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A clinicopathologic study of the comparative staining of a panel of antibodies in Malignant fibrous histiocytoma and other sarcomas

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Objective : *This study focusses on the clinical features, histopathology and comparative expression of a panel of antibodies in Malignant fibrous histiocytoma (MFH) and other sarcomas. The comparative staining by antibodies in each histomorphologic neoplastic cell type is described.*

Setting : *Department of Pathology, King Chulalongkorn Memorial Hospital*

Subject : *Patients were diagnosed with Malignant fibrous histiocytoma from January 1995 to December 1999*

Design : *Retrospective descriptive study*

Methods : *We searched and collected all cases of MFH from surgical pathological files from January 1995 to December 1999. The clinical datas including sex, age, size, site and pathological finding were determined. The staining of a panel of antibodies (KP1/CD68, muscle specific actin (MSA) and desmin were determined in each cell type as a grade of the number of positive cells. Grade 0,1,2,3 revealed neoplastic as less than 5, 6 – 25, 26 – 50, and more than 50 %, respectively.*

Results : *Fifteen cases of MFH were collected between January 1995 and December 1999. The histomorphologic criteria for diagnosis was made according to the criteria of Enzinger and Weiss. Eleven cases strictly fulfilled these criteria. The diagnosis of the other 4 cases were changed.*

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Light microscopic examination found storiform – pleomorphic (9 cases) and myxoid type (2 cases). Of 11 cases, the major KP1/CD68 expression was grade 3 in round cells (45.4 % of cases), grade 2 in multinucleated giant cells (45.4 % of cases), and grade 1 for neoplastic spindle cells (54.5 % of cases). The most common pattern of MSA was grade 1 in neoplastic spindle cells (45.5 %). Addition, most staining for desmin was grade 0. All four cases were positive for KP1/CD68. The expression of MSA in spindle cells was grade 3 in leiomyosarcoma. However, the single desmin expression in leiomyosarcoma was ranging from grade 0 to 2. The antibody expression in rhabdomyosarcoma was grade 2 for desmin and grade 1 for both KP1/CD68 and MSA.

Conclusion : *We would like to propose these antibodies which consist of histiocytic maker (KP1/CD68), MSA, and desmin. These three antibodies are the minimal requirement for diagnosis of MFH which is comprised of different morphology of neoplastic cells. We propose that the pattern of KP1/CD68 expression as grade 3 in round cells, grade 2 in multinucleated giant cells, and grade 1 for spindle cells still useful when combined with the expression of MSA and desmin. Since MSA and desmin rarely express in round and multinucleated giant cells but more expression in spindle cells. In contrary, other sarcomas (smooth and striated muscle) have strong expression for MSA and desmin. Thus, we should emphasize about the grade of antibody expression for each cell type. If the MSA and desmin express stronger than KP1/CD68 within all cell types, the muscle tumor should be consider. On the otherhand, if the KP1/CD68 express diffuse and stronger than MSA and desmin expression within round and multinucleated giant cells, the MFH should be diagnosed. Finally, we insist that KP1/CD68 is still useful to support the diagnosis of MFH when combined with other as panel antibodies.*

Key words : *Malignant fibrous histiocytoma, Immunohistochemistry, KP1/CD68.*

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วรนุช ปัญญาวรวุฒิ, ลลนา แสนโสภา, ปรีชา เรืองเวชวรชัย. การศึกษาลักษณะทางคลินิกพยาธิวิทยาและเปรียบเทียบผลของการแสดงทางอิมมูโนฮิสโตเคมีในผู้ป่วย Malignant fibrous histocytoma และ Sarcoma ชนิดอื่น ๆ. จุฬาลงกรณ์เวชสาร 2544 เม.ย; 45(4): 295 - 307

