

Abstract

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Role of magnesium in the pathogenesis of hypertension.

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BACKGROUND: Human essential hypertension is a complex, multifactorial, quantitative trait under polygenic control. Although the exact etiology is unknown, the fundamental hemodynamic abnormality in hypertension is increased peripheral resistance, due primarily to changes in vascular structure and function. These changes include arterial wall thickening, abnormal vascular tone and endothelial dysfunction and are due to alterations in the biology of the cellular and non-cellular components of the arterial wall.

DISCUSSION: Many of these processes are influenced by magnesium. Small changes in magnesium levels may have significant effects on cardiac excitability and on vascular tone, contractility and reactivity. Accordingly magnesium may be important in the physiological regulation of blood pressure whereas perturbations in cellular magnesium homeostasis could play a role in pathophysiological processes underlying blood pressure elevation. For the most part, epidemiological and experimental studies demonstrate an inverse association between magnesium and blood pressure and support a role for magnesium in the pathogenesis of hypertension. However data from clinical studies have been less convincing and the therapeutic value of magnesium in the prevention and management of essential hypertension remains unclear. In view of the still ill-defined role of magnesium in clinical hypertension, magnesium supplementation is advised in those hypertensive patients who are receiving diuretics, who have resistant or secondary hypertension or who have frank magnesium deficiency. A magnesium-rich diet should be encouraged in the prevention of hypertension, particularly in predisposed communities because of the other advantages of such a diet in prevention. The clinical aspect that has demonstrated the greatest therapeutic potential for magnesium in hypertension, is in the treatment of pre-eclampsia and eclampsia.

CONCLUSION: The present review discusses the role of magnesium in the regulation of vascular function and blood pressure and the implications in mechanisms underlying hypertension. Alterations in magnesium regulation in experimental and clinical hypertension and the potential antihypertensive therapeutic actions of magnesium will also be addressed.

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