A Case of Cutaneous Neurofibroma Intimately Contacted with Intrathoracic and Chest Wall Plexiform Neurofibroma in Von Recklinghausen's Disease

Gyong Moon Kim, M.D.[1], Sei Yeon Kim, M.D.[1], Woo Sun Lee, M.D.[1], Heesu Kim, M.D.[1], Duck Kon Cho, M.D.[2], Si-Yong Kim, M.D.[1]

Departments of [1]Dermatology & [2]Chest Surgery, Catholic University of Korea, Seoul, Korea

Congenital neurofibromatosis type 1, or Von Recklinghausen's disease is an autosomal dominant disorder characterized by neurofibroma, pigmented skin lesions (Café-au-lait macules), iris hamartomas and meningeal tumors, but rarely, by autonomic ganglia tumors, such as pheochromocytomas. We have experienced an intrathoracic and chest wall plexiform neurofibroma intimately contacted with collagenoma-like, dome-shaped skin lesions of type 1 neurofibromatosis, which are relatively rare and interesting, but can be regarded as typical findings in neurofibromatosis. Although intrathoracic neurogenic tumors are not uncommon, cases like ours are interesting, as the feature of collagenoma-like skin neurofibroma was very closely apposited with chest wall neurofibroma. Our case had no aypical features of malignancy and the patient was clinically followed up without recurrence.
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We experienced intrathoracic chest wall plexiform neurofibroma, continuous with collagenoma-like, dome-shaped typical skin lesions of type 1 neurofibromatosis, which were interesting clinical findings. Although intrathoracic neurogenic tumors are not uncommon[1], cases like ours are uncommon due to the collagenoma-like typical skin neurofibroma and the very closest apposition of the intrathoracic neurofibroma and chest wall neurofibroma (plexiform neurofibroma) with the skin lesion. Additionally, the intrathoracic manifestations of neurofibromatosis-1 are protean, which on occasion can mimic those of malignancy. Furthermore, unexpected findings, such as rapid growth of a neural tumor, should be recognized as atypical features (suspicious for malignant degeneration) and should result in further evaluation[2]. Our case had no aypical features of malignancy, and the patient showed no recurrence.

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Reprint request to: Si-Yong Kim, M.D., Department of Dermatology, St. Vincent Hospital, Catholic University of Korea, 93-6 Ji-dong, Paldal-gu, Suwon, Gyeonggi-do, Korea. Tel. 82-31-249-8204, Fax: 82-31-253-8927, E-mail. kgmcmcdm@yahoo.co.kr

CASE REPORT

A 29-year-old female was referred for the investigation of skin-colored, elevated plaques on her back, and a radiographically observed mass in the superior mediastinum (Fig. 1). She had experienced intermittent chest symptoms, such as sharp pain and abnormal sensations for recent years, but theses had not been too severe. The size of the intrathoracic chest wall mass had not increased until 5 years previously. A physical examination showed multiple café-au lait macules and a large plaque of skin-colored, elevated patches on the left upper back area, which were histopathologically typical neurofibroma of Von Recklinghausen's neurofibromatosis. There was no family history of this disease. The skin lesions in the operative field were simultaneously totally excised. The mediastinal mass had previously