จุดประสงค์ : *การศึกษานี้จะมุ่งเน้นที่ลักษณะทางคลินิก ลักษณะทางพยาธิวิทยาและเปรียบเทียบผลของการแสดงออกทางอิมมูโนฮิสโตเคมีของมะเร็ง ชนิด Malignant fibrous histiocytoma (MFH) และ Sarcoma ชนิดอื่น ๆ นอกจากนั้นยังศึกษาเปรียบเทียบผลของการแสดงออกของชุด ของแอนติ้บอดี้ในเซลล์มะเร็งแต่ละชนิด โดยวิเคราะห์ลักษณะการแสดงออกของเซลล์มะเร็งเป็นระดับการติดของเซลล์ (เกรด)*

สถานที่ที่ทำการศึกษา : *ภาควิชาพยาธิวิทยา โรงพยาบาลจุฬาลงกรณ์*

ผู้ป่วยที่ได้ทำการศึกษา : *ผู้ป่วยที่ได้รับการวินิจฉัย Malignant fibrous histiocytoma ตั้งแต่มกราคม 2538 ถึง ธันวาคม 2542*

รูปแบบการวิจัย : *การศึกษาเชิงพรรณนาย้อนหลัง*

วิธีการศึกษาวัดผล : *ได้ทำการทบทวนใบรายงานผลทางพยาธิวิทยาของผู้ป่วยที่ได้รับการวินิจฉัย MFH ตั้งแต่มกราคม 2538 ถึง ธันวาคม 2542 การศึกษานี้ได้วิเคราะห์ลักษณะทางคลินิกได้แก่ อายุ เพศ ขนาด และตำแหน่งของก้อน รวมถึงการตรวจพบทางพยาธิวิทยา การตรวจวินิจฉัยทางกล้องจุลทรรศน์และการศึกษาการใช้ชุดของแอนติ้บอดี้ ซึ่งได้แก่ KP1/ CD68, muscle specific actin (MSA) และ desmin โดยวัดผลเป็นระดับการติดของเซลล์ (เกรด) ดังนี้ เกรด 0,1, 2, 3 คือจำนวนเซลล์ที่ติดน้อยมากกว่า 5 %, 6 - 25 %, 26 - 50 % และมากกว่า 50 % ตามลำดับ*

ผลการศึกษา : *ผู้ป่วยที่เคยได้รับการวินิจฉัยว่าเป็น Malignant fibrous histiocytoma จำนวน 15 ราย การวินิจฉัยทางกล้องจุลทรรศน์ใช้เกณฑ์การวิเคราะห์ของ Enzinger and Weiss พบว่ายืนยันการวินิจฉัย MFH 11 ราย และอีก 4 รายมีการเปลี่ยนแปลงการวินิจฉัย ในผู้ป่วย 11 รายพบ storiform-pleomorphic type เกิดขึ้นมากที่สุดคือ 9 ราย และ myxoid type 2 ราย จากการตรวจวิเคราะห์ในผู้ป่วย 11 รายพบระดับการแสดงออกของ KP1/ CD68 เป็นเกรด 3 ในเซลล์มะเร็งรูปร่างกลม (45.4 % ของ case) เกรด 2*

ในเซลล์ที่มีหลายนิวเคลียส (45.4 % ของ case) และเกรด 1 ในเซลล์รูปกระสวย (54.5 % ของ case) ส่วนการแสดงออกที่พบบ่อยของ MSA คือพบว่าเซลล์ที่ติดส่วนใหญ่เป็นเซลล์รูปกระสวยโดยส่วนใหญ่เป็นเกรด 1 (45.5 %) ส่วน Desmin พบว่าโดยส่วนใหญ่ของเซลล์ทั้ง 3 แบบจะมีการแสดงออกน้อยมากจนถึงไม่ติดเลย (เกรด 0)

ส่วนอีก 4 รายที่แยกการวินิจฉัยออกมาพบมีการแสดงออกของ KP1/CD68 ทุกราย สำหรับกลุ่มมะเร็งของกล้ามเนื้อเรียบพบการแสดงออกของเซลล์รูปกระสวยส่วนใหญ่เป็นเกรด 3 แต่อย่างไรก็ตามสำหรับ desmin จะมีการแสดงออกตั้งแต่เกรด 0 ถึง 2 ส่วนมะเร็งกล้ามเนื้อลายพบการแสดงออกของ desmin เป็นเกรด 2 แต่สำหรับ MSA และ KP1/CD68 มีการแสดงออกส่วนใหญ่เป็นเกรด 1

