CASE REPORT

Neurofibroma of the Sciatic Nerve with Neurofibromatosis Type 1

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Abstract- A 28-year-old man with neurofibromatosis type 1(NF1) presented with a tumor in the sciatic nerve and femoral nerve. The differential diagnosis of malignant peripheral nerve sheath tumor was based on clinical, radiological, and histological evidence. The tumor apparently originated in sciatic nerve at the posterior aspect of the left thigh. The lesion was resected totally without neural damage to the sciatic nerve. The tumor did not recur after 2 years.

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Keywords: Neurofibroma in the sciatic nerve; Malignant peripheral nerve sheath tumor; Malignant schwannoma; Von Recklinghausen's disease

Introduction

The neurocutaneous syndromes comprise a group of heterogeneous disorders characterized by dysplasia and a tendency to form tumors. The CNS and skin are primarily involved but other organ systems can also be affected. Since the skin and nervous tissue originate from the same germ layer i.e. the ectoderm, these disorders have been variously called congenital ectodermoses and congenital neuroectodermal dysplasias. Van der Hoeve believed that neurofibromatosis can be found in sciatic nerve.

Neurofibromatosis (NF) is a disease of defective development of the neuroectodermal tissues that tends to involve multiple systems and occurs in approximately 1 in 4000 to 5000 individuals. Approximately half of the cases appear to be sporadic and the mutation rate has been estimated at 1 in 10000 gametes per generation, one of highest mutation rates in humans. Approximately 50% of patients have affected relatives and in nearly all instances the distribution of cases is consistent with an autosomal dominant mode of inheritance. NF1 is observed in all regions of the world and affects both men and women equally.

Case Reports

Clinical features and associated disorders

NF1 is characterized by cutaneous pigmentation, multiple tumors within the central and peripheral nervous systems and lesions of the vascular and other organ systems.

Focal hyperpigmented areas and café au lait spots, ranging in size from a few millimeters to centimeters, are more commonly found on the trunk than on the limbs, and they are not found on the scalp, soles or palms. These spots are light brown and result from an aggregation of neural crest-derived pigmented melanoblasts in the basal layer of the epidermis. Café au lait spots are present at birth and become more apparent with time. The number of café au lait spots probably does not significantly increase after the first several years of life, although the degree of hyperpigmentation usually does. The presence of six or more café au lait spots larger than 15mm in the greatest diameter is required for the diagnosis of NF, a criterion that is most useful when applied to postpubertal patients. It should be recognized, however, that approximately 10% of the general population have café au lait spots without other stigmata of the disease. Less frequent cutaneous changes in NF1 include diffuse axillary or inguinal freckling and large area of faintly increased pigmentation (melanoderma).

Clinical presentation

A 28-year-old man with neurofibromatosis type 1 (NF1) presented with an 8 year history of a left thigh mass associated with diffuse leg pain. He had other clinical manifestations of neurofibromatosis type 1 at face and body skin. Magnetic resonance imaging scans revealed a well-defined solid mass in the posterior aspect of the left thigh closely associated with superficial sciatic nerve. The patient had another tumor (Figure 1, region 2)in inguinal region in the femoral nerve which was not operated.

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Surgical intervention

The tumor segment was in the sciatic nerve (Figure 1, region 1)and fibers of sciatic nerve were around it. We found the upper and lower borders of the tumor which were in the sciatic nerve then we cut the sheet of the sciatic nerve, and removed the tumor from the fibers of sciatic nerve.

Specimen received by Armin Pathobiology Lab:

1) Thigh mass:

The specimen consists of an ovoid and encapsulated fragment of elastic tan-brown tissue measuring 11*6*6 cm (size of tumor) (Figure 1, region 2).The cut surface is solid, creamy-yellow and tan-colored with scattered hemorrhagic areas.

2) Multiple foot masses:

The specimen consists of three dome shaped irregular fragments of elastic skin and subcutaneous tissue measuring in aggregate 3.5*3.0*2.0cm.

In the microscopic examination, the sections of all the specimens showed the same following structure; a benign neoplasm composed of elongated cells with wavy nuclei, which are either tightly packed or loosely separated by edematous stroma. The covering skin revealed fibrosis. Section of thigh mass showed necrosis as well.

Diagnosis

1) Thigh mass resection covered by skin showing neurofibroma with necrosis and the covering skin revealing fibrosis.

2) Multiple foot masses resection (x3) showing neurofibromas and covering skin revealing fibrosis.

Discussion

Malignant transformation of neurofibroma to malignant schwannoma occurs in 29% of patients with NF (2,6), but its origin from a large nerve trunk is less common in patients with NF1. Some transformations occur after radiotherapy (7) or previous surgery for a benign neurofibroma. The pleiotropic effect of the NF allele on chromosome 17 (4,11) is responsible for increasing the risk for both neural crest and nonneural crest malignancies (1,3,5). Development of malignant schwannoma from neurofibroma is associated with inactivation of both NF1 (tumor suppressor gene) alleles, and by partial inactivation on the other tumor suppressor gene p53 located elsewhere on the centromere of chromosome 17 (4,9). Neurofibroma increase in size under the conrol of the sex steroids in both sexes, directly or through mediation by nerve growth factor (NGF) (12) whose receptor is located on the distal arm of chromosome 17 (13). The onset of malignant schwannoma may be attributable to the abnormal and continuous stimulation of nerve cells sensitive to NGF (10). In conclusion, sciatic invasion by a benign sporadic nerurofibroma is a rare occurrence. It suggests that surgical removal of asymptomatic benign-appearing lesion of that type should be considered if they are adjacent to important anatomical structures.

