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Nerve Sheath Myxoma (Neurothekeoma)

— A Case Report —

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A case of nerve sheath myxoma also called as neurothekeoma in a 33-year-old woman is described. The lesion appeared as a painful, elevated nodule on the scalp for several months, without an appreciable increase in size. Microscopically, it showed typical histologic characteristics of nerve sheath myxoma, and tumor cells revealed strong, positive reaction for S-100 protein and negativity for epithelial membrane antigen (EMA) on immunohistochemical staining. These immunohistochemical findings of this case support the view that the origin cells of this tumor may be schwann cells rather than perineurial cells. The histogenesis and differential diagnosis of this tumor are discussed.

Key Words: *Myxoma, Nerve sheath tumor, Neurothekeoma, S-100 protein, EMA, Myxoid neurofibroma*

INTRODUCTION

Tumors of nerve sheath origin are classically divided into the two categories of neurofibroma and neurilemmoma (Abell et al., 1970). A much rarer tumor which has myxomatous character is also considered to be of nerve sheath origin and was first mentioned as a specific entity by Harkin and Reed in 1969. The histologic appearance of these lesions is usually sufficiently distinctive from other neurogenic tumors. Despite recent ultrastructural and immunohistochemical studies on this tumor the origin of the precursor cell still remains controversial and this tumor is frequently misdiagnosed as other myxoid soft tissue tumor including neurofibroma. (Webb, 1979; Angervall et al., 1984; Fletcher et al., 1986). The first Korean case of neurothekeoma arising on the scalp was reported by Kim et al. (1990).

We describe a case of nerve sheath myxoma, so called neurothekeoma, having characteristic histological features and immunohistochemical findings, providing the evidences that these tumors are derived from the schwann cell.

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CASE HISTORY

A 33-year-old woman presented with a painful nodule on the scalp. She had had the nodule for several month without there being an appreciable increase in its size. Physical examination revealed a 1 cm raised, tender nodule on the scalp and otherwise unremarkable. Complete excision of this lesion was done. The excised tumor measured about 1 cm in diameter and the cut surface was tan yellow and gelatinous with distinct lobulation. Microscopically the tumor involved the both dermis and subcutis. It consisted of well defined lobules of myxomatous tissue separated by thin fibrous septa, and composed by spindle or stellate cells lying singley or in a small groups within a myxomatous stroma (Fig. 1). The cellularity of the lobules varied considerably. Some lobules where neoplastic cells were sparsely noted had abundant mucoid matrix in a small pool (Fig. 2). In other lobules the tumor cells formed fascicles, some of which were arranged in loose whorls (Fig. 3). The nucleus of most tumo cells was small, rounded or ovoid with hyperchromatism and frequently one or several vacuoles. Some of the cells contained plump dense nucleus. They were multinucleated and appeared to form a syncytium. The cytoplasm of the tumor cells was eosinophilic and appeared to have bipolar or mutipolar

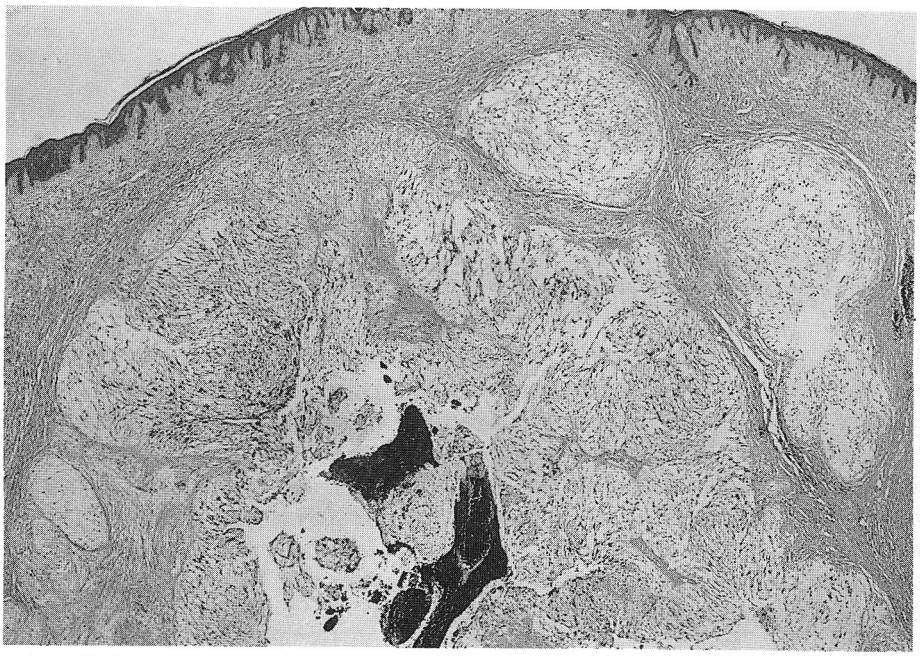

Fig. 1. The tumor is a well defined lobules of myxomatous tissue separated by thin fibrous septa, and consists of spindle or stellate cells (H&E ×20).