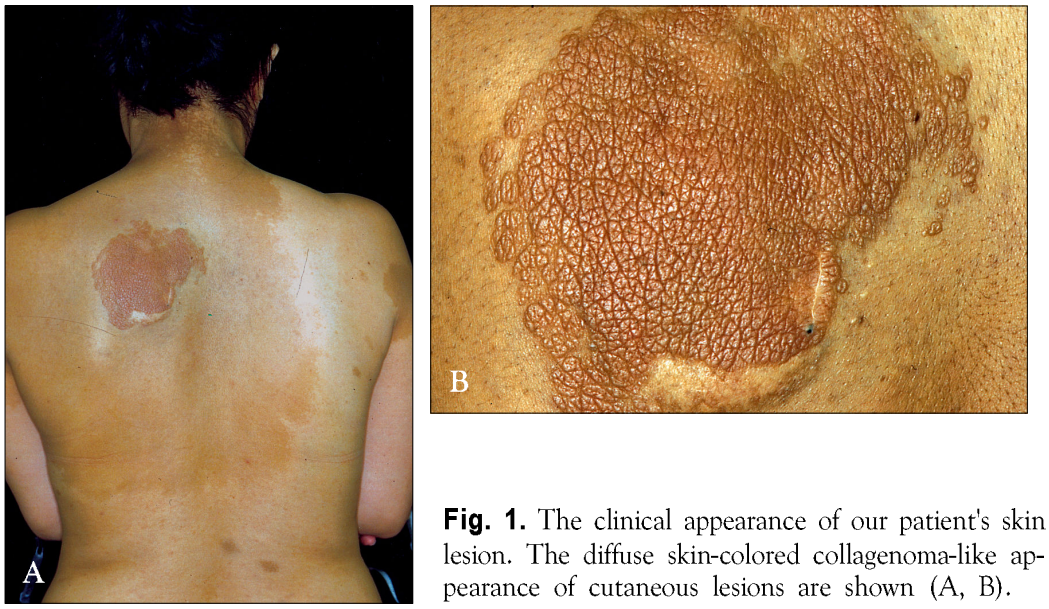

Fig. 1. The clinical appearance of our patient's skin lesion. The diffuse skin-colored collagenoma-like appearance of cutaneous lesions are shown (A, B).

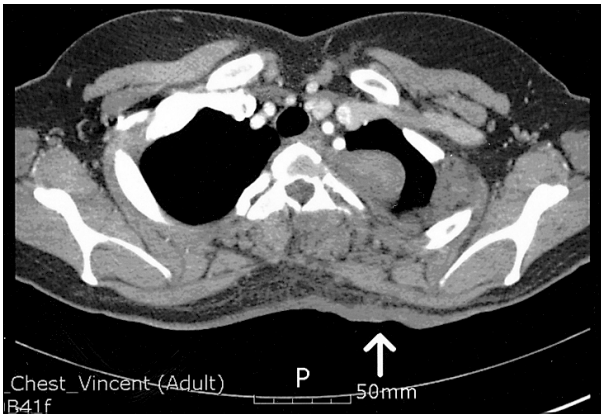

Fig. 2. In the CT findings, multiple skin lesion of left sulci and a intrathoracic mass were found.

been diagnosed radiographically as a benign neurogenic tumor. In the CT and MRI findings, multiple left sulci and a chest wall mass were found (Fig. 2). In the operative findings, the tumors showed no sign of invading the adjacent structures; and a large, lobulated, smooth, well-circumscribed chest wall mass (3.8 × 2.2 cm in size) was found under the left levator scapulae and trapezius muscle at the C6-T2 level, with surrounding multiple small masses. Additionally, a lobulated mass (2.6 × 1.1 cm in size) in the intermuscular layer of the splenius capitis muscle (just nearby spinous process at T1-4 level) and a large, lobulated, smooth circumscribed mass in the left thoracic inlet (3.8 × 3.1 cm in size) were also found. No pleural adhesion or effusion was observed. The pathological diagnosis of the tumor was that of a neurofibroma, with typical spindle shaped cells, both in the cutaneous and chest wall lesions (Fig. 3, 4). The postoperative course was uneventful, and 5 months after the operation, the patient was well and apparently free from tumor recurrence.

DISCUSSION

Neurofibromatosis is an inherited disorder, in which tumors develop in the skin, bones, endocrine glands, and nervous system, and is also a neurocutaneous or phakomatoses, characterized by cutaneous lesions as well as peripheral or central nervous system neoplasms[3]. Riccardi proposed a classification scheme for patients with neurofibromatosis (NF)[3]. Of the seven types of NF, NF1 is the best characterized form with regard to diagnostic skin findings. Cutaneous lesions of neurofibromatosis are myriad in NF1, and play a major role, both clinically and diagnostically. NF1 is characterized by Café-au-lait macules, neurofibromas, Lisch nodules and frecklings in the axillae and groin. In particular, cutaneous neurofibromas are classified as cutaneous, subcutaneous and plexiform and one of the most frequent complications of NF-1 is the formation of benign

