Short reports

Intrathoracic vagus nerve neurofibroma and sudden death in a patient with neurofibromatosis

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Abstract

A 21 year old man with type 1 neurofibromatosis was found dead in the middle of the night. Postmortem examination revealed a large neurofibroma arising from the right intrathoracic vagus nerve, which might have contributed to his sudden death.

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Neurofibromas are benign tumours of the peripheral nerves usually presenting as palpable masses in the subcutaneous soft tissue. In type 1 neurofibromatosis they may be found in almost any location and present with unusual symptoms.¹ In this report we describe the sudden death of a patient with type 1 neurofibromatosis who was found to have a neurofibroma of the intrathoracic vagus nerve.

Case report

A 21 year old man with type 1 neurofibromatosis had been followed up in our outpatient clinic. He had initially presented five years earlier with multiple café au lait spots and cutaneous neurofibromas and radiological examination of the chest and spine revealed mild thoracolumbar scoliosis. No mass was detected in the mediastinum. As the scoliosis was mild and showed no evidence of progression, surgery was not carried out. Since then, no further radiological examination of the chest had been undertaken. He had remained well and was last seen seven months before being found dead in his bed in the middle of the night.

On postmortem examination the main findings were in the thoracic cavity. There was mild thoracolumbar scoliosis with convexity to the left. A huge neurofibroma, 17 × 10 × 9 cm, was seen arising from the right vagus nerve. It extended from the origin of the right recurrent laryngeal nerve to 1 cm below the cavoatrial junction (fig 1). The heart and trachea were slightly displaced to

Figure 1 Gross specimen including the tongue (T) and superior portions of the larynx and hypopharynx. A large neurofibroma (N) is seen arising from the right intrathoracic vagus nerve. Multiple small neurofibromas are seen along the length of both recurrent laryngeal nerves as fusiform swellings.

the left but retained their normal contours. There was no appreciable compression of the major vessels. Multiple small neurofibromas were present along the entire length of both vagus and recurrent laryngeal nerves (fig 1). Cut section of the large neurofibroma showed pale yellow firm tissue. Microscopy revealed characteristic features of neurofibroma, consisting of wavy spindle tumour cells supported in a loose myxoid stroma in which were a number of mast cells (fig 2A,B). Immunohistochemically the tumour cells showed intense positive staining for S-100 protein (fig 2B), confirming their neural differentiation.

The heart weighed 300 g and was normal. The coronary vessels were widely patent and there was no acute myocardial infarction. The cardiac conduction system appeared normal on histological examination and the other cranial nerves and both adrenal glands were normal. There was no evidence of pheochromocytoma. The other organs showed nothing noteworthy.

Discussion

The neurofibromatoses are genetic disorders that primarily affect cell growth of neural tissues. Two clinically and genetically distinct forms are recognised: type 1 or peripheral

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Figure 2 (A) Photomicrograph of the neurofibroma showing wavy spindle tumour cells supported in a myxoid stroma (haematoxylin and eosin). (B) The tumour cells showing intense positive immunostaining for S-100 protein.

neurofibromatosis and type 2 or central neurofibromatosis.^{2,3} In type 1 neurofibromas may be found in virtually any location¹ and unusual symptoms have been related to the presence of these tumours in various organs including the gastrointestinal tract,⁴⁻⁶ appendix,⁷ larynx,⁸ blood vessels,⁹ and heart.¹⁰

Our patient showed classical clinical features of type 1 neurofibromatosis with multiple café au lait spots, cutaneous neurofibromas, and thoracolumbar scoliosis. In addition, there were multiple neurofibromas of both vagus and recurrent laryngeal nerves, the one affecting the right intrathoracic vagus nerve assuming an unusually large size (fig 1). In this respect it is interesting to note that neurogenic tumours of the vagus nerves, including neurofibromas and schwannomas, have a predilection for the left side.^{11,12} Dabir *et al*¹² suggest that this could be due to the propensity of these tumours to occur in the thickest portion of the nerve—hence the

tendency to arise on the left proximal intrathoracic vagal trunk, which is larger than that on the right side.

The sudden death of this patient is unique and of interest. The exact cause is not known, but, in the absence of significant findings in the clinical background of type 1 neurofibromatosis apart from the large neurofibroma of the right intrathoracic vagus nerve, it is tempting to relate death to the neurofibroma. Associated pheochromocytoma discharging arrhythmogenic catecholamines is not the cause in our case as postmortem examination revealed no evidence of either adrenal or extra-adrenal pheochromocytoma. The possibility that the carotid sinus syndrome contributed to his death is unlikely as the mediastinal neurofibroma was located far away from the carotid sinus and the glossopharyngeal nerve itself was unaffected by tumour. The exact posture of the patient when he was found dead in his bed could not be recalled by his parents. If he had been lying in a left lateral position, the mechanical effect on the heart and great vessels of the large tumour on the right intrathoracic vagus nerve could have contributed to his sudden death. This is not substantiated, however, by the findings of the postmortem examination as the heart retained its normal contour and there was no appreciable compression of the major vessels. Finally, the neurofibroma might have resulted in autonomic dysfunction leading to cardiac arrhythmia and sudden death.

The sudden death of this patient suggests that patients with type 1 neurofibromatosis should have regular radiographic chest examinations as early detection and treatment of neurofibromas of the intrathoracic vagus nerve may be desirable.

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