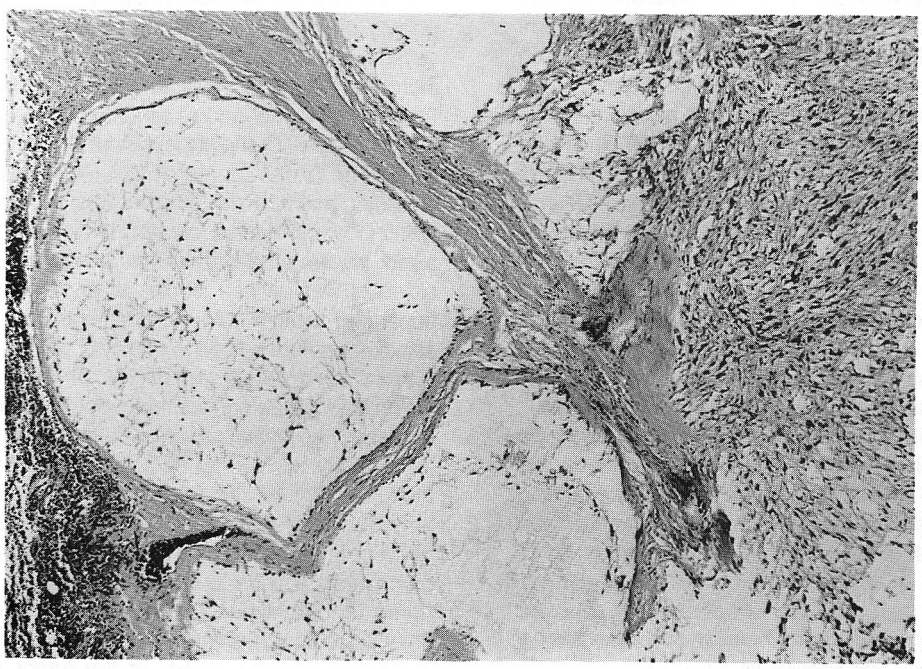

Fig. 2. The cellularity of the lobules varies; some lobules consist of pool of abudant mucoid matrix and sparse tumor cells whereas others had fasicles of tumor cells (H&E ×40).

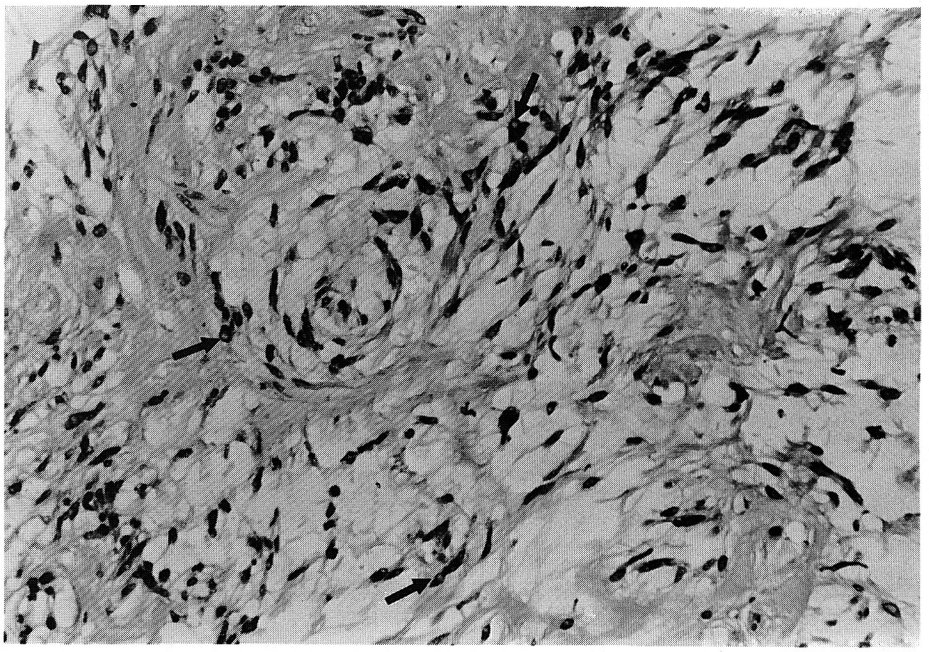

Fig. 3. Some of tumor cells are arranged in a loose whorl. The nuclei of cells are hyperchromatic with one or two vacuoles (arrays) (H&E ×100).