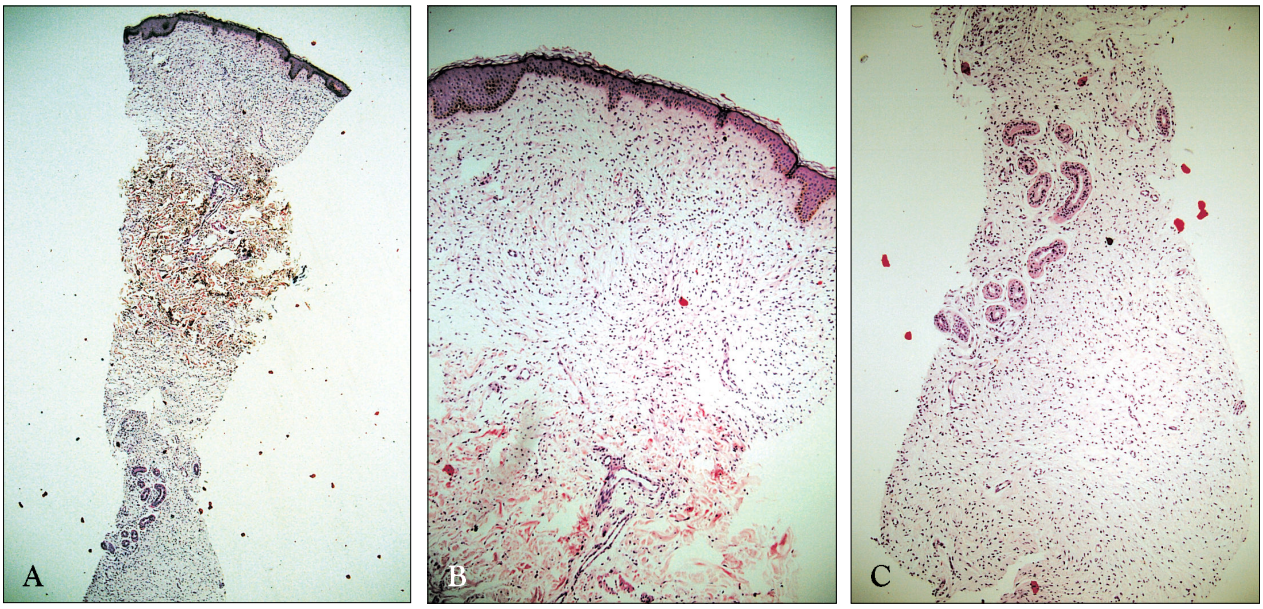

Fig. 3. A skin biopsy reveals subcutaneous diffuse nodular aggregates of neurofibroma cells in loose mucinous stroma (H & E, A: × 40, B: ×100 (upper portion), C: × 100 (lower portion)).

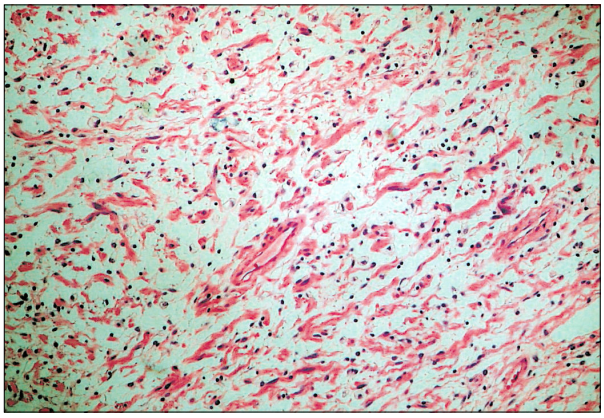

Fig. 4. Histopathology of the intrathoracic mass reveals the same appearance as cutaneous neurofibroma cells including neurofibroma cells and mucinous stroma (H & E, × 200).

tumors, such as discrete cutaneous and plexiform neurofibromas. Theses plexiform lesions form along the small branches of nerves, large nerve trunks, or spinal roots, resulting in the entrapment of multiple fascicles of a nerve, distorting into a multinodular bag of worm-like structures[4]. Microscopically, plexiform neurofibroma (PN) shows a chaotic array of wavy Schwann cells dispersed in an extracellular matrix of mucopolysaccharides and collagen. PN usually appears in the neck and extremities, but when it occurs below the diaphragm, is usually retroperitoneal or paraspinal in location. Visceral involvement in NF is uncommon, as is hepatobiliary involvement[5]. Gastrointestinal involvement occurs in 10-25% of patients with NF, including solitary or multiple neurofibromas and leiomyomas and occasionally PNs. Mediastinal neurogenic tumors, especially neurofibromas, account for 2-4% of occurrences; and neurofibromas associated with Von Recklinghausen's disease for less than 1% of all cases. Generally, mediastinal neurofibromas, which arise from an intercostals nerve or sympathetic chain, are much more common than those from the vagus or phrenic nerve. Conversely, neurogenic tumors with Von Recklinghausen's disease often arise from the intrathoracic vagus nerve. The CT finding of PN has been described as homogenous low-attenuation masses on post-contrast images. This finding has been attributed to the entrapment of adipose tissue, cyst degeneration and the presence of myxoid degeneration. Less commonly, these lesions may have calcifications and postcontrast serpiginous or peripheral entrapment[6,7]. Ideally, the optimal management of this tumor is a biopsy, to exclude malignancy, followed by resection, without compromise of the vital structures. In summary, aggressive looking PNs may affect the mesentery, retroperitoneum and

