Clinicopathological Features of Extraskeletal Myxoid Chondrosarcoma: An Analysis of 9 Cases

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CLC number: R738.6 Document code: A Article ID: 1000-9604(2008)03-0230-07

10.1007/S11670-008-0230-X

ABSTRACT

Objective: To investigate the Clinicopathological characteristics of extraskeletal myxoid chondrosarcoma (EMC). **Methods:** Nine cases of extraskeletal myxoid chondrosarcoma were studied. Extensive immunohistochemical analysis was performed in all the cases and ultrastructural studies were done in 2 extraskeletal myxoid chondrosarcomas. Follow-up information was available for seven patients. **Results:** There were 7 males and 2 females whose ages ranged from 31 to 69 years (median 52.78 years). Local pain or tenderness and the presence of a palpable mass were the main complaints of the patients. The tumors were located mainly in the lower extremities (66.7%). Most tumors were deep-seated. They usually had a distinct multinodular configuration delineated by fibrous connective tissue. The tumor cells were arranged in delicate intersecting strands, rings, and garlands for the most part. The myxoid matrix was abundant in most cases. Immunohistochemical analysis was performed in all the cases and ultrastructural studies were done in 2 extraskeletal myxoid chondrosarcomas. EMC expressed vimentin (100%, 9/9), neuron-specific enolase (77.8%, 7/9), S-100 protein (66.7%, 6/9), synaptophysin and chromogranin A (22.2%, 2/9). None of the tumors expressed EMA and desmin. Ultrastructurally: EMC was characterized by distinct cords of cells immersed in a glycosaminoglycan rich matrix. The cells were rich in mitochondria, had well-developed Golgi apparatus and there were numerous smooth vesicles. In many cells, there were also prominent glycogen deposits and lipid droplets. Some tumor cells had intracisternal microtubules. In one of the 2 extraskeletal myxoid chondrosarcomas there were 140–180 nm diameter membrane-bound dense-core secretory granules in cell bodies. **Conclusion:** Extraskeletal myxoid chondrosarcoma (EMC) is a rare soft tissue sarcoma characterized by distinctive morphological and cytogenetical features. However, the chondroid nature has been a subject of controversy, and its line of differentiation remains to be determined. A substantial proportion of EMC shows immunophenotypic and/or ultrastructural evidence of neuroendocrine differentiation. EMC has high potential of local recurrence and metastasis, and a high disease-associated death rate.

Key words: Extraskeletal myxoid chondrosarcoma; Ultrastructural; Immunohistochemical; Neuroendocrine differentiation; Prognosis

Extraskeletal myxoid chondrosarcoma (EMC) was first described by Stout and Verner[1] in 1953 and later in more detail and as a distinct entity by Enzinger and Shiraki[2] in 1972. It is a unique, rare soft-tissue tumor with prominent myxoid morphology. The tumor most commonly develops in deep parts of the proximal extremities and limb girdles in middle-aged adults, and there is a predilection for male patients. Probably because of the rarity and unfamiliarity, the nomenclature and classification were somehow confused previously: the tumors had been also described under a variety of headings including extraskeletal chondrosarcoma, chordoid tumor, chordoid sarcoma, and tenosynovial sarcoma, particularly before the first designation of 'EMC' given by Enzinger and Shiraki[2]. In addition, EMC may bear a histological resemblance to parachordoma[3], mixed tumor of skin and soft tissue[4] and other myxoid soft-tissue tumors[5]. However, detailed clinicopathological analyses based on accumulated examples have demonstrated that EMC is an undoubtedly distinctive tumor entity[2, 6–9]. It is characterized by a protracted clinical course, even

Received: Apr. 6, 2008; **Accepted:** Jul. 9, 2008
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with the development of metastases, and thus has been regarded as a low-grade sarcoma[7]. More recent long-term follow-up studies have indicated, however, the intermediate malignancy of this tumor[8].

MATERIALS AND METHODS

The specimens were retrieved from Chongqing Medical University Department of Pathology. All cases had been diagnosed between 1985 and 2006. The clinical data of extraskeletal myxoid chondrosarcoma patients are listed in Tab. 1. The material was fixed with 10% formalin and embedded in paraffin. Paraffin sections (4 μm) were cut and stains for hematoxylin and eosin were performed. Immunohistochemical stains were performed in 9 cases for which formalin-fixed, paraffin-embedded tissue was available. The streptavidin-peroxidase (S-P) method was used. Two cases were examined ultrastructurally.

Tab. 1. Clinical data of the extraskeletal myxoid chondrosarcoma patients

Patient	Age	Gender	Location	Size(cm)	Course(month)
1	49	M	Thigh	11×10×5	60
2	60	M	Thumb	5×3×2	6
3	56	F	Ankle	4×3×2	10
4	35	M	Buttock	4×4×2	14
5	69	M	Shoulder	12×12×7	12
6	58	M	Back	10×6×4	13
7	59	M	Thigh	8×6×6	18
8	58	F	Foot	4×3×3	11
9	31	M	Groin	7×6×5	10

RESULTS

Clinical Features

The main clinicopathological features of the 9 patients with extraskeletal myxoid chondrosarcoma are presented in Tab. 1. There were 7 males and 2 females whose ages ranged from 31 to 69 years (median 52.78 years). Local pain or tenderness and the presence of a palpable mass were the main complaints of the patients. Tumor size ranged from 4 to 11 cm in maximum dimension (median 7 cm). Most tumors were deep-seated. No cases involved the skin and the bone. The tumors usually had a lobulated appearance, well demarcated tumors contained by a pseudocapsule. On cut section, the tumor has a well defined multinodular architecture comprised by gelatinous nodules separated by fibrous septa. Intratumoral cysts and haemorrhage, and geographic areas of necrosis may be present.

Pathologic Findings

All the cases had histologic features of classical EMC. They usually had a distinct multinodular configuration delineated by fibrous connective tissue. Most of the tumors had expansive growth, but some cases were more infiltrative. Most cases had fibrous septa traversing the lesion. Most tumors arose within skeletal muscle or tendinous structures, although some involved the deep subcutis and abutted on the superficial muscular fascia.

Histologically, extraskeletal myxoid chondrosarcomas showed the typical features: The tumor cells were arranged in delicate intersecting strands, rings, and garlands for the most part, but some tumors had a loss of cohesion between tumor cells that resulted in small balls or clusters of bland histocytoid-appearing cells suspended in a myxoid matrix. Some also had areas of small nests or whorls of the tumor cells. The individual tumor cells had spindle-shaped or oval hyperchromatic nuclei that occasionally contained small nucleoli and showed mild to moderate nuclear atypia, and some also had a variable amount of eosinophilic cytoplasm (Fig. 1). Cells occasionally had vacuolated cytoplasm, but recognizable cartilaginous differentiation was not present. The majority of the tumors (6 cases, 67%) were considered low grade because they were predominantly hypocellular, with mild nuclear pleomorphism, rare mitoses, and absence of necrosis. The remaining (3 cases, 33%) were highly