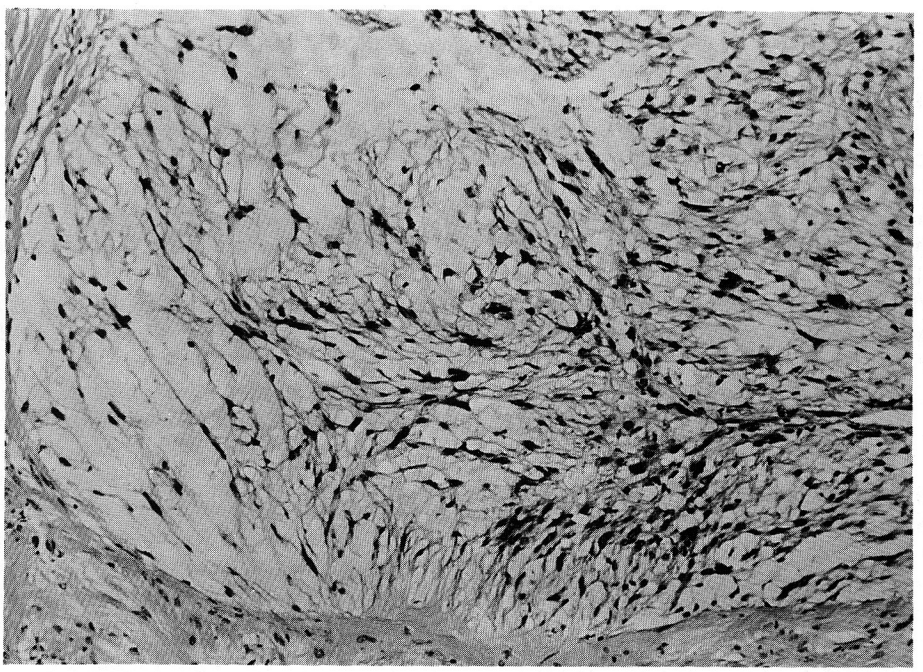

Fig. 4. At the periphery, tumor cells show sheaf-like arrangment of spindle cells (H&E ×200).

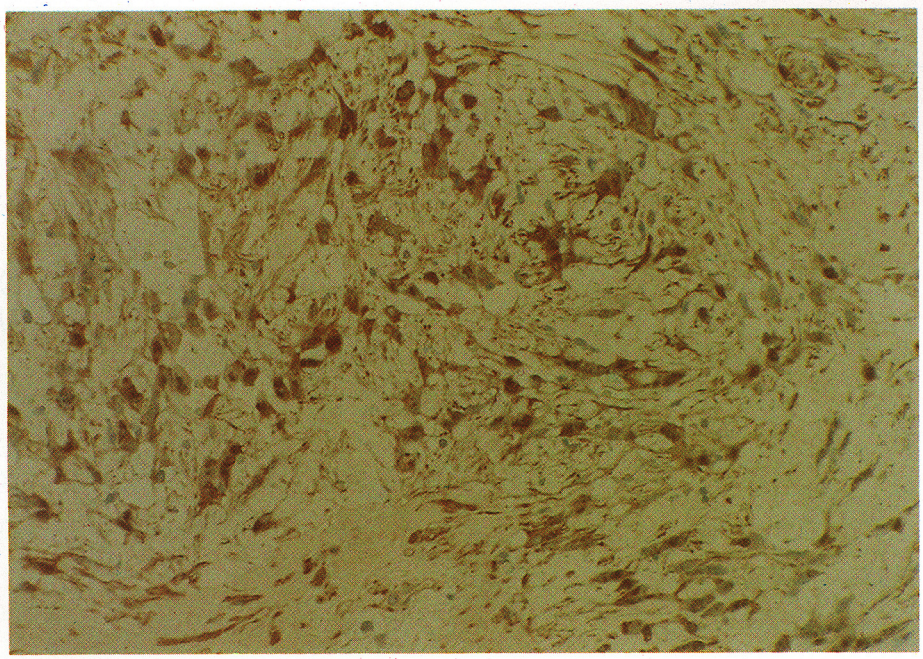

Fig. 5. The immunohistochemical staining for S-100 protein reveals strong cytoplasmic positivity with the prominence of long and slender processes (PAP ×400).

