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Relationships between renal vasculature abnormalities and arterial hypertension in children and adolescents

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Introduction. This study investigated hypertensive children for non-stenotic renal vascular abnormalities. There is no evidence in the literature of any correlation between these conditions.

Methods. Patients referred for elevated blood pressure were considered. Excluded from the study were those with hypertension secondary to known causes such as aortic coarctation, morbid obesity, hyperinsulinism, acute or chronic kidney disease, neurological diseases, oncological diseases and/or steroid therapy for other immunological diseases, and genetic diseases such as Williams syndrome or neurofibromatosis. Forty-three patients were selected with persistent hypertension (blood pressure > 95th centile) of more than one year's duration and confirmed by 24h ambulatory blood pressure monitoring. They were studied for sodium and caloric intake, blood chemistry studies for renal function (glomerular filtration rate GFR, renin and aldosterone), thyroid function, adrenal function (catecholamines, cortisol and ACTH), and abdominal ultrasound with Doppler study of the renal arteries. All patients underwent CT-angiography or MRI scanning to rule out possible renal artery stenosis and Echocardiography to evaluate left ventricular diastolic dysfunction/hypertrophy (LVDD/H).

Results. 37 patients (86%) had abnormal renal vasculature, either arterial or venous, in terms of the number of arteries, size and course. 26 pts (60%) had a polar accessory artery which was unilateral in 23 (89%) patients and in 3 (11%) was bilateral. Seven patients (16%) showed "nut-cracker syndrome" an abnormality of the left renal vein which coursed between the aorta and the mesenteric artery which formed an acute angle constricting the left renal vein as it went towards the inferior vena cava. Two patients (5%) had triple left renal veins and two (5%) showed a congenital gothic aortic arch. Only six patients (14%) showed a normal renal vasculature pattern. Eleven patients (25%) showed LVDD/H.

Conclusion. The incidence of hypertension in children is increasing in recent decades for several reasons, particularly obesity. Young patients with persistent elevated blood pressure also should be investigated for renal vasculature abnormalities and possible LVDD/H which may be treatable.