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ORIGINAL ARTICLE

Effect of different beta blockers on penile vascular velocities in hypertensive males

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KEYWORDS

Penile duplex;
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Abstract *Background:* Beta blockers are very commonly used as antihypertensive medications in young active individuals. This class has been accused of erectile dysfunction in patients taking them. Problems with erectile function can raise a concern in the treatment of hypertension and may influence the choice of treatment regimens and decisions to discontinue drugs.
Aim: The aim was to assess the effect of different beta blockers: nebivolol, atenolol, bisoprolol, and carvedilol on the penile arterial duplex velocities in hypertensive males.
Methods and results: 108 non-smoking, non-diabetic, recently diagnosed hypertensive men, otherwise healthy, participated in the study. The patients were divided into four groups: Group 1 (24 patients) who were taking 5 mg of nebivolol, Group 2 (28 patients) who took 100 mg of atenolol, Group 3 (29 patients) who were taking 10 mg of bisoprolol, and Group 4 (27 patients) who were on 25 mg of carvedilol. The penile vascular velocities were measured before treatment and after a treatment phase of eight to twelve weeks of beta blocker antihypertensive treatment. We obtained a statistically significant diminish of the stimulated PSV with atenolol ($P = 0.03$), bisoprolol ($P = 0.05$), and carvedilol ($P = 0.02$), while, with nebivolol the PSV did not show a significant change ($P = 0.7$). There was also a significant decrease of the stimulated EDV with nebivolol (0.04) with no change with the other beta blockers.
Conclusion: Nebivolol is a unique member of the beta blocker family showing neutral effects on the penile vascular velocities as compared to other beta blockers in hypertensive males.

1. Introduction

Erectile dysfunction (ED), the persistent inability to achieve and/or maintain an erection sufficient for satisfactory sexual activity (1) is a condition of increasing prevalence worldwide which has been estimated to affect 150 million individuals and is supposed to impact up to 50% of men between the ages of 40 and 70 (2). ED and hypertension are common conditions

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that possibly share pathophysiologic pathways. Compared to the general population, hypertensive patients have a higher prevalence of ED (3,4). However, an important point has been raised as to whether the higher prevalence of ED in those patients is the result of hypertension per se, or of antihypertensive treatment, or as a combination of both. ED has an important impact on the quality of life and this leads to patients' non-compliance to antihypertensive therapy whenever it is believed that their ED is related to their antihypertensive drug therapy. Keene et al. reported drug-related erectile dysfunction in approximately 25% of cases, being mostly readily reversible when the drug is stopped, or a suitable alternative is given (5).

The complaint of erectile dysfunction is frequent in patients with cardiovascular disease especially when treated with beta-blockers. Issues of cause and effect are confused because cardiovascular disease 'per se' may cause erectile dysfunction, as there appears to be a higher rate of sexual dysfunction in untreated men with cardiovascular disease compared with men of similar age (6).

Beta blockers are a drug class of wide heterogeneity in terms of selectivity to adrenergic receptors, intrinsic sympathetic activity and vasoactive effects. Some beta blockers, such as nebivolol, carvedilol, labetalol and celiprolol, possess variable degrees of vasodilatory properties. Since vasoconstriction may contribute to vasculogenic sexual dysfunction through reduced blood supply, it could be hypothesized that vasodilatory beta blockers may diverge in clinically meaningful ways from traditional beta blockers on their effects in sexual function. However, this assumption seems to be only partially correct, since observational and clinical data suggest that carvedilol shares the negative effects of traditional beta blockers on sexual function (7), while nebivolol might be the only exception in this class of antihypertensive drugs regarding the effects on erectile function (8,9). The negative effects of beta blockers on sexual function have been recently debated (10,11). Two studies reported that erectile dysfunction induced by treatment with beta blockers is primarily due to knowledge of side effects and similarly occurs with placebo (12,13); therefore, beta blocker-induced erectile dysfunction seems to be perceived and not real. On the other hand, there are three carefully designed, randomized crossover studies, conducted by Fogari (14,15), aiming to evaluate specifically the effect of antihypertensive treatment in erectile function. These studies provide strong evidence for a negative effect of beta blockers on erectile function, since beta blockers were worse than placebo, which in turn was worse than renin-angiotensin system inhibitors. Although a placebo effect, at least in some patients, cannot be entirely excluded, available data indicate that a negative effect of beta blockers on sexual function cannot be negated (10).