processes. At the margin of the tumor cytoplasmic processes formed a closely aggregated, parallel array (Fig. 4). Axons and associated nerves were not identified. The vascularity within the tumor was not evident and a few delicate capillary vessels were present in the fibrous septa. The abundant mucous matrix was positively stained with Alcian blue at PH 2.5 and 1.0 and metachromatically stained with toluidine blue at PH 4.0 and 1.0. There was no PAS-positive material in the cells or mucoid stroma. Immunohistochemically, almost all the tumor cells revealed a strong cytoplasmic staining for S-100 protein (Fig. 5). The staining was evenly distributed throughout the cytoplasm. The long and slender cytoplasmic extensions which were not easily observed in the H-E stained sections were evident.

DISCUSSION

Since the first description of nerve sheath myxoma by Harkin and Reed in 1969, various terms have been used for this tumor. They include pacinian neurofibroma, neurothekeoma, myxoid tumor of the nerve sheath, plexiform myxoma, plexiform neurofibroma, bizarre cutaneous neurofibroma, and myxoid neurofibroma (Prose et al, 1957; MacDonald and Wilson-Jones, 1977; Allen, 1980; Gallager and Helwig, 1980; King and Barr, 1980). This diversity of terminology for this tumor is on account of its rarity and uncertain histogenesis. Ultrastructural observations provide evidence that the neoplastic cells are distinctively derivated from the peripheral nerve sheath (Erlandson and Woodruff, 1982). But it is still being debated whether the tumor cells originate from schwann or perineurial cells. Some investigators found fine structures of the perineurial cell such as discontinuous basal lamina, desmosome-like junctions, cytoplasmic microfilaments, interdigitated cytoplasmic processes, and pinocytic vesicles (Angervall et al., 1984; Webb, 1979). From these characteristics, the name "perineurial myxoma" or "myxoid perineurinoma" was proposed (Pulitzer and Reed, 1985). But Blumberg (1989) and Gallager (1980) favored schwann cell origin based on the ultrastructural findings representing basal lamina and interdigitating cytoplasmic processes, although these were done from paraffin-embedded specimens. However, the immunohistochemical studies on this tumor contradicted the ultrastructural ones. Most of the cases reported in the literature demonstrate strong positivity of tumor cells for S-100 protein, favoring the schwann cell origin because S-100 protein is a well-established marker for schwann cells and myelin sheath (Fletcher et al., 1989; Angervall et al., 1984). Recently, as epithelial mem-

brane antigen is known as a usueful marker for normal and neoplastic perineurial cells, the schwann cells and perineurial cells can easily be distinguished with the above markers (Perentes et al., 1987; Ariza et al., 1988). This case demonstrated S-100 positivity and EMA immunonegativity, indicating that the origin cell may be a schwann cell rather than a perineurial cell. One case reported by Perentes et al. (1987) showed same immunohistochemical findings as this case, although two cases studied by Ariza (1983) demonstrated negative immunoreactivity for both S-100 and EMA.

In a review of 70 cases by Pulitzer et al. (1985), lesions had a predilection for females and for the face and upper extremites. The patients ranged in age from 2 to 70 years with mean and median both of 24.3 and 21. Average lesion size is one centimeter. Only one of 70 lesions was recurrent and no meatastasis is known to have occurred from any case.

Histologically, this tumor is characterized by multinodular or lobulated growth of myxomatous tissue and stellate cells. These myxomatous characteristics may be confused with other myxoid soft tissue tumors including myxoma, myxoid malignant fibrous histiocytoma, myxoid liposarcoma, myxoid neurofibroma, and focal mucinosis. All malignant myxoid tumors are marked by a much greater degree of cellularity, a more pronounced vascular pattern and presence of specific cellular elements such as lipoblast. Focal mucinosis has the same location and clinical presentation as nerve sheath myxoma. But the former has no sharp circumscription and cellularity seen in nerve sheath myxoma. Intramuscular myxoma is differentiated by no lobulation, a paucity of cells, abundance of mucoid material, and almost complete absence of vascular structures. Myxoid neurofibroma composed of pools of acid mucopolysaccharides containing widely spaced schwann cells is easily confused with nerve sheath myxoma. A myxoid neurofibroma lacks a lobular pattern or mitotic activity, has an obvious fibrillary background and usually contains nerve fibers within the tumor. And, tumor cells are intimately associated with wirelike strands of collagen and many thick collagen bundles.

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