One in three patients with arterial hypertension has left ventricular hypertrophy (LVH), and the higher the blood pressure the higher the probability (1). This is the finding of the systematic review reported by Pewsner et al., which is published simultaneously in the British Medical Journal and Deutsches Ärzteblatt.*1

The treating physician should know for each hypertension patient whether s/he has left ventricular hypertrophy. This is defined as a left ventricular muscular mass >125 g/m² for men and >110 g/m² for women, in accordance with the current (2007) blood pressure guidelines of the European Society of Hypertension – European Society of Cardiology.

The most commonly used diagnostic test to date is two-dimensional (2-D) echocardiography with a high diagnostic certainty (2). In the few patients in whom echocardiography does not yield sufficient information, magnetic resonance imaging (MRI) – the potential future gold standard in addition to 3-D echocardiography – may be used (2, 3).

High prevalence with increasing follow-on costs
Arterial hypertension affects large parts of the population-16 million people are affected in Germany alone, who incur annual costs of 8.1 billion euros. The heart, brain, and kidneys are the organs that bear the brunt of hypertension. For the heart of a patient with high blood pressure, the development of left ventricular hypertrophy (LVH) (1) is a reasonable compensatory mechanism by the heart in order to cope with hypertensive stress on the one hand (4). On the other hand, it is an independent cardiovascular risk predictor and an alarm signal, because the associated health threats include:

- Development of a hypertensive cardiac disorder with associated diastolic and systolic dysfunction and heart failure
- Ventricular fibrillation
- Malignant cardiac arrhythmias
- Myocardial infarction
- Sudden cardiac death.

Ten year mortality in hypertension patients without myocardial hypertrophy is 1%, but in patients with hypertension without significant increase in the myocardial mass ten year mortality increases to 6%, in myocardial hypertrophy and increased left ventricular mass to 10%, and in concentric and eccentric hypertrophy to 24% (5).

Regression of the left ventricular hypertrophy reduces the risk of cardiovascular events (1, 6–8); in hypertension patients this is best achieved with angiotensin converting enzyme inhibitors, angiotensin receptor blockers, and calcium antagonists (1, 7) – although the available data are inconclusive (9). Targeting hypertension alone, however, is not sufficient as an intervention in patients with hypertensive heart disease. A cardiologist and specialist in internal medicine should participate in the consultation.

Echocardiography versus electrocardiography
Is it therefore necessary to conduct echocardiography at regular intervals in each patient with the common disorder “hypertension”? Care for hypertension patients is delivered primarily by general practitioners, but echocardiography is a specialist investigation performed by cardiologists; if this procedure is used by non-cardiologists, these will have to have a specialist certificate in echocardiography.
Does it have to be echocardiography when there is the option of electrocardiography, a procedure that can be delivered by any general practitioner and specialist in internal medicine? All textbooks list numerous electrocardiographic criteria for LVH; in Germany, the Sokolow-Lyon index is most commonly used to detect LVH. Current hypertension guidelines also recommend the Sokolow-Lyon index in all hypertension patients (SV_1+RV_5-6>38 mm); alternatively they recommend the Cornell product ([RaVL+SV_3] × QRS duration >2440 mm × ms) to diagnose LVH.

**Sensitivity and specificity of LVH signs on electrocardiography**

Several smaller studies (for example [3]) have shown that in patients with positive Sokolow-Lyon or Cornell criteria on the ECG, higher grade LVH can be assumed. The specificity is about 90% (3). These criteria can be of prognostic importance (8, 10). Crucially, however, if the ECG criteria in a hypertension patient have not been met this does not mean that LVH can be excluded. ECG identifies only one in three male hypertension patients with LVH and only one in five female hypertension patients with LVH, who can then be treated accordingly. The sensitivity in men is about 30% and in women, about 20% (3).

It may be argued that the low sensitivity applies only to the Sokolow-Lyon index. But according to Pewsner et al., more than 30 different ECG hypertrophy indices exist, and even in 2007, there are always publications that show that one index is superior to others (8, 10).

That this is a vain hope is shown by Pewsner et al. in their systematic review of the literature. The authors viewed and analyzed 1761 citations and 21 studies in 5608 patients with the 6 most common ECG left ventricular hypertrophy indices. Their conclusion is as follows:

None of the ECG indices for left ventricular hypertrophy are able to exclude LVH in hypertension patients with a high enough degree of certainty. They all have high specificity (median 89–99%) but only a low sensitivity (median 10.5–21%).

**Echocardiography as the method of choice for LVH screening and monitoring**

The low sensitivity of the LVH criteria has been known for some time, and many doctors have not relied on an inconspicuous electrocardiogram and have instead looked for LVH by using echocardiography in their hypertension patients.

The systematic review by Pewsner et al. raises the evidence level and therefore confirms the opinion that electrocardiography is unsuitable for LVH screening in patients with hypertension. The method of choice for LVH screening and monitoring in hypertension patients is therefore not electrocardiography but echocardiography.

In the interest of hypertension patients, it would be desirable to see this more clearly formulated in the hypertension guidelines, even if it is currently not known to which extent morbidity and mortality of hypertension patients can be reduced and cost-benefit analyses are currently lacking. Qualified health services research may provide these data. In the meantime: remember to always act in the patient’s best interests.

**Conflict of Interest Statement**

The author declares that no conflict of interest exists according to the guidelines of the International Committee of Medical Journal Editors.

Manuscript received on 22 July 2007, final version accepted on 22 July 2007.

Translated from the original German by Dr Birte Twisselmann.

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