

Combination Therapy versus Monotherapy in Treatment of Arterial Hypertension

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ABSTRACT

Abstract: Hypertension is the most prevalent cardiovascular disorder and is linked to elevated mortality rates. Blood pressure is controlled by complex neural, endocrine, renal and blood vessels. Hypertension is classified into primary and secondary hypertension. Blood pressure is equal to peripheral vascular resistance multiply by cardiac output. Different drugs have been used in the treatment of hypertension each with different mechanism of action and adverse effects such as diuretic drugs, angiotensin converting enzyme inhibitor, vasodilators, centrally acting antihypertension drugs. Monotherapy of hypertension with single drug is ineffective in controlling high blood pressure therefore combination therapy with two of three drugs is usually effective as each drug acting with different mechanism of action and different site this leading to better blood pressure control.

Keywords:

arterial hypertension, combination therapy, monotherapy, drugs in hypertension

Introduction

Conventional monotherapy, which utilizes one antihypertensive medication, has historically been viewed as the foundation of hypertension management because of its affordability. Various categories of antihypertensive medications, such as angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), calcium channel blockers, diuretics, and beta blockers, are frequently employed as monotherapy choices [1].

Combination therapy entails the concurrent administration of two or more antihypertensive agents from distinct drug classes [2]. Approximately 75% of individuals with hypertension

necessitate combination therapy as they struggle to manage their blood pressure successfully with a single medication. Transitioning rapidly from monotherapy to a combination regimen is one approach to achieving better blood pressure control [4].

Pathogenesis of Essential Hypertension:

The onset of essential hypertension is influenced by multiple factors and is quite intricate. The kidneys act both as a contributor to and a target of the hypertensive condition, with the disease resulting from the interplay of various organ systems and several separate or interconnected mechanisms.

Contributing elements to the development of hypertension consist of genetics, stimulation of neurohormonal mechanisms like the sympathetic nervous system and the

renin-angiotensin-aldosterone system, excess body weight, and higher consumption of dietary salt [4]

Benefits of monotherapy:

1. Economic efficiency since only one drug is needed.
2. Standard monotherapy is generally simple to manage and monitor, providing a straightforward choice for patients.

Limitations of monotherapy treatment

1. There may be insufficient regulation of blood pressure in individuals with complex health issues that require multiple medications. Since hypertension is frequently a multifactorial condition, some patients might need a combination of drugs to manage their blood pressure.
2. Even at the highest prescribed doses, monotherapy may not effectively control blood pressure, which can lead to an increase in side effects.

Benefits of combination therapy

1. Utilizing a combination of medications allows for a more convenient dosing schedule, reduces the required dosage, and can be administered once daily, enhancing patient adherence.
2. This approach provides an additive or synergistic effect on reducing blood pressure at lower dosages of each component while mitigating the side effects of each drug.

Limitation of combination therapy

1. Key factors to consider include the complexity and expense of managing and monitoring several medications, the difficulty in pinpointing the source of adverse effects, the heightened risk of side effects, and the potential for poor adherence.

From a review of the literature:

The combination of Diuretics and ACE Inhibitors

Fosinopril, the first of a new class of ACE inhibitors with a dual excretion route, is both efficient and well-tolerated. The studies reviewed here indicate that the absorption and

pharmacokinetics of fosinopril and HCTZ remain unchanged when these medications are taken together. Additionally, the research demonstrates that the combination of fosinopril and HCTZ effectively manages hypertension; both drugs work additively and do not cause any negative interactions. The simultaneous use of these two medications allows for reduced dosages of each, leading to a decrease in side effects. Specifically, the negative impacts of HCTZ on blood lipid levels and glucose are reduced.

Fosinopril/HCTZ offers numerous benefits compared to using fosinopril or HCTZ by themselves for uncomplicated hypertension and is appropriate for a wide range of hypertensive patients, including specific groups such as those with diabetes or older adults. Since congestive heart failure (CHF) is typically managed with both a diuretic and an ACE inhibitor, the combination of fosinopril and HCTZ could be effective for treating patients with CHF [5].

Combination of felodipine and metoprolol

A double-blind, parallel-group randomized study conducted over 12 weeks compared the combination therapy of felodipine and metoprolol (5/50mg) with each monotherapy, showing a notably greater antihypertensive response (98% with the combination compared to monotherapy (felodipine at 79% and metoprolol at 82%). The combination therapy also demonstrated a significantly larger reduction in mean systolic/diastolic BP (28/18 mmHg) compared to either felodipine (18/12 mmHg) or metoprolol (19/12 mmHg) [6].

Combining an angiotensin receptor blocker ARB with a diuretic

The optimal administration of an ARB in conjunction with a diuretic adheres to the recommended therapeutic approach of utilizing two antihypertensive medications that work through complementary mechanisms to achieve a more significant reduction in blood pressure. There are several benefits to pairing an ARB with a diuretic, including: 1) enabling the use of lower doses of individual medications than would be necessary to reach the same level of effectiveness with a single medication, leading to a

decreased occurrence of side effects and enhanced patient adherence; 2) enhancing the antihypertensive and hemodynamic effects of ARBs, which is a result of the salt depletion caused by thiazide diuretics; and 3) minimizing the likelihood of hypokalemia induced by diuretics. [7].

The combination of a renin angiotensin system inhibitor (RASi) with a calcium channel blocker (CCB)

A first-line combination of a calcium channel blocker (CCB) and a renin angiotensin system inhibitor (RASi) reduces oedema, the primary side effect of the dihydropyridine CCB and the primary factor restricting its use, in addition to its antihypertensive effectiveness. It has been demonstrated that the dose-dependent BP-lowering effect of telmisartan and amlodipine taken as a single pill is noticeably higher than that of either medication taken alone. Ambulatory blood pressure monitoring in patients with stage 1 and stage 2 hypertension has validated these findings, showing that telmisartan/amlodipine taken as a single pill has a significant 24-hour lowering effect on blood pressure. On combination therapy, a greater percentage of patients reached 24-hour blood pressure targets of less than 130/80 mmHg. Combination therapy has proven to be more effective for a wide range of patients, including those with obesity, diabetes mellitus, and moderate-to-severe hypertension. Additionally, amlodipine-induced oedema is less common when telmisartan and amlodipine are used together, which makes them a preferred combination for treating hypertension. [8]

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