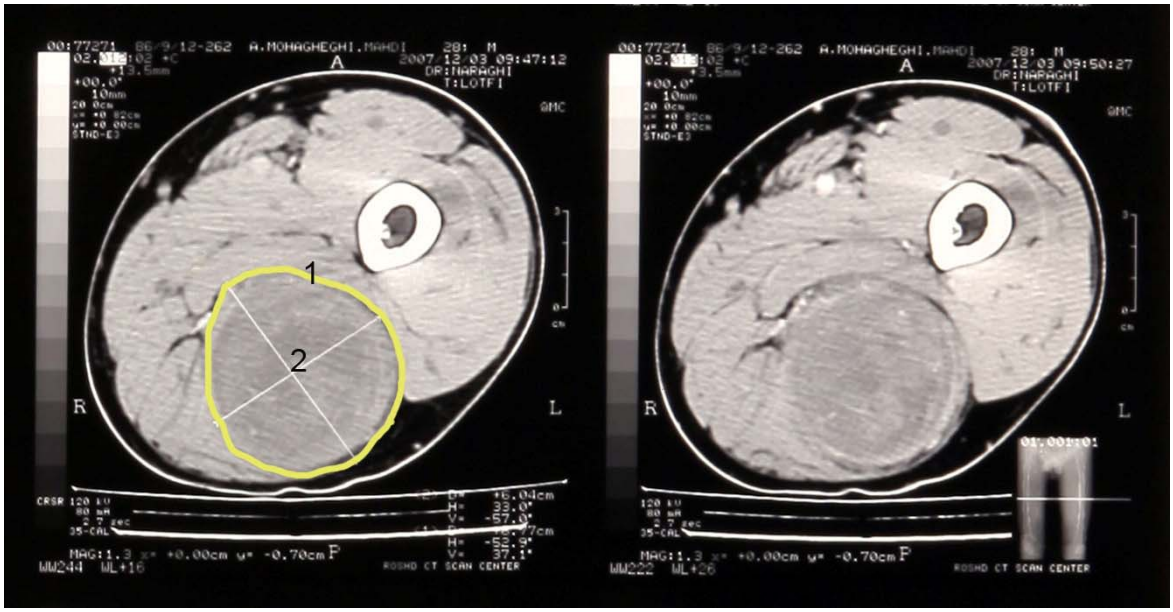

Figure 1. CT scan of patient's left thigh

1. Sciatic Nerve (like a banana)
2. Tumor Neurofibroma

References

1. Aoki S, Barkovich AJ, Nishimura K, Kjos BO, Machida T, Cogen P, Edwards M, Norman D. Neurofibromatosis types 1 and 2: cranial MR findings. Radiology 1989;172(2):527-34.
2. Ariel IM. Tumors of the peripheral nervous system. CA Cancer J Clin 1983;33(5):282-99.
3. Bader JL, Miller RW. Neurofibromatosis and childhood leukemia. J Pediatr 1978;92(6):925-9.
4. Barker D, Wright E, Nguyen K, Cannon L, Fain P, Goldgar D, Bishop DT, Carey J, Baty B, Kivlin J, et al. Gene for von Recklinghausen neurofibromatosis is in the pericentromeric region of chromosome 17. Science 1987;236(4805):1100-2.
5. Brasfield RD, Das Gupta TK. Von Recklinghausen's disease: a clinicopathological study. Ann Surg 1972;175(1):86-104.
6. Das Gupta TK, Brasfield RD. Solitary malignant schwannoma. Ann Surg 1970;171(3):419-28.
7. Ducatman Ducatman BS, Scheithauer BW, Piepgras DG, Reiman HM, Ilstrup DM. Malignant peripheral nerve sheath tumors. A clinicopathologic study of 120 cases. Cancer 1986;57(10):2006-21.
8. Goetz CG. Textbook of Clinical Neurology. 3rd ed. Philadelphia, PA: Saunders Elsevier; 2007.
9. Lothe RA, Saeter G, Danielsen HE, Stenwig AE, Høyheim B, O'Connell P, Børresen AL. Genetic alterations in a malignant schwannoma from a patient with neurofibromatosis (NF1). Pathol Res Pract 1993;189(4):465-71; discussion 471-4.
10. Mentzel T, Katenkamp D. Intraneural angiosarcoma and angiosarcoma arising in benign and malignant peripheral nerve sheath tumours: clinicopathological and immunohistochemical analysis of four cases. Histopathology 1999;35(2):114-20.
11. Mulvihill JJ, Parry DM, Sherman JL, Pikus A, Kaiser-Kupfer MI, Eldridge R. NIH conference. Neurofibromatosis 1 (Recklinghausen disease) and neurofibromatosis 2 (bilateral acoustic neurofibromatosis). An update. Ann Intern Med 1990;113(1):39-52.
12. Perez-Polo JR, Hall K, Livingston K, Westlund K. Steroid induction of nerve growth factor synthesis in cell culture. Life Sci 1977;21(10):1535-44.
13. Seizinger BR, Rouleau GA, Ozelius LJ, Lane AH, Faryniarz AG, Chao MV, Huson S, Korf BR, Parry DM, Pericak-Vance MA, et al. Genetic linkage of von Recklinghausen neurofibromatosis to the nerve growth factor receptor gene. Cell 1987;49(5):589-94.