สรุป : คณะผู้จัดทำอยากจะขอเสนอว่ากลุ่มของแอนติ้บอดี้ซึ่งประกอบด้วย histiocytic marker (KP1/CD68), MSA, and desmin โดยทั้ง 3 ตัวนี้เป็นจำนวนของแอนติ้บอดี้ขั้นต่ำที่จะต้องใช้เพื่อการวินิจฉัย MFH ซึ่งมะเร็งชนิดนี้ประกอบด้วยเซลล์หลาย ๆ รูปร่างและหน้าตา คณะผู้จัดทำขอเสนอว่าการแสดงออกของแอนติ้บอดี้ในลักษณะดังต่อไปนี้คือเกรด 3 ในเซลล์รูปร่างกลม เกรด 2 ในเซลล์ที่มีหลายนิวเคลียส และเกรด 1 สำหรับเซลล์รูปกระสวย ลักษณะการติดแบบนี้ยังคงมีประโยชน์โดยเฉพาะอย่างยิ่งเมื่อนำมาพิจารณาร่วมกับลักษณะการแสดงออกของ MSA และ Desmin เนื่องจากว่าทั้ง MSA และ Desmin มักจะไม่ติดในเซลล์รูปร่างกลมและเซลล์ที่มีหลายนิวเคลียส แต่จะติดมากในเซลล์รูปกระสวย ในทางตรงข้ามมะเร็งกล้ามเนื้อทั้งกล้ามเนื้อเรียบและลายจะพบเซลล์ติด MSA และ Desmin มากกว่า ดังนั้นเราควรจะที่จะเน้นให้เห็นความสำคัญของชนิดของเซลล์ที่มีการแสดงออกของแอนติ้บอดี้ หรือเซลล์ที่ติด โดยหาก MSA และ Desmin ติดมากกว่า KP1/CD68 ก็ควรที่จะวินิจฉัยเป็นมะเร็งในกลุ่มกล้ามเนื้อ แต่หากติด KP1/CD68 มากกว่าในเซลล์รูปร่างกลมและเซลล์หลายนิวเคลียส ก็ควรที่จะวินิจฉัยว่าเป็น MFH ท้ายสุดคณะผู้จัดขอยืนยันว่า KP1/CD68 ยังคงมีประโยชน์เพื่อช่วยในการวินิจฉัย MFH เมื่อใช้ร่วมกับแอนติ้บอดี้ชนิดอื่น

Malignant fibrous histiocytoma (MFH) is the most common soft tissue sarcoma in the late adult life.[1-3] Its histogenesis, however, is still a matter of debate because of its various celllular components and patterns. The 4 subtypes of malignant fibrous histiocytoma consist of storiform-pleomorphic, myxoid (myxofibrosarcoma), giant cell (malignant giant cell tumor of soft part), and inflammatory (Xanthosarcoma, malignant xanthogranuloma).[4] The mixture of storiform and pleomorphic patterns is often confused with various pleomorphic sarcomas such as pleomorphic liposarcoma, pleomorphic rhabdomyosarcoma, malignant schwannoma, and leiomyosarcoma.[5] The prototypical pleomorphic/storiform variant is now widely regarded as the most common type in MFH,[6-8] as widely reviewed in recent years. At this time, the previously popular diagnostic antibodies (Alpha-1-antitrypsin and alpha-1-antichymotrypsin) have been discredited.[9.10] New antibodies have been applied to confirm the diagnosis of MFH.[5,11] So far, none of the immunohistochemical markers that have been evaluated previously are cell lineage specific and the result of the staining has been problematic. A new approach using KP1/CD68 to characterize MFH has been proposed by Binder SW.[5] However, the utility of this antibody still has been debated. Some publishers believe that this tumor is derived from the fibroblast lineage and not the monocyte or macrophage lineages.[4,12] Thus the report from this group showing using the histiocytic markers were negative.[12] From this point, the utility of KP1/CD68 as one of the panel of antibodies to confirm diagnosis of MFH is still controversial.

