Virchows Arch (1996) 429:301–303
© Springer-Verlag 1996

CASE REPORT

Masaharu Fukunaga · Shinichiro Ushigome
Noboru Fukunaga

Low-grade fibromyxoid sarcoma

Received: 8 February 1996 / Accepted: 22 May 1996

Abstract A low-grade fibromyxoid sarcoma arising in the thigh of a 16-year-old Japanese girl is described. The patient had a well-circumscribed mass measuring 3.5 cm in its greatest diameter within her left vastus medialis muscle and a 6-month history of pain. Microscopically, the tumour was not encapsulated and filtrated into adjacent skeletal muscle. The tumour was characterized by poor to moderate cellularity, a proliferation of bland-appearing spindle tumour cells, and alternating fibrous and myxoid areas with a whorled pattern of the tumour cells. Neither cellular atypia nor mitotic figures were observed. There was no tumour necrosis. Immunohistochemically, the tumour cells were diffusely and strongly positive for vimentin and desmin. Some cells contained alpha smooth muscle actin. They were uniformly negative for CAM5.2, epithelial membrane antigen, muscle-specific actin (HHF35), factor-VIII-related antigen, S-100 protein, neurofilament, CD34, and CD31. The tumour had a diploid DNA content with S-phase fractions of 6.6% by flow cytometry. The patient was alive with no evidence of disease 11 months after excision.

Key words Fibromyxoid sarcoma · Myxofibrosarcoma

Introduction

The first two cases of low-grade fibromyxoid sarcoma were described by Evans in 1987 [4], and a further case report appeared in 1990 [3]. This neoplasm is characterized by the combination of a remarkably bland morphology and a tendency to metastasize. Because of the limited case numbers, general acceptance of this peculiar neoplasm was slow. However, owing to the recent publication of two large series [5, 6], the clinicopathological entity has been further defined. To our knowledge, there are only 27 cases in the English literature [3–6, 9–11]. In this report, we describe a case of low-grade fibromyxoid sarcoma and discuss the main differential diagnosis and its possible histogenesis.

M. Fukunaga (✉) · S. Ushigome
Department of Pathology, The Jikei University School of Medicine, 3-25-8, Nishi-shinbashi, Minato-ku, Tokyo 105, Japan
Tel.: (81)3-3433-1111, ext. 2231, Fax: (81)3-3435-1922

