Intratumoral Fat in Neurofibroma and Coexistence of Eccrine Hidrocystoma

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We report a case of intratumoral fat in neurofibroma and coexistance of eccrine hidrocystoma on the occipital area of the scalp for one year duration. There are several diseases showing fatty change histopathologically. Among them, few cases of neurofibroma showing fatty change had been reported. The mechanism of fatty change is unclear, but several hypotheses are proposed. Here we report a case of neurofibroma showing fatty change and coexistence of eccrine hidrocystoma, and discuss the pathomechanism of fatty change and its relationship with disease.
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Key Words: Neurofibroma, Fatty change, Eccrine hidrocystoma, Pathomechanism

INTRODUCTION

Neurofibroma is a common benign tumor composed of complex proliferation of neuromesenchymal tissue with residual nerve fibers. Clinically it is a solitary, skin-colored, soft papulonodule presenting a 'button-hole sign'. On histopathologic examination, the lesion is a non-encapsulated dermal or subcutaneous tumor composed of a cellular proliferation within stroma made up of thin, wavy, and faintly eosinophilic fibers[1]. There are several reports about neurofibromas partly replaced by adipose cells[2-4]. Fatty changes have been known to be common in some cutaneous lesions, including nevus lipomatous superficialis and intradermal melanocytic nevi[5-7], and several peripheral nerve tumors[8,9]. In our case, we found fatty change in neurofibroma and coexistence of eccrine hidrocystoma, and to our knowledge, fatty changes in neurofibroma concurred with eccrine hidrocystoma, have never been documented. The mechanism of intratumoral fat is unclear but several hypotheses have been proposed[3,4]. Here, we report a case of intratumoral fat in neurofibroma and coexistence of eccrine hidrocystoma, and discuss possible pathologic mechanisms of fatty change in our case.

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CASE REPORT

A 41-year-old woman had a one-year history of ulcerated papule on the occipital area of the scalp. It was observed as a dome-shaped bean sized flesh colored ulcerated papule without specific signs or symptoms (Fig. 1). The patient felt the size had been increased insidiously during the above period.

Her past medical and familial history was unremarkable. Laboratory tests including complete blood count, liver function test, thyroid function test, and urinary analysis were negative or normal. An excisional skin biopsy was performed. Histopathologically, we observed three different typical histopathologic findings at the same lesion (Fig. 2). First of all, it showed a well-circumscribed, non-encapsulated neoplasm composed of loosely arranged interlacing bundles of spindle cells with elongated nuclei. It was partly separated by wavy

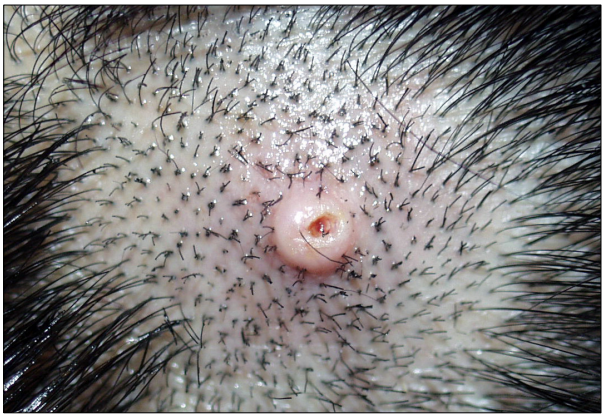

Fig. 1. The skin lesion is a dome-shaped bean-sized flesh-colored ulcerated papule on the scalp.

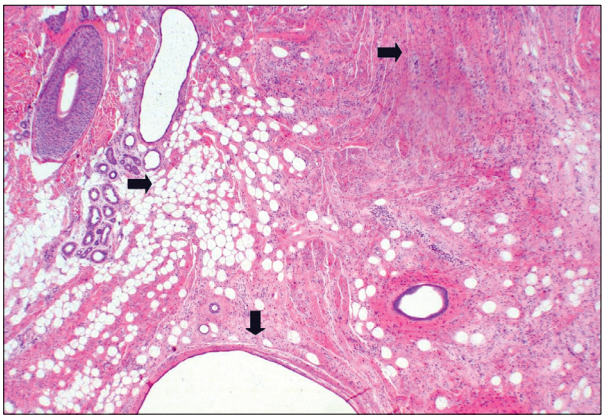

Fig. 2. Figure of the whole lesion. The arrow respectively indicates neurofibroma in the right upper portion, intratumoral fat in the middle portion, and eccrine hidrocystoma in the lower portion (H&E, × 20).

collagen and basophilic myxoid material with some mast cells, and focal areas of the lesion were replaced by adipose cells (Fig. 3). In another part of the lesion, several cystic structures lined by one or two layers of cuboid cells without evidence of decapitation secretion were observed (Fig. 4). The cystic structures showed positive staining for S-100 (Fig. 5A) and negative staining for vimentin and PAS (Fig. 5B, 5C). A pathologic diagnosis of neurofibroma showing fatty change, concurred with eccrine hidrocystoma was established, and complete excision was performed.