1.1. Aim of the study

The aim was to assess the effect of different beta blockers: nebivolol, atenolol, bisoprolol, and carvedilol on the penile arterial duplex velocities in hypertensive males.

2. Patients and methods

2.1. Patients

108 nonsmoking, non-diabetic, recently diagnosed hypertensive men, otherwise healthy, participated in the study, which was approved by the Ethics Committee of the University of Ain Shams. All patients gave an informed consent before participating in the study.

The patients underwent a thorough history including the International Index of Erectile Function (IIEF-5) criteria. They all had an echocardiogram (ECG), and laboratory testing including fasting blood sugar and 2 h post prandial to exclude those with Diabetes Mellitus.

All patients underwent an exercise treadmill test to exclude the presence of ischemic coronary artery disease.

The patients were then divided into four groups: Group 1 (24 patients) who were taking 5 mg of nebivolol, Group 2 (28 patients) who took 100 mg of atenolol, Group 3 (29 patients) who were taking 10 mg of bisoprolol, and Group 4 (27 patients) who were on 25 mg of carvedilol.

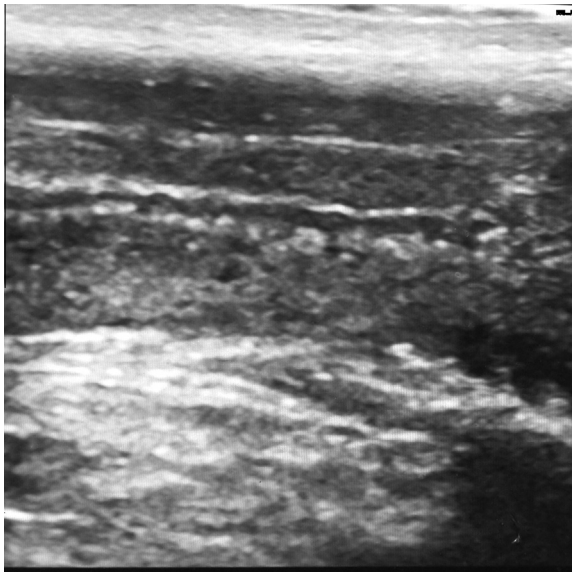

Fig. 1 Cavernosal artery by grayscale bi-dimensional ultrasound.

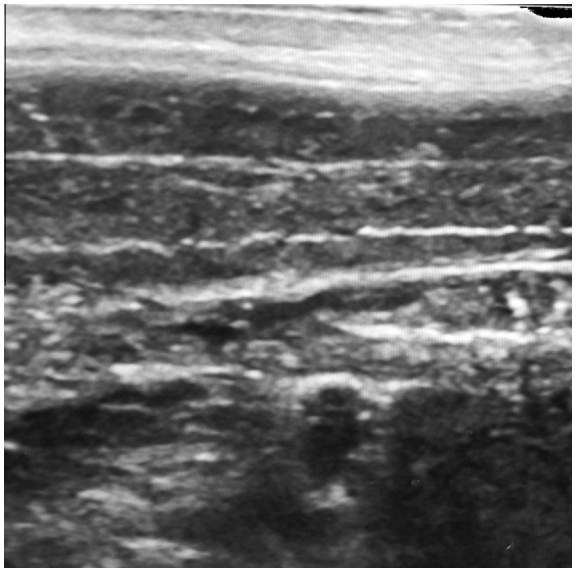

Fig. 2 Cavernosal artery by grayscale bi-dimensional ultrasound.