Failure of the Captopril Test to Identify Renovascular Disease in Young Hypertensive Patients

C.M.		Erley
T.		Risler

Section of Hypertension and Nephrology, University of Tübingen, Medical Clinic, Department III, Tübingen, FRG

C.M. Erley, Section of Hypertension and Nephrology, University of Tübingen, Medical Clinic, Department III, Otfried-Müller-Strasse 10, D-W-7400 Tübingen (FRG)

Dear Sir,

Renovascular hypertension (RVH) is a potentially curable form of high blood pressure. Its treatment with angioplasty or surgery provides the opportunity to prevent cardiovascular morbidity and mortality due to hypertension, and to avoid the expense and potential morbidity of life-long pharmacotherapy for hypertension. Especially in young adults, RVH as an operatively remediable cause should be identified and treated whenever possible. This approach is justified by a high incidence of secondary forms of hypertension (5–20%) in the young age group, frequently adequate physical conditions for an intervention, and often favorable effects on blood pressure, so that an operation or dilatation would appear to be preferable over the need for life-long pharmacotherapy [1].

Next to a careful physical examination (severe hypertension, presence of abdominal bruits), a lot of tests to detect patients with RVH have been described in the last years. Especially the determination of captopril-stimulated peripheral renin activity has become a screening test to distinguish patients with essential hypertension from those with RVH [2, 3]. We investigated our outpatients with hypertension and without signs of renal insufficiency by using the captopril test in the manner described by Muller et al. [2] in order to rule out RVH as the underlying cause of the disease. In this report, we will describe our observations in 62 patients.

Before the investigation, β -blockers and angiotensin-converting enzyme (ACE) inhibitors were discontinued for at least 1 week, and diuretics were discontinued for at least 48 h. Whenever possible, we advised our patients to pause with other antihypertensive agents. The sodium excretion rate was determined on the day of investigation by urine collection over 24 h (a sodium excretion rate > 70 mval/l was guaranteed). All patients showed normal blood values for sodium, potassium and creatinine. A further diagnostic investigation by either conventional or Table 1. Differences and characteristics of the 62 patients investigated with the captopril test

$P <$

0.025 compared with patients with essential hypertension, $p < 0.025$ compared with patients with renal-artery stenosis. $p < 0.05$ compared with patients with essential hypertension.

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Table 2. Differences and characteristics of young patients (age < 35 years) investigated with the captopril test

digital subtraction renal arteriography was performed when the test gave a positive result. In 6 out of 62 patients we investigated within the last 6 months, renal-artery stenosis could be suspected correctly by the captopril test. In 6 patients with positive captopril test no renal-artery stenosis was detected during renal arteriography. The differences between the three groups (patients with essential hypertension and negative captopril test, patients with renal-artery stenosis, and patients with false-positive captopril test) are given in table 1. In general, patients with a false-positive captopril test were younger, had a more pronounced sympathetic activity (as derived from the level of urinary catecholamines) and higher values for proteinuria (assessed by acid precipitation assay). All statistical evaluations were performed by Mann-Whitney-Wilcoxon test.

After these observations, we started a prospective study to investigate the hypothesis that in young patients with hypertension and signs of hyperfiltration, the captopril test fails to exclude renal-artery stenosis. The characteristics of 14 young patients are given in table 2. Six patients had a positive captopril test, and 8 patients exhibited normal values. In all patients with positive captopril test, renal angiography was performed to exclude renal-artery stenosis. These two groups differed

concerning sympathetic nerve system activity, body mass index and microproteinuria. There was no difference in baseline renin activity between these two groups. Only renin values after exposition to ACE inhibitors showed these marked differences.

We postulate that young patients with a positive captopril test belong to an earlier stage of essential hypertension with so-called high-renin hypertension. These patients seem to have a high filtration fraction [4]. An association between glomerular hyperfiltration and proteinuria has been established in spontaneous hypertension in rats, and the same pathomechanisms are suspected in man [5, 6]. Whether our young patients with microproteinuria and increased renin activity after ACE inhibition will have an increased risk to get a hemodynamically mediated glomerulopathy will be answered by follow-up studies of these patients. Nevertheless, the captopril test failed to detect patients with renal-artery stenosis in this subgroup of hypertensive patients.

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