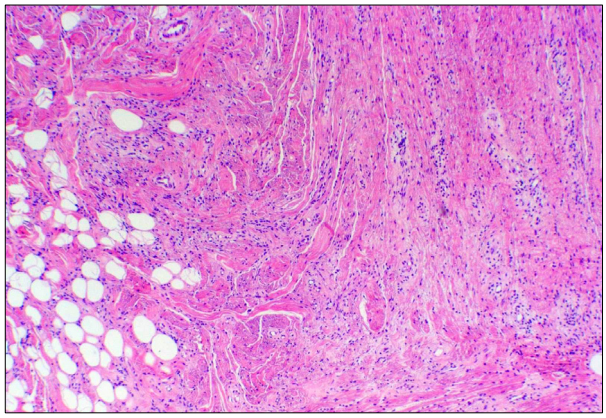

Fig. 3. The tumor is well-demarcated neoplasm composed of loosely arranged interlacing bundles of spindle cells with elongated nuclei, partly separated by wavy collagen and basophilic myxoid material. The focal areas of tumor were replaced with vacuolated cells in the mid dermis (H&E, × 40).

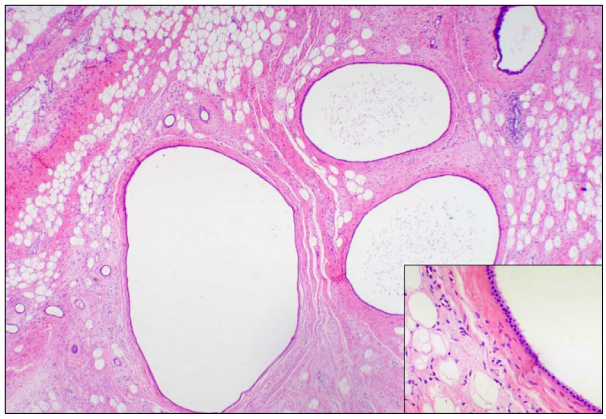

Fig. 4. In another part of the tumor, there are several cystic structures lined by one or two layers of cuboidal cells (H&E, × 40). There was no evidence of decapitation secretion (inset) (H&E, × 200).

DISCUSSION

Neurofibroma is a benign nerve sheath tumor derived from the peripheral nerve. Its basic pathologic process is a proliferation of the entire 'neuromesenchyma', which includes the Schwann cells, endoneurial fibroblasts, perineurial cells, mast cells, and cell types with intermediate features[1,10,11]. Clinically, neurofibroma is a solitary, skin-colored, soft papulonodule and ranges in size from 0.5 to 2.0 cm. There are several clinical subtypes in neuro-

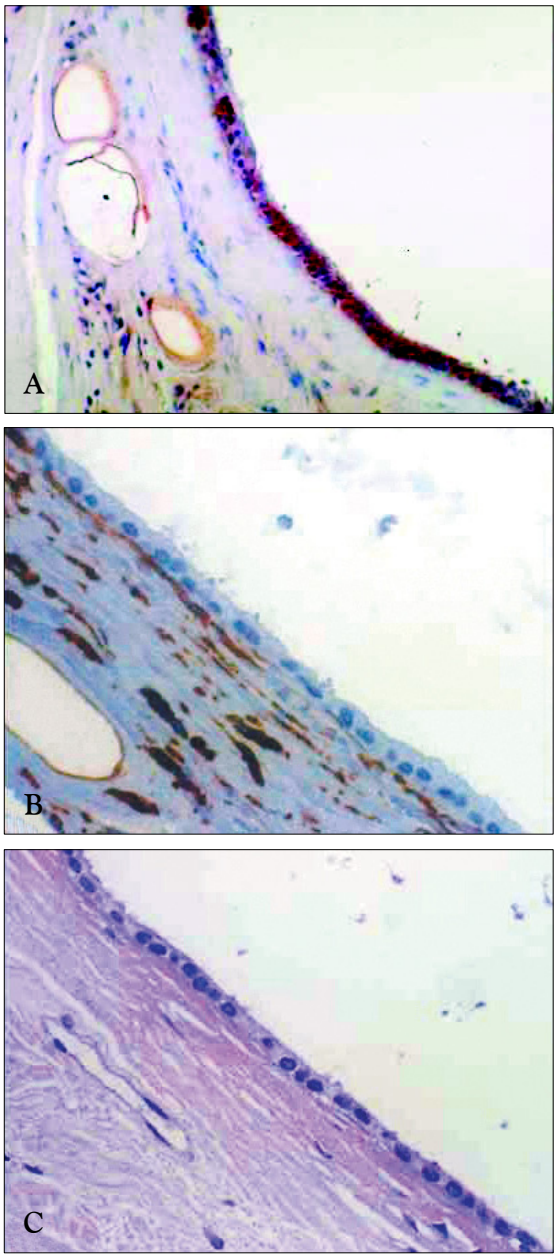

Fig. 5. (A) Tumor cells of eccrine hidrocystoma were stained intensely for S-100 (S-100, × 200). (B) Tumor cells of eccrine hidrocystoma showed negative staining for vimentin (vimentin, × 200). (C) Tumor cells of eccrine hidrocystoma showed negative staining for PAS (PAS, × 200).