In our study, we decided to evaluate the clinical feature, histopathology, and comparative expression of a panel of antibodies for MFH and other sarcomas.

Material and Methods

Data from surgical files of the Pathological Department, King Chulalongkorn Memorial Hospital collected between January 1995 to December 1999 were searched.

Clinical features consisting of sex, age, size, and location were considered. Light microscopic examination including immunohistochemistry profiles was performed. Four-micron sections used for light microscopic study were cut from paraffin-embedded tissue blocks and stained with hematoxyline and eosin. In all cases, codes for Malignant fibrous histiocytoma were selected.

The diagnosis were made according to criteria of Enzinger and Weiss. The storiform/pleomorphic type consists of the combination of storiform and pleomorphic areas. Most of the storiform area has plump spindle cells arranged in short fascicles in a cartwheel or storiform pattern around slitlike vessels. Less commonly, the fascicular pattern is seen, where plump round cells are arranged haphazardly without orientation to vessels and there are giant cells with multiple hyperchromatic irregular nuclei. Focal myxoid change and modest a number of xanthoma cells, lymphocytes and plasma cells are demonstrated. Mitotic figures are numerous. (Figure 1)

In the myxoid type, at least half of tumor shows myxoid areas. The myxoid areas apppear either as blending or abutting with the adjacent cellular areas. The storiform pattern is less evident. The tumor and inflammatory cells are anchored along the curvilinear vessels.

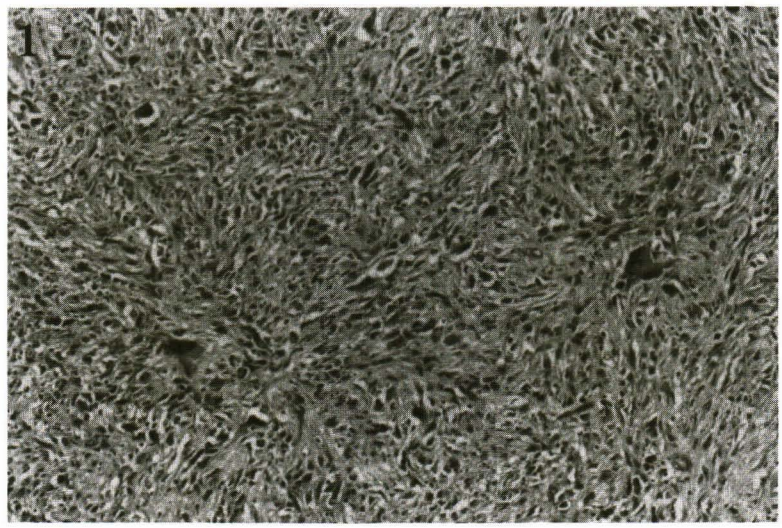

Figure 1. The storiform/pleomorphic subtype of MFH. The plump spindle cells arrange in storiform pattern. Scattered plump round cells and multinucleated giant cells are demonstrated.(x200)

The giant cell type (malignant cell tumor of soft parts) contains numerous osteoclast-type giant cells.

The inflammatory type shows large amount of xanthoma cells and acute inflammatory cells.

Immunohistochemistry staining was performed on formalin-fixed, paraffin - embedded tissue blocks by the avidine-bioten complex method. A panel of commericial antibodies were used as follows :

1. CD68 (clone KP1, dilution 1:2000, DAKO)
2. Muscle specific actin (clone HHF 35, dilution 1:100, DAKO)
3. Desmin (clone D33, dilution 1:200, DAKO)

The interpretation of various antibodies (KP1/CD68,muscle-specific actin , and desmin) expression in each tumor cell type is classified as a grade from 0 to 3. Grade 0 as the number of positive cells are less than 5. Grade 1 as the number of representative positive cells are 5 to 25 %. Grade 2 as the number of positive cells is 26 to 50 %. Grade 3 as the number of positive cells is more than 50 %.

