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ARTERIAL HYPERTENSION AND ERECTILE DYSFUNCTION: COMMON PATHOGENETIC MECHANISMS AND THERAPEUTIC POTENTIAL OF IRBESARTAN

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Abstract: Arterial hypertension (AH) and erectile dysfunction (ED) are interrelated clinical conditions whose pathogenesis involves endothelial dysfunction, reduced nitric oxide bioavailability, overactivation of the renin–angiotensin–aldosterone system (RAAS), oxidative stress, and impaired vascular regulation. The commonality of these mechanisms supports interest in the potential role of antihypertensive therapy, particularly angiotensin II receptor blockers (ARBs), including irbesartan, in patients with concomitant AH and ED.
Keywords: arterial hypertension, erectile dysfunction, endothelial dysfunction, renin–angiotensin–aldosterone system .

Introduction

Arterial hypertension is one of the main risk factors for cardiovascular disease. Men with hypertension also frequently experience erectile dysfunction, which may reflect systemic vascular dysfunction [1, 2]. Common mechanisms of these conditions include endothelial dysfunction, decreased nitric oxide (NO) bioavailability, activation of the RAAS, and oxidative stress [3, 4]. According to the arterial size hypothesis, vascular abnormalities may manifest ED earlier than some other clinical features of cardiovascular disease [5–7].

The aim of this review is to examine the general pathogenetic mechanisms of hypertension and ED and to evaluate the available data on the use of irbesartan .

Materials and methods

A descriptive review of scientific publications on the pathogenesis of hypertension and ED, the role of RAAS, the effect of antihypertensive drugs on sexual function and the clinical use of irbesartan was conducted .

Note: Before submitting an article, you must indicate the databases actually used, the search period, and the criteria for selecting publications.

1. Common pathogenetic mechanisms of hypertension and ED

1.1 Endothelial dysfunction

The endothelium regulates vascular tone and maintains a balance between vasoconstrictor and vasodilator factors. In hypertension, chronic hemodynamic stress contributes to endothelial damage and decreased NO bioavailability [4].

In the cavernous tissue of the penis, NO activates guanylate cyclase, increases the concentration of cyclic guanosine monophosphate, and ensures smooth muscle relaxation necessary for erection [9, 10]. Therefore, impaired NO-dependent vasodilation may contribute to the development of vascular ED.

1.2. The role of RAAS and oxidative stress

Angiotensin II, via AT1 receptors, causes vasoconstriction, promotes sodium and water retention, and is involved in vascular remodeling. Furthermore, it enhances the formation of reactive oxygen species, which reduce NO bioavailability and impair endothelial function [11, 12].

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Such processes can disrupt the blood supply to the cavernous tissue and reduce the ability of its smooth muscles to relax. Chronic inflammation and structural changes in the vessels further exacerbate these disorders [3, 4].

Thus, endothelial dysfunction, RAAS activation, and oxidative stress form the pathophysiological basis for the relationship between hypertension and ED.

2. Antihypertensive therapy for concomitant ED

Treatment of patients with hypertension and ED is aimed at achieving target blood pressure, reducing cardiovascular risk, and improving quality of life. When selecting a drug, comorbidities, treatment tolerability, and potential impact on sexual function should be considered [1, 2].

The effect of antihypertensive drugs on erectile function varies and depends on the specific drug and individual patient characteristics. ARBs are of interest due to their ability to block the adverse effects of angiotensin II. However, it cannot be assumed that all drugs in this class are guaranteed to improve erectile function [2, 8].

Self-discontinuation of antihypertensive therapy is unacceptable. If ED occurs, it is necessary to assess blood pressure control, metabolic risk factors, comorbidities, and potential adverse effects of the medications being taken.

3. Irbesartan : properties and potential mechanisms of action

Irbesartan is an ARB and primarily blocks the AT1 receptor of angiotensin II. This reduces the vasoconstrictor effect of angiotensin II and helps lower blood pressure. The drug is used according to the dosage regimens prescribed by clinical guidelines and package inserts.

AT1 receptor blockade may reduce the adverse effects of the RAAS on the vascular wall and help preserve endothelial function. Theoretically, this could create favorable conditions for an erectile response, but this proposed mechanism does not equate to proven efficacy in treating ED.

The organoprotective properties of irbesartan were studied, in particular, in patients with diabetic nephropathy in the IDNT and IRMA 2 studies [15, 16]. When using the drug, it is necessary to monitor blood pressure, potassium concentration and renal function, especially in patients with chronic kidney disease and taking concomitant medications that affect potassium balance.

4. Clinical data on the efficacy of irbesartan

4.1. Antihypertensive effect

In a comparative study by Kassler-Taub et al. , irbesartan provided a more pronounced reduction in blood pressure than losartan at the doses studied. Another study reported a higher rate of achieving target blood pressure with irbesartan compared with valsartan .

These results confirm the antihypertensive efficacy of irbesartan , but do not allow us to assert its absolute superiority over all other ARBs.

4.2. Effect on erectile function

In a prospective study of 1069 patients with hypertension and metabolic syndrome who received irbesartan alone or in combination with hydrochlorothiazide, the prevalence of ED decreased from 78.5% to 63.7% over six months of follow-up.

A study involving 218 men compared felodipine plus irbesartan and felodipine plus metoprolol. The irbesartan group showed an improvement in libido, but this did not translate into an objective improvement in erectile function.

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Irbesartan was also studied in men after radical prostatectomy , assessing changes in IIEF-5 scores. The results from this group of patients cannot be directly generalized to all men with hypertension and vascular ED.

Overall, the available data suggest a potential beneficial effect of irbesartan on selected sexual function parameters. However, interpretation of the results is limited by study design, concomitant therapy, and the potential impact of improved blood pressure control. Additional randomized trials using standardized ED assessment scales are needed.

5. Practical aspects of patient management

In patients with a combination of hypertension and ED, a comprehensive assessment of cardiovascular risk is recommended, including the presence of diabetes, obesity, dyslipidemia, smoking, and chronic kidney disease. The International Index of Erectile Function, including the short form IIEF-5, can be used to assess the severity of ED and its dynamics [2].

The choice of antihypertensive medication should be based on clinical indications, efficacy, and safety. When prescribing irbesartan, blood pressure, creatinine, and potassium levels should be monitored. In cases of persistent ED, consultation with a urologist or andrologist may be necessary, and specific treatment should be considered, taking into account the patient's cardiovascular status.

Conclusion

Arterial hypertension and erectile dysfunction have common pathogenetic mechanisms, the leading ones being endothelial dysfunction, decreased bioavailability of NO, activation of the RAAS and oxidative stress.

Irbesartan has proven antihypertensive activity and can be considered for the treatment of patients with hypertension and concomitant ED when indicated. Some studies demonstrate possible improvement in sexual function, but the drug's specific effect on ED has not yet been definitively proven.

To clarify the clinical significance of irbesartan, further controlled studies using standardized erectile function assessment scales and taking into account concomitant risk factors are needed.

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