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Hemodynamic and renal effects of atrial natriuretic peptide (α-hANP) in normal man

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We studied the hemodynamic and renal actions of α-hANP in 7 healthy volunteers. 200 μ of α-hANP were given as an intravenous bolus injection. M-mode-echocardiography was performed and serum levels of ANP and cGMP as well as cGMP-, sodium- and potassium excretion were determined.

Within 2 min, a transient heart rate increase of 34% together with a fall of mean arterial blood pressure of 11% was observed. Stroke volume increased from 77.5 ± 15.1 to 90.3 ± 10.2 ml and cardiac index from 2.44 ± 0.41 to 2.88 ± 0.41 l/m²/min. Ejection fraction rose from 62.9 ± 1.8 to 73.5 ± 3.8% (p < 0.01). Hemodynamic changes were most pronounced from 10 to 15 min after injection and reached baseline values another 15 min later. Serum ANP rose 20fold; cGMP rose 8fold within the first 15 min and normalized after 1 hour. Urinary cGMP excretion increased nearly 8fold, urine volume 9fold, sodium excretion 5fold and potassium excretion doubled. These renal effects—in contrast to the hemodynamic changes—showed a maximum within the first 30 min, but were still present for at least 90 min later. No severe side effects were observed.

Conclusions: Improved myocardial performance together with sustained diuresis and natriuresis may be of therapeutical benefit in the acute treatment of congestive heart failure. The role of cGMP as a marker for ANP action is confirmed.