Results

Clinical findings

All cases previously diagnosed as MFH from the surgical files of the Department of Pathology, King Chulalongkorn Memorial Hospital were selected. The 15 cases of MFH were examined. Eleven cases were classified to be MFH according to the Enzinger and Weiss criteria. The diagnoses of the other four cases were changed. The clinical features including age, sex, size, and site presented in Table 1. The age of patients ranged from 22 to 74 years (mean 49.9, median 55 years). Of 11 patients, seven were male and four were female. The ratio of male to female was 1.75:1. The size of mass ranged from 2.0 to 22.0 cm (mean 8.9 cm). The majority of tumors occurred in the lower extremity (45.4 %). In other sites, the mass arose in the trunk (27.3 %), the upper extremity (18.2 %), and the retroperitoneum (9.1 %)

The other four cases also found in older patients. The age ranged from 45 to 93 years. The size ranged from 0.6 to 16.0 cm. They occurred in the lower extremity, trunk, and head and neck. (Table 2)

Light microscopic finding :

9 cases were classified, (81.8 %) of storiform-pleomorphic and 2 cases (18.2%) of myxoid type. The giant cell and inflammatory cell subtypes were not found.

The separated four cases consisted of Atypical Fibroxantoma 1 case, Leiomyosarcoma 2 cases and Rhabdomyosarcoma 1 case.

Immunohistochemistry staining :

The result of antibody staining for each neoplastic cell type of MFH is presented in Table 3. Tumor cells were positive with granular cytoplasmic staining with KP1/CD68 for all eleven cases which were defined as MFH from light microscopy. The data of relative frequency of various antibody expression from different cell type is shown in table 4. The staining of round cells for KP1/CD68 (grade 0 to 3) were 0, 27.3, 27.3, and 45.4 % of cases in order. The major of staining with KP1/CD68 for round cells showed grade 3 (45.4 %). (Figure 2A) The expression of KP1/CD68 in spindle cells was 0, 54.5,9.1, and 36.4 % of cases for grade 0 to 3. The major of staining with KP1/CD68 in spindle cells showed grade 1 (54.5%).(Figure 2B) The KP1/CD68 staining for multinucleated giant cells were 27.3, 18.2, 45.4, and 9.1 % of cases for grade 0 to 3. The majority of staining for giant cells showed grade 2 (45.4 %). (Figure 2C)

The major expression of MSA in MFH for round and giant cells was grade 0 (45.5 and 81.8 %). Most spindle cells showed grade 2 (45.5 %). The major expression of desmin for all neoplastic cell types was grade 0.

Table 1. The Clinical features of MFH.

Number	Age	Sex	Site	Size(cm.)
1	55	M	Trunk : chest wall	5.0X7.0X8.0
2	59	M	Trunk : Back	2.5X2.5X1.0
3	60	M	Trunk : Back	5.0X5.0X4.5
4	22	M	Retroperitoneum	22.0X20.0X7.0
5	31	F	Upper extremity	2.0X0.9X0.8
6	66	M	Upper extremity	15.0X9.0X5.0
7	68	F	Lower extremity	8.0X14.0X17.0
8	74	M	Lower extremity	6.5X6.0X2.5
9	55	F	Lower extremity	11.0X10.0X9.0
10	33	F	Lower extremity	7.0X5.5X4.5
11	26	M	Lower extremity	0.5X1.5X2.0

Table 2. The clinical features of other sarcomas.

Number	Age	Sex	Site	Size(cm.)
1	93	F	Head and neck	0.6x0.3
2	57	M	Lower extremity	16.0x12.0x3.5
3	45	M	Chest wall	10.0x6.0x2.0
4	75	M	Retroperitoneum	10.0x8.0x5.0

Table 3. The expression of panel antibodies as grading in each neoplastic cell type of MFH.

