Pheochromocytoma and Neurofibromatosis Type 1: An Exceptional Association

Nassim Essabah Haraj*, El Aziz Siham and Chadli Asma

Endocrinology Department of CHU Ibn Rochd of Casablanca, Faculty of Medicine and Pharmacy of Casablanca, University Hassan II, Morocco

Abstract: The association of a pheochromocytoma to a neurofibromatosis type 1 is a rare association.

We relate the observation of a 62 years female patient who had, sinced a young age, showed café au lait spots and neurofibromas on the entire body, and been monitored for the last 4 years for high blood pressure with headaches, excessive sweating and palpitations. Dosage of urine catecholamine metabolites has revealed a rate elevated to 20 times the normal. Adrenal tomodensitometry has revealed a voluminous heterogeneous mass occupying the right adrenal loge, presenting a narrow contact with the inferior vena cava, and with the upper pole of the right kidney, measuring 10.5 x 9.3 x 8.7 cm, along with a small heterogeneous mass of the left adrenal.

Under the scope of the neurofibromatosis, fundus photography has been performed and showed Lisch nodules, while cerebral tomodensitometry results were normal.

After undergoing bilateral andrenalectomy, anatomopathological examination has revealed a completely excised pheochromocytoma on the right adrenal, and a macro-nodular adrenal hyperplasia on the left adrenal.

Metaiodobenzylguanidine scan has not showed any ectopic placement of the pheochromocytoma, and urinary methoxy derivatives were normal post-surgery.

Screening and adequate surgical support of the pheochromocytoma, for patients with neurofibromatosis type 1 presenting high blood pressure, allows to avoid complications.

Keywords: Neurofibromatosis, pheochromocytoma, endocrine hypertension, adrenal, high blood pressure.

INTRODUCTION

The association of a pheochromocytoma to a neurofibromatosis type 1 is a rare association [1].

Screening of pheochromocytoma in NF1 patients is essential, given the potential gravity it represents: Endocrine High Blood Pressure (HBP), cardiovascular complications, risk of sudden death, etc. [2].

Throughout this observation, we will relate the clinical, paraclinical, and therapeutic particularities of this association, in order to draw attention to the necessity of early screening.

CASE REPORT

We report the case of a 62 years old patient who presents, since young age, café au lait spots with neurofibromas on the entire body (Figures **1a-c**), treated for the last 4 years for high blood pressure with headaches, excessive sweating and palpitations.

The symptomatology prompted the dosage of urine catecholamine metabolites which were 20 times the normal. An adrenal tomodensitometry has been performed (Image 4), revealing a large heterogeneous mass occupying the adrenal loge, presenting a narrow contact with the inferior vena cava and with the upper pole of the right kidney, and measuring 10.5 x 9.3 x 8.7 cm, along with a small heterogeneous mass of the left adrenal.

A panel of tests has been performed for the neurofibromatosis: Fundus photography has showed Lisch nodules, and the cerebral tomodensitometry results were normal (Figure **2**).

The patient was prepared for surgery with an adequate hypertension control and was placed under alpha blocker.

The patient has underwent a bilateral adrenalectomy, and the anatomopathological examination has revealed a completely excised pheochromocytoma on the right adrenal, and a macro-nodular adrenal hyperplasia on the left adrenal. Hormone replacement therapy by hydrocortisone and education for adrenal insufficiency was given to the patient.

The evolution has been marked by the reappearance of a benign high blood pressure, two weeks after the surgery.

Metaiodobenzylguanidine (MIBG) scan has not showed any ectopic placement of the pheochromo-

*Address correspondence to this author at the Endocrinology Department of CHU Ibn Rochd of Casablanca, Morocco; Tel: 212 (0) 6 67 52 71 12;
E-mail: haraj.nassim@gmail.com

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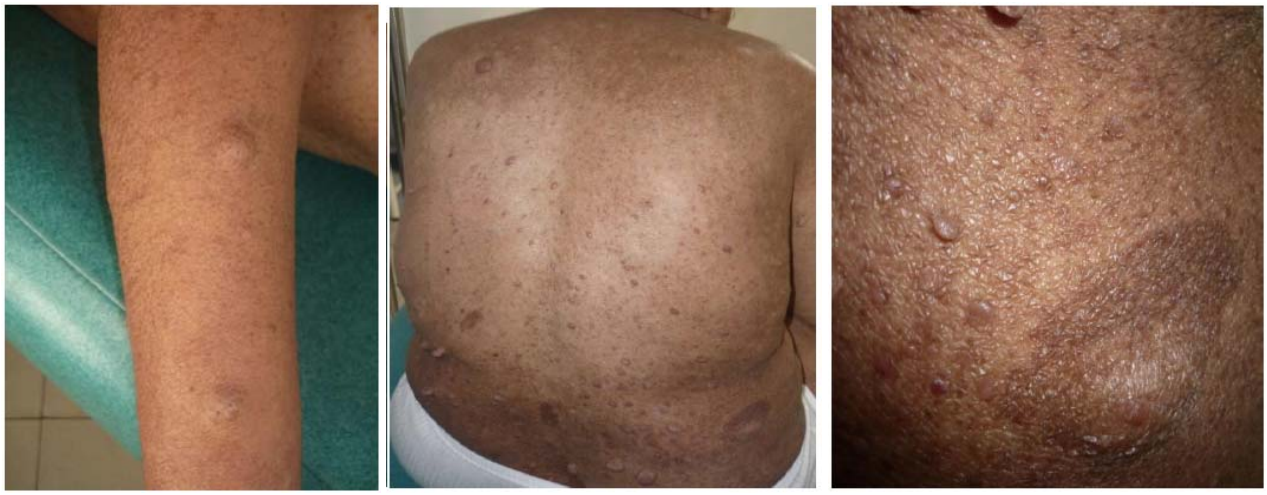

a **b** **c**

Figures 1a-c: Neurofibromas and café au lait spots laid on the patient's body.