fibroma, such as localized, diffuse, and plexiform variants[1]. Histopathologically, there are several variants including cellular, myxoid, collagenous, hyalinized, epithelioid, pigmented, granular cell, pacinian, atypical, xanthomatized, with epithelial or rhabdomyxomatous differentiation, dendritic cell with pseudorosettes, and lipomatous neurofibroma[2-4,10-12].

Eccrine hidrocystoma was first described in 1893 by Robinson[13]. In the present, it is classified into two subtypes: the one is Robinson type representing multiple small cysts, and the other is Smith and Chernosky[14] type, representing a larger solitary cyst. The cause of eccrine hidrocystoma is unknown until now. Robinson[13] suggested a hot environment as an important causal factor. Murayama et al.[15] also reported the possibility of eccrine hidrocystoma as a hamartoma-like disorder from retention of perspiration.

In this case, the histopathologic findings showed typical findings of neurofibroma. Particularly, the adipose cells were focally infiltrated within the lesion. The infiltrative pattern seemed to be related to the replacement of fatty tissue[16], rather than an engulfment of subcutaneous/periadnexal fat or other artifactual changes[1]. In another part of the lesion, it revealed several cystic structures lined by one or two layers of cuboid cells and it showed positive staining for S-100 and negative staining for vimentin and PAS without evidence of decapitation secretion. So the biopsy specimen was diagnosed as neurofibroma showing fatty change, concurred with eccrine hidrocystoma. We could find several interesting and unusual aspects in our patient. First, it is an unusual case showing intratumoral fat in neurofibroma concurred with eccrine hidrocystoma, although multiple eccrine hidrocystomas developed in various conditions such as Graves' disease and Parkinson disease had been reported[17,18]. Second, fatty change in this condition is interesting. Fatty changes have been reported in the normal organ like bone marrow and heart, in the pathologic conditions like fibroepithelial polyp, nevus lipomatous superficialis, neurofibroma and melanocytic nevi,[3-7] and in the peripheral nerve tumors like lipofibromatous hamartoma of the nerve and spinal epidural lipomatosis[8,9]. In recent series, it was reported that lipomatous changes were developed in 6.9% of 320 neurofibromas[2]. William and Choen[6] proposed intradermal nevi with fat increased according to the age of the patient, and Maize and Foster[7] suggested that fat within nevi might be a natural result of aging. They presented that multifactorial process, such as aging-associated metabolic change and reactive response to chronic irritation,

could induce fatty changes. It has been suggested that fatty changes of neurofibroma might be related to senescent change or chronic injury such as shaving, combing, or exposure to ultraviolet radiation[19]. Although it is documented that any peripheral nerve tumor mentioned above can have intermingled with adipose tissue, we think subtle irritation as a most possible cause of fatty change in our case, because trauma-related change, e.g., ulceration, was observed clinically and histopathologically. Although many hypotheses such as fatty metamorphogenesis of nevus cells, development of adipocytes from mesenchymal elements and pluripotent reticulum cells adjacent to blood vessels have been suggested for pathomechanism of fatty infiltration[19], the origin of adipose cells is still unclear. It has been suggested that electron microscopic studies might be helpful to confirm the presence of transitional features of fat cells[20]. Third, eccrine hidrocystoma in this case is unusual. Commonly, eccrine hidrocystomas appear as multiple small, translucent, vesiculopapular lesions, and face, especially periorbicular area, is known as a common site. There is no report about eccrine hidrocystoma developing on the scalp as a part of ulcerated papule. Considering the unusual location and clinical shape of eccrine hidrocystoma, a hot environment such as artificial hair drying or chronic exposure to sun light might be related to the development of eccrine hidrocystoma within neurofibroma. Also there might be some possibility of pressure effect from neurofibroma as an additional causal factor, but the relationship is not clear and a coincidence cannot be ruled out completely.

In conclusion, we report a case of fatty change in neurofibroma concurred with eccrine hidrocystoma in a middle-aged woman. We think the fatty infiltration in our case might be brought up by irritation rather than senescent change. Further studies will be required to clarity the pathomechanisms of fatty infiltration of various pathologic conditions in near future.

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