No.	KP1/CD68 (grade)			MSA (grade)			Desmin (grade)		
	Round	Spindle	Giant *	Round	Spindle	Giant *	Round	Spindle	Giant *
1	1	1	2	2	2	2	1	1	1
2	2	2	0	0	3	0	1	0	0
3	3	3	2	1	1	0	0	0	0
4	1	1	0	3	0	0	0	0	0
5	3	3	1	0	1	0	0	0	0
6	2	1	2	0	1	0	0	0	0
7	3	3	1	1	1	0	0	0	0
8	1	1	0	0	2	0	0	0	0
9	3	1	3	2	2	1	0	0	0
10	3	3	2	0	1	0	0	0	0
11	2	1	2	2	0	0	0	0	0

Giant * = multinucleated giant cell

Table 4. The relative frequency of various antibodies expression from difference neoplastic cell types in MFH.

Antibody	Cell type	Grade O		Grade 1		Grade 2		Grade 3	
		case	%	case	%	case	%	case	%
KP1/CD68	Round	0	0	3	27.3	3	27.3	5	45.4
	Spindle	0	0	6	54.5	1	9.1	4	36.4
	Giant *	3	27.3	2	18.2	5	45.4	1	9.1
MSA	Round	*5*	*45.5*	2	18.2	3	27.3	1	9.1
	Spindle	2	18.2	*5*	*45.5*	3	27.3	1	9.1
	Giant *	*9*	*81.8*	1	9.1	1	9.1	0	0
Desmin	Round	9	81.8	2	18.2	0	0	0	0
	Spindle	10	90.9	1	9.1	0	0	0	0
	Giant *	10	90.9	1	9.1	0	0	0	0

Giant* = Multinucleaated giant cell

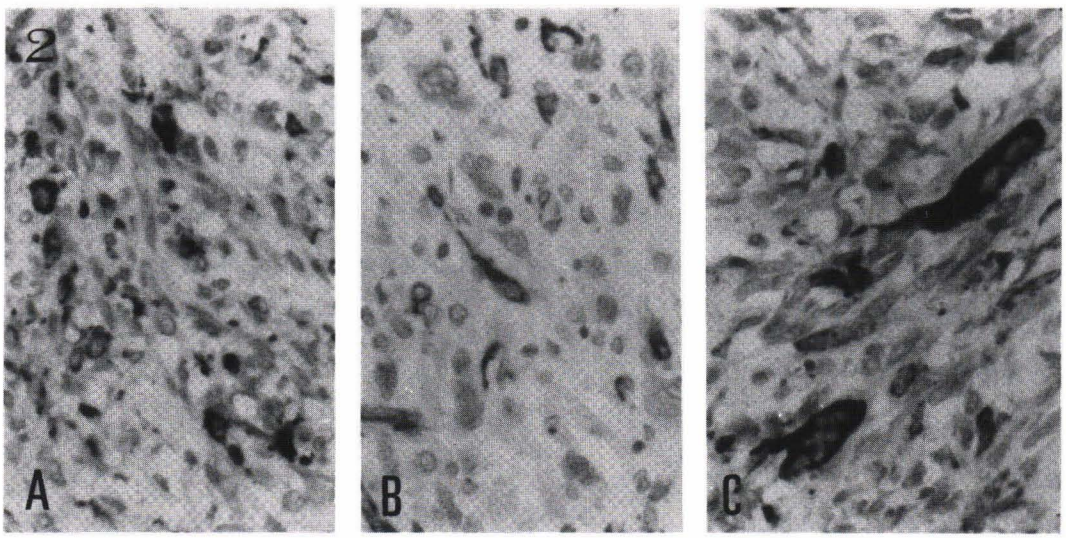

Figure 2. The expression of KP1/CD68 as granular pattern of neoplastic round cells (2A), spindle cells (2B), and multinucleated giant cells (2C) (x400)

