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# Comparing beta-blocking effects of bisoprolol, carvedilol and nebivolol.

Stoschitzky K, Stoschitzky G, Brussee H, Bonelli C, Dobnig H.

Division of Cardiology, Department of Medicine, Medical University of Graz, Graz, Austria. kurt.stoschitzky@meduni-graz.at

**OBJECTIVE:** Bisoprolol, carvedilol and nebivolol have been shown to be effective in the treatment of heart failure. However, the beta-blocking effects of these drugs have never been compared directly. **METHODS:** Therefore, we performed a randomized, double-blind, placebo-controlled, cross-over trial in 16 healthy males. Subjects received 10 mg bisoprolol, 50 mg carvedilol, 10 mg nebivolol and placebo on the first morning followed by 5 mg bisoprolol once daily, 25 mg carvedilol twice daily, 5 mg nebivolol once daily and placebo for 1 week. Heart rate and blood pressure were measured at rest and exercise 3 and 24 h following intake of the first dose, and immediately before and 3 hours following intake of the last dose of each drug. In addition, effects of the drugs on nocturnal melatonin release were determined, and quality of life (QOL) was evaluated. **RESULTS:** Heart rate at exercise was decreased at 3 h following intake of the first single dose of each drug by bisoprolol (-24%), carvedilol (-17%) and nebivolol (-15%), and at 24 h following intake of the respective last dose of each drug following 1 week of chronic administration by bisoprolol (-14%), carvedilol (12 h; -15%) and nebivolol (-13%) ( $p < 0.05$  in all cases). Thus, trough-to-peak-ratios at long-term were as follows: Bisoprolol, 58%; carvedilol (12 h), 85%; nebivolol, 91%. Nocturnal melatonin release was decreased by bisoprolol (-44%,  $p < 0.05$ ) whereas nebivolol and carvedilol had no effect. QOL with carvedilol was slightly but significantly lower than with the other drugs, whereas bisoprolol and nebivolol did not alter QOL. **CONCLUSIONS:** These data show that peak beta-blocking effects of bisoprolol appear stronger than those of nebivolol and carvedilol. On the other hand, nebivolol exerts the highest trough-to-peak-ratio. However, beta-blocking effects of all the three drugs are similar at trough. Only bisoprolol but neither nebivolol nor carvedilol decreased nocturnal melatonin release, a feature which might cause sleep disturbances. Finally, only carvedilol slightly decreased QOL, whereas nebivolol and bisoprolol did not affect QOL. We conclude that different beta-blockers may exert clinically relevant different effects. 2006 S. Karger AG, Basel

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