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Options for novel, pathophysiology-based management of Hypertensive Disorders of Pregnancy (HDPs)

Introduction: From a hemodynamic point of view, hypertension may be caused by an increase in cardiac output and/or peripheral vascular resistance. In addition, volume status and the degree of vascular stiffness determine the height of blood pressure. When hypertension is found during pregnancy (HDPs), all these pathophysiological phenomena may play a role but the pattern is far from homogeneous. First, it makes a difference whether hypertension was pre-existent or induced by the pregnancy. Secondly, it is important to consider that HDP may involve as a spontaneous disorder in an otherwise healthy woman or be superimposed upon another 'silent' underlying abnormality.

Pathophysiological Considerations: In pregnancy-related hypertension we usually find a lower cardiac output, increased vascular resistance, increased arterial stiffness and a reduced plasma volume. The activity of the renin-angiotensin system is suppressed as well. This suggests that there is a hypertensive stimulus which leads to a compensatory reduction in pressor systems. The fact that sympathetic activity is activated rather than suppressed can be seen as an attempt to 'keep the circulation going'.

Pathophysiology-based management: The most appropriate approach to the patient with a HDP is to direct treatment to those factors that could initiate or exacerbate a rise in pressure. Recent evidence suggests that a substantial proportion of women with preeclampsia - a common form of HDP - have renal vascular abnormalities, either as a pattern of intrarenal nephrosclerosis or, and perhaps more often, as macrovascular disease, notably fibromuscular dysplasia. Studies in non-pregnant women have shown that in fibromuscular dysplasia renin may become suppressed and sodium output enhanced. Thus, we could learn from this disease to treat and perhaps even prevent the development of hypertension. Many other studies in non-pregnant hypertensive patients have evaluated specific treatments aimed to enhance vascular nitric oxide production, to lower arterial stiffness or to improve the microcirculation. All such treatment modalities could be beneficial in HDP as well. Finally, a novel method to treat resistant hypertension, i.e. baroreceptor stimulation, could theoretically be very useful in hypertension of pregnancy and deserves further exploration.

Biography

Peter de Leeuw is emeritus professor of Medicine at the Maastricht University Medical Center. His clinical and research interest goes to vascular medicine with particular reference to hypertension and related disorders. He has published over 700 papers on hemodynamics, neurohumoral abnormalities and drug treatment in hypertension. Most recently, he has been involved with baroreceptor stimulation as a novel treatment of resistant hypertension. He has been President of the Dutch Hypertension Society and a Council Member of the International Society of Hypertension. Moreover, he has been Editor-in-Chief of three medical journals in internal medicine.

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