High blood pressure due to aortic coarctation and renal artery stenosis in a teenager with type 1 neurofibromatosis

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Nefrología 2008; 28 (2) 216-217

SUMMARY
Hypertension affect about 1% of patients with neurofibromatosis type 1 (NF1). Major causes are concomitant pheochromocytoma in adults and renovascular hypertension in children. In most cases, NF1 is associated with renal artery stenosis, smooth cell proliferation and advential fibrosis. We describe a 16 year old girl with hypertension complicating NF1 secondary to severe coarctation of abdominal aorta and tight stenosis of right renal artery, a very uncommon case. She was first diagnosed when she was 3-years-old and managed with antihypertensive drugs (atenolol, hidralazine and nifedipine); she experienced progressive uncontrollable hypertension but no symptoms, thus she was admitted to repeat studies. Laboratory evaluation (including creatinine, serum electrolytes, urinalysis, urine catecholamines and creatinine clearance) was normal. Percutaneous transfemoral magnetic resonance angiography disclosed severe coarctation of abdomen aorta, functional oclusion of superior mesenteric artery and tight stenosis of right renal artery with postestenotic dilatation. Patient underwent surgery with aorto-aortic by-pass and right kidney artery reimplantation. Periodical controls confirmed no hypertension, even four years after surgery and normal flow patterns in Doppler ultrasonography. Patients with NF1 must be screened for pheochromocytoma and renovascular hypertension. If hypertension appears, careful management is mandatory, as periodical follow-up even after surgery, since the long-term recurrence rate of renovascular lesions is not well established.

Key words: Neurofibromatosis. Renovascular hypertension. Coarctation. Renal artery stenosis.

INTRODUCTION
The incidence of high blood pressure in patients with NF1 is around 1%, mainly associated to pheochromocytomas in adulthood. During childhood, most cases are secondary to renal artery stenosis and rarely to coarctation of the abdominal aorta.
We present a 16-year old female with NF1, who had been controlled since she was 3 year old because of hypertension secondary to abdominal coarctation, which was angiographically confirmed. She had no symptoms but the blood pressure could not be controlled with drugs (atenolol, hydralazine, nifedipine).

On physical exam multiple «café au lait» spots could be seen, as well as freckles in axillary areas, with no cutaneous neurofibromas. A murmur could be heard on right superior quadrant of the abdomen, and peripheral pulses were palpable and symmetrical. Neurological examination was normal. During the follow-up, the blood pressure measurements were between 150/110 and 140/100 mmHg. These values were always over the 95th percentile for sex, age and height.

Further investigations: renal function and urine catecholamines levels were within the normal range. The echocardiography showed mild left ventricle hypertrophy. The cranial MRI disclosed a glioma involving the optic chiasm and nerve. An ambulatory blood pressure monitoring was performed: During the day high blood pressure was detected with nocturnal dip. On renal Doppler ultrasound the renal flow was diminished in the right kidney, which suggested renal artery stenosis. The abdominal angiography showed severe coarctation of the abdominal aorta with a lumen reduction of 85% and right renal artery stenosis. The same could be seen on percutaneous femoral angiography (fig. 1).

With these findings surgical intervention was decided consisting on aorto-aortic bypass and right renal artery reimplantation. A control angiography was performed that confirmed the reestablishment of the circulatory pattern (fig. 2). Pharmacological therapy was required associated to oral nifedipine during four months. Four years after the intervention renal function was normal, Doppler ultrasounds performed during the follow-up showed preserved flows, and the arterial pressure was normal.

The frequency of high blood pressure in patients with NF1 is around 1% and can be due to renal artery stenosis, pheochromocytomas, coarctation of the abdominal aorta, or cerebral tumors. During childhood, the most frequent cause is renal artery stenosis, while in adults it is pheochromocytoma. The association between renal artery stenosis and aortic coarctation in patients with neurofibromatosis is exceptional. In fact, there are approximately ten cases reported in the literature.

In spite of the diagnostic advances (ABPM, renal Doppler ultrasound, angio-MRI) conventional angiography still is the main diagnostic investigation, especially in those cases that will be susceptible to surgical therapy. The management of these patients must be individualized, according to the underlying condition and age. The surgical treatment is successful in 80% of the cases. For this reason it is currently the preferred therapeutic option, and also taking into account that in children the results of the angioplasty are not satisfactory. Anyway, the follow-up of the patients in the intermediate and long term is very important, as we do not know the relapse rate of these lesions.

**REFERENCES**