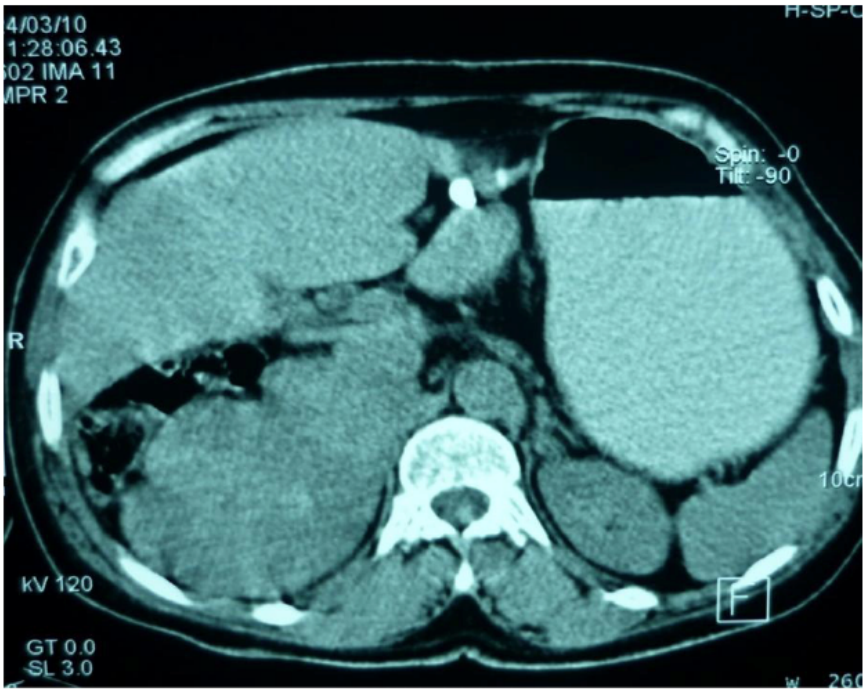

Figure 2: Adrenal tomodensitometry: Bilateral Masses.

cytoma, and urine catecholamine metabolites were normal post-surgery.

The essential hypertension diagnosis has been retained, and blood pressure stabilized under biotherapy (calcium channel blockers and beta-blockers).

DISCUSSION

NF1 is the most frequent of neurofibromatoses (representing 95%). It has an incidence rate of about one birth in 3500, and a predominance of about one individual in 4000. Its transmission is autosomal dominant. Half the cases are sporadic, which is explained by the frequency of spontaneous mutations. The NF1 gene is located on chromosome 17 [3].

The diagnostic criteria of NF1 has been well established, according to the 1988 NIH consensus conference. The diagnostic is set if two or more of the following signs are found:

- Six café au lait spots of more, measuring more than 5 mm in their largest diameter in

prepubescent individuals, and more than 15 mm in pubescent individuals.

- Two or more neurofibromas of any type, or one plexiform neurofibroma.
- Axillary or inguinal lentigines.
- One optic glioma.
- Two Lisch nodules or more (iris hamartoma).
- Two characteristic bone lesions like sphenoid dysplasia, thinning of long bone cortex with and without pseudarthrosis.
- A first degree relative suffering from NF1 according to the previous criteria [4].

Regular monitoring of NF1 patients is important to early detection of NF1 complications, many of which are of early onset. The severity of NF1 is variable from subject to another, and generally increases with age [3].

The association of pheochromocytoma to a neurofibromatosis type 1 is a rare association, it is found in only 0.1 to 5.7% of cases [5].

The phenotype is comparable to that of the sporadic forms, with an average age at diagnosis of 42 years, 9.6 % are of bilateral form, 6.1 % of extra adrenal form, and 11.5% of malignant form [6].

Screening for pheochromocytoma in NF1 patients is essential, the incidence of discovery of pheochromocytoma is much higher in NF1 patients (20 to 50% of NF1 patients with HBP, compared to 0.1% of patients with HBP) [6].

In from of any patient with NF1, monitoring should be recommended. This monitoring is essentially clinical, and allows to easily identify complications such as HBP which could be linked to a pheochromocytoma [7].

Screening on time allows adequate surgical treatment of the tumor, in order to avoid complications, notably cardiovascular complications.

CONCLUSION

In light of this observation, we can conclude that screening and adequate surgical treatment of the pheochromocytoma in patients with NF1 presenting HBP can avoid complications.

The authors declare that there is no conflict of interests regarding the publication of this paper.

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