertension, Antihypertensive drugs their mechanism was described. From the reviewed literature it is obvious that HPLC is a commonly available method of testing in pharmaceutical laboratory so this method should be of choice for complete determination of all the components. Selection of analytical methods is determined by several factors such as speed, convenience, specificity, accuracy, precision, sensitivity, selectivity, cost, and availability of instruments,

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