The comparative expression of various antibodies for another 4 cases is presented in Table 5. According to the combination of clinical data and pathologic finding, the new diagnosis was atypical fibroxanthoma. The result of immunohistochemical study revealed positive staining for KP1/CD68 (grade 1 to 2), MSA (grade 2) and desmin (grade 1). The expression of cases number 2 and 3 for MSA was diffusely and strongly positive in spindle cells while moderate for desmin (grade 2). The pleomorphic or giant cells were also positive.The expression of KP1/CD68 was moderate to diffuse and strong staining in spindle and round cells but negative in multinucleated giant cell. The diagnosis of both these patients was leiomyosarcoma. Patient number 4 revealed moderate staining for desmin and focal staining for MSA and KP1/CD68. The diagnosis was rhabdomyosarcoma.

Discussion

Malignant fibrous histiocytoma is still defined within the fibrohistiocytic tumors. Many previous retrospective studies have tried to separate this group and believe this is a misclassification. However, the arguments have persisted as to whether MFH is a fibroblastic neoplasm, a primitive mesenchymal neoplasm showing polytypic differentiation, or simply a multipotential tumor of uncertain origin.[12] Ultrastructural and immuhistochemistry studies of MFH reveal that it originates from a primitive mesenchymal cell that may show divergent lines of differentiation. It may present as fibroblastic, histiocytic, and even myofibroblastic phenotypes.[13,14] From this point, the findings from immunohistochemistry studies, which usually give insight into the cellular differentiation of neoplastic cells, are also debated.[15] However, the criteria for diagnosis which include clinical features,

histomorphology, immunohistochemistry especially the expression are evaluated here in an attempt to clear this confusion of KP1/CD68. Questions about the use of this marker for diagnosis are remaining.

In this study the age of patients ranged from 22 to 74 years (mean 49.9, median 55 years). However, previous studies have found the majority of cases in patient between 50 to 70 years. This may reflect differences between eastern and western populations. The incidence of MFH in our country is very low, and occurs in males (1.75 to 1) in concurrence with prior reports. The most frequent site found in the lower extremity, followed by the upper extremity and retroperitoneum, except the inflammatory type which is usually located in the retroperitoneum.[4] Our findings concur with this grouping since the majority of cases occurred in the lower extremity (45.4 %). The other sites were trunk (27.3 %), upper extremity (18.2 %), and retroperitoneum (9.1 %).Typically, the tumor mass is solitary and the size ranges from 5 to 10 cm. Usually, the lesion occures within skeletal muscle.[4] The tumors reported here were masses solitary and the size ranged from 2.0 to 22.0 cm (mean 8.9 cm).

Clinical features often aid in the diagnosis, however, they are not sufficient. The outcome of immunohistochemistry staining cannot be predicted from the hematoxyline and eosin staining. A provision for immunohistochemical staining is necessary.

A panel of antibodies which consisted of three types (KP1/CD68, muscle specific actin (MSA), and desmin) was applied for diagnosis. The CD68 cluster of antibodies recognizes a 110 kd. There are seven recognized CD68 antibodies: Y2/131, EBM 11, Ki-M6, Ki-M7, Y1/82A, KP1, and PG-M1. These antibodies appear to recognize different epitopes. KP1/CD68 is a monoclonal antibody that recognizes an antigen most likely to be present on membrane-bound lysosomes of cells derived from the monocyte/macrophages lineage.[16-18] In this study all 15 cases revealled positive staining for KP1/CD68. The grading of positive neoplastic cells varied from 1 to 3. The major staining of round cells exhibit strong and diffuse positivity for nearly 50 % of cases. The multinucleated giant cells expressed less than the round cells, however, higher than spindle cells. The most KP1/CD68 and MSA expression in spindle cells is grade 1. (Table 4) The KP1/CD68 also stains in other sarcomas but the grading of staining is vary from grade 1 to 3. (Table 5)

Table 5. The expression of panel antibodies as grading in each neoplastic cell type of other sarcomas.

