

## Bilateral Plexiform Neurofibroma of the Sciatic Nerve Associated with Neurofibromatosis Type 1: A Rare Case

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### Abstract

### Case Report

Neurofibromatosis type 1 (NF1) or von Recklinghausen's disease is a phakomatosis transmitted by autosomal dominant inheritance. It is diagnosed when some criteria are present in the same individual. Patients with NF1 tend to develop neurofibromas which are benign tumors of peripheral nerve sheath cells. We describe the rare case of a 32-year-old man with NF1 and a bilateral plexiform neurofibroma of the sciatic nerve. Given the high surgical risk, the patient was maintained under clinical and radiological surveillance. The evolution is unpredictable and current treatment options are limited to surgical resection. Radiation is not used because it could actually promote malignant transformation and it's known that neurofibroma is non-responsive to chemotherapy. Angiotensin-converting enzyme inhibitors have been proposed as a novel treatment of neurofibromas and recently the administration of interferon- $\alpha$  gave good results in unresectable, progressive and symptomatic lesions.

**Keywords:** Neurofibromatosis, Plexiform, Neurofibroma, sciatic.

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## INTRODUCTION

Neurofibromatosis type 1 (NF1) or von Recklinghausen's disease is one of the most common genetic diseases, transmitted by autosomal dominant inheritance and affecting 1/3000 to 1/4000 individuals. The diagnosis is usually made easily, based on physical examination [1]. There are two peripheral nerve sheath tumors found in patients with NF1: neurofibroma, a benign tumor, and malignant peripheral nerve sheath tumor (MPNST). Plexiform neurofibroma and localized intraneural neurofibroma are significant precursors of MPNST [2]. We describe the rare case of a 32-year-old man with neurofibromatosis type 1 and a bilateral plexiform neurofibroma of the sciatic nerve.

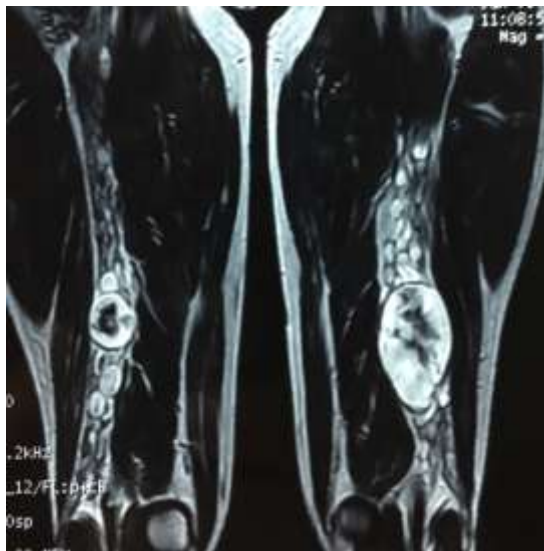
## CASE PRESENTATION

A 32-year-old man was referred for a 2-year history of bilateral and diffuse thigh pain. He was monitored since childhood by a physician for NF1. Physical examination found a bilateral palpable mass of

the thigh. Neurological examination was normal. Clinical manifestations of NF1 were founded: multiple café-au-lait spots in the trunk, abdomen and lower limb (Figure 1). Routine laboratory tests were normal and standard radiographic study did not show any bone abnormality. Magnetic resonance imaging was performed and found two masses, well-delimited, located on the sciatic nerve route, measuring  $7.6 \times 4.0 \times 3.2$  cm (right mass) and  $3.4 \times 3 \times 2$  cm (left mass) associated with multiple nodular string-shaped lesions distributed along the nerve roots. These lesions were hyperintense in T2 with hypointense central focus (target sign) suggesting the diagnosis of plexiform neurofibromas of the sciatic nerve (Figure 2). A biopsy was performed and confirmed the diagnosis. Given the high surgical risk and since the lesion doesn't compromise functionality or hasn't undergone malignant transformation, the patient was maintained under clinical and radiological surveillance every six months for three years with medical pain control. After 3 years, these lesions remain stable.



**Fig-1:** Clinical image showing “café-au-lait” macules in the trunk, abdomen and lower limb



**Fig-2:** Magnetic resonance imaging showing bilateral plexiform neurofibromas of the sciatic nerve

## DISCUSSION

Neurofibromatosis type 1 was first described in 1793 then better documented and understood in 1882 by von Recklinghausen [3]. It's one of the most common phakomatosis, transmitted by autosomal dominant inheritance [4]. Von Recklinghausen's disease is diagnosed when at least two of these 7 main criteria are present in the same individual [1, 5, 6]:

- First-degree relative afflicted.
- At least 6 café-au-lait macules.
- Freckling in the axillary or inguinal region (Crowe sign).
- At least 2 neurofibromas of any type or at least 1 plexiform neurofibroma.
- Optic nerve glioma.
- At least 2 Lisch nodules
- A characteristic bone lesion: pseudoarthrosis, sphenoid wing dysplasia, thinning of long bone cortex

Patients with NF1 tend to develop neurofibromas, whereas patients with NF2 harbor schwannomas. Common tumors of the sciatic nerve are schwannomas and neurofibromas [7-9]. Neurofibromas are benign tumors of peripheral nerve sheath cells (WHO grade 1) and can be divided into 2 groups: the diffuse infiltrative and the intraneural. The latter typically affects larger nerves and can be either solitary or fusiform tumors or, rarely plexiform and pathognomonic of NF1 [10, 11]. Plexiform neurofibromas are slow-growing tumors and may be unilateral or bilateral. The symptomatology may vary according to the localization [12] and a palpable mass is usually the only presenting symptom of peripheral nerve tumors [13]. MRI is the most useful imaging modality that has increased the detection of peripheral nerve abnormalities. Plexiform neurofibroma typically show hypointense T1 and hyperintense T2 signal with the characteristic target sign (central hypointense region) [5, 11]. The evolution is unpredictable and 10% of plexiform neurofibromas undergo transformation into a malignant peripheral nerve sheath tumor [1, 14, 15]. Current treatment options are limited to surgical resection with a recurrence in 20% of cases [16]. It's usually difficult or even not possible because of the extensive and the infiltrating nature of these tumors but it's performed when the lesion is severely disfiguring, compromises functionality or has undergone malignant transformation [17, 18]. Radiation is not used because it could actually promote malignant transformation [19] and it's known that neurofibroma is non-responsive to chemotherapy [20]. Angiotensin-converting enzyme (ACE) inhibitors have been proposed as a novel treatment of neurofibromas [21] and recently the administration of interferon- $\alpha$  gave good results in unresectable, progressive and symptomatic lesions [22].

## CONCLUSION

Plexiform neurofibromas are rare benign tumors pathognomonic of neurofibromatosis type 1, with an unpredictable evolution and a risk of malignant transformation. The diagnosis of these lesions is frequently delayed. In this case, surgical intervention was not possible and we chose to undergo clinical follow-up every 6 months for 3 years. Angiotensin converting enzyme inhibitors and interferon- $\alpha$  need to be discussed as a possible therapy options of plexiform neurofibromas.

### Conflicts of Interest

The authors declare that they have no conflicts of interest.

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