liver, and simulate malignancy. Some reports have described a well-documented tendency toward bleeding in plexiform neurofibromatosis in patients with Von Recklinghausen's disease[8]. Fortunately, our case showed no episodes of intrathoracic or cutaneous hemorrhage, or evidence of malignancy. Our case was interesting due to the chest wall involvement of the intrathoracic plexiform neurofibroma, which was in very close contact with the skin-colored, dome shaped cutaneous lesions of the neurofibroma. We can infer that if there are huge skin lesions suspicious of a neurofibroma, there must be, as a matter of course, simultaneous complete whole body evaluation, including intrathoracic or intraabdominal examinations. Thoracic neurofibromatosis is typically associated with Von Recklinghausen's disease. In the chest wall, neurofibromas often arise from the intercostals nerves and may involve virtually every nerve in the chest wall, causing massive deforming tumors. Intense pain may be experienced in the distribution of the affected walls. Malignant degenerations of neurofibromas in Von Recklinghausen's disease are well established, and associated neoplasms include malignant Schwannomas, neurofibrosarcomas and neurosarcomas. The prognosis in this tumor is poor. Resection of the primary mass may be indicated to reduce the risk of malignant degeneration[9]. Because malignant transformations of intrathoracic neurofibromas are not unusual, total resection and histopathological review must be performed, as in our case. Neurofibromatosis may involve the mediastinum; nevertheless, only a few cases of this intrathoracic vagus nerve tumor associated with Von Recklinghausen's disease have been reported in the literature. Weitzner, as well as others, described the thickest portion of the vagus nerve, the proximal portion and left vagus nerve as the preferred sites of occurrence[10,11]. Histopathological examination of the cutaneous lesion showed typical features of a neurofibroma, with numerous neurofibroma cells and mucoid stroma, and the chest wall lesions of neurofibroma also proved to be a neurofibroma, with no abnormal atypical features of tumors, which was subsequently removed by total resection. In contrast to previous literature, our case was considered as a skin neurofibroma closely contacted with the chest wall, that is, to the inner extent of the left levator scapular and trapezius the muscle at the C6-T2 level, which has rarely been reported in the literature. The current policy is to precede with the surgical removal of theses lesions in cases of symptoms and compression phenomenon in order to relieve pressure from the adjacent structures. Regarding the potential malignant transformation of a plexiform neurofibroma, a reliable test for the diagnosis or prediction is not available. Young male adults have to be monitored for life in order to detect any early change in the clinical and radiological features. The prognosis of the patients after surgical resection is excellent, but close follow-up for the risk of a new tumor appearance is necessary.

REFERENCES

1. Inoue M, Motsudomi T, Osaki T, Oyama T, Hratake J, Yasumoto K. Malignant transformation of intrathoracic neurofibroma in Von Recklinghausen's disease. Scand Cadiovasc J 1998; 32:173-175.
2. Rossi SE, Erasmus JJ, McAdams HP, Donelly LF. Thoracic manifestations in neurofibromatosis-1. Am J Roentgenol 1999;173:1631-1638.
3. Tsao H. Neurofibromatosis and tuberous sclerosis. In Bolgnia JL, Jorrizo JL, Rapini RP, editors. Dermatology. Mosby, 1st eds, London, 2003:853-858.
4. Zisis C, Dountsis A, Tzamourani E, Legaki S, Rontogianni D, Palamidas F, et al. Multiple cervical and intrathoracic plexoid neurofibromas: Case report. J Cadiovasc Surg 2003;44:779-781.
5. Fenton LZ, Foreman N, Ashmead JW. Diffuse, retroperitoneal mesenteric and intrathoracic periportal plexiform neurofibroma in a 5-year-old child. Pediatr Radiol 2001;31:637-639.
6. Bourgouin PM, Shepard JO, Moore EH, McLoud TC. Plexiform neurofibromatosis of the mediastinum: CT appearance. Am J Roentgenol 1988; 151:461-463.
7. Moon WK, Im JG, Han MC. Malignant schwannomas of the thorax: CT findings. J Comput Assist Tomogr 1993;17:274-276.
8. Rao V, Affifi RA, Ghazarian D. Massive subcutaneous hemorrhage in a chest wall neurofibroma. Can J Surg 2000;43:459-460.
9. Salaza R, Robotti EB, Chin DH, Grossman JA. Giant neurofibromatosis of the chest wall: two patient reports. Ann Plast Surg 1998;41:211-214.
10. Weitzner S, Adjacent malignant schwannoma and neurofibroma of intrathoracic vagus. Am Surg

1976;42:866-870.
11. Shintani Y, Ohta M, Hazama K, Minami M, Okumura M, Hirabayashi H, et al. Bilateral cervicomediastinal neurofibroma originating from the vagus nerve in a patient with Von Recklinghausen's disease: report of a case. Surg Today 2002; 32:1068-1071.