No.	KP1/CD68(grade)			MSA (grade)			Desmin (grade)		
	Round	Spindle	Giant *	Round	Spindle	Giant *	Round	Spindle	Giant
1	1	1	2	2	2	2	1	1	1
2	2	2	0	3	0	0	1	0	0
3	3	3	0	3	3	3	2	2	2
4	1	1	1	1	1	0	2	2	0

Giant* = Multinucleated giant cell

Gloghini A. et al. reported the expression of KP1/CD68 antibodies in hematologic and non-hematopoitic malignancy with presumed non-histiocytic origin. These included malignant fibrous histiocytoma (79.2 %), malignant schwannoma (36.4 %), liposarcoma (33.3 %), leimyosarcoma (21.6 %), cutaneous or metastatic melanoma (69.9 %), and renal cell carcinoma (60 %). Overall, this finding support the view that among these malignant neoplasm KP1/CD68 is not specific for histiocytic differentiation and shows a wide spectrum of immunoreactivity.[19]

Another antibodies : Muscle specific actin (MSA) or Pan-muscle actin. The actin family of contractile protien, molecular weight 42 kd, has 3 subtypes. It is present in cardiac, skeletal, and smooth muscle cells.[20] Additionally, it is also demonstrated in pericyte, myoepithelial cells, and myofibroblasts.[21] Desmin has a molecular weight of 55 kd. It is a component of the cytoskeletal of cardiac, skeletal, and smooth muscle cells. Immunoreactivity has been identified in myofibroblasts,reticulum cells of the lymph node, endometrial stromal cells, fetal mesothelium, stromal cells of the kidney, and chorionic villi.[22] In this study, the spindle cell component showed focally positive for MSA in MFH but this was expressed diffusely and strongly in leiomyosarcoma. Most staining for desmin in all neoplastic cells was grade 2. The combination of MSA and desmin are highly sensitive and sensitive marker for rhabdomyosarcoma and leiomyosarcoma. Regarding to leiomyosarcoma, the sensitivity increasing from 45 % for desmin only, or from 50 % from MSA only, to 64 % for both markers. Our patient (number 4) was 75 years – old and had a retroperitoneal mass. The major expression of both round and spindle cells is grade 2. However, they also express as grade 1 for MSA and CD68. Desmin can detect about 80 to 100 % even in undifferentiated type.[23] Thus, it is a sensitive marker for rhabdomyosarcoma even in high grade lesions, as was demonstrated in this study.

Conclusion

The first important guidline for diagnosis of MFH is the integration of clinical datas with histomorphologic criteria (Enzinger and Weiss's criteria). The most furthermore convenient investigation is adjunct panel of antibodies. We would like to propose these three antibodies which consist of histocytic marker (KP1/CD68), MSA, and desmin. These three antibodies are the minimal requirement for diagnosis of MFH which is comprised of different morphology of neoplastic cells. The understanding of different expression of various antibodies in each tumor cell type is important and have to be very careful at the interpretation part. We propose that the KP1/CD68 expression pattern as grade 3 in round cells, grade 2 in multinucleated giant cells, and grade 1 for spindle cells still useful when combined with the MSA and Desmin expression. Since MSA and desmin rarely express in round and multinucleated giant cells but more expression in spindle cells. In contrary, other sarcomas (smooth and striated muscle) have strong expression for MSA and desmin. Thus, we should emphasize about the grade of expression in each cell type. If the MSA and desmin express higher than KP1/CD68, the muscle tumor should be consider. On the otherhand, if the KP1/CD68 express diffuse and stronger than MSA and desmin in round and multinucleated giant cells, the MFH should be diagnosed.

The KP1/CD68 was ever claimed to be the new specific marker for MFH. However, our study find the non-specific expression of KP1/CD68 since it also reveals in other sarcomas. Nevertheless, it still plays an important role. Finally, we insist that KP1/CD68 still useful for support the diagnosis of MFH when combined with other as panel antibodies.

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