N. Fukunaga
Pathology Laboratory, Yokohama Seamen's Insurance Hospital, Yokohama, Japan

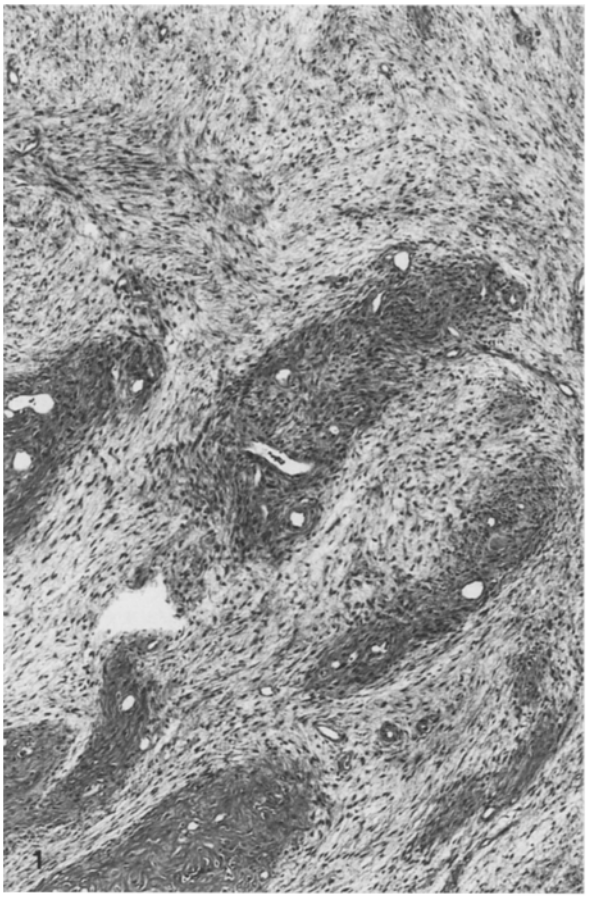
Case report

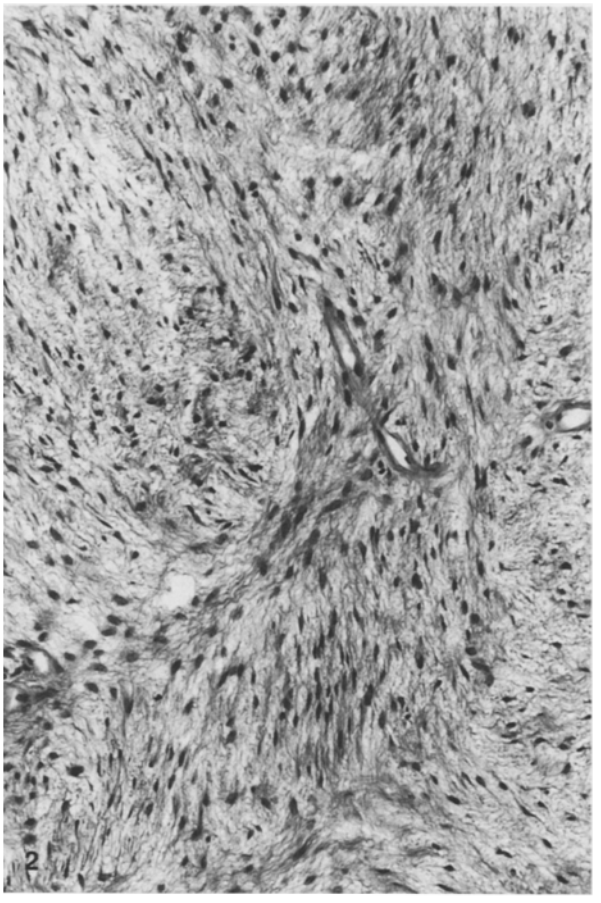
A 16-year-old Japanese girl presented with a 6-month history of pain in the distal and inside part of the left thigh. Physical examination, computed tomography scan, and ultrasound examination showed a well-circumscribed mass measured 3.5 cm in the greatest diameter within her left vastus medialis muscle. Excision was undertaken. The patient was alive with no evidence of disease 11 months after excision.

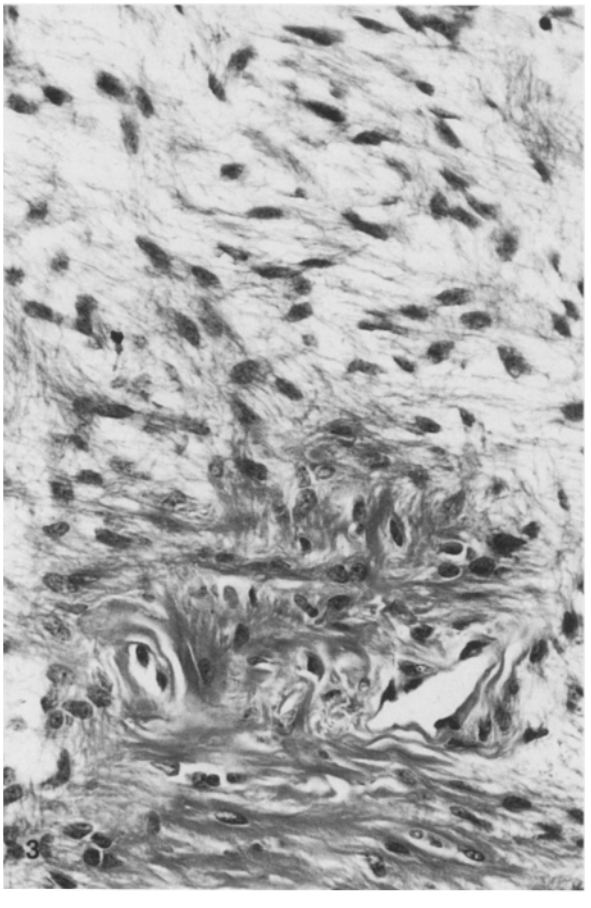
Pathological findings

Macroscopically, the excised tumour, measuring 3.5×2.5×2.0 cm, was well circumscribed and appeared as a white mass with a fibrous to myxoid cut surface. Microscopically, the tumour was not encapsulated. Relatively hypercellular areas with collagenous stroma altered with less cellular areas in which tumour cells were interspersed with myxoid stroma (Fig. 1). Vessels were relatively prominent in fibrous areas. The tumour showed predominantly haphazard, whorled or short fascicular arrangements (Fig. 2). The cells were uniform and had a benign appearance; they were spindle shaped and had fusiform or ovoid, vesicular nuclei with fine chromatin, inconspicuous nucleoli and scant indistinct cytoplasm (Fig. 3). The tumour infiltrated into adjacent skeletal muscle (Fig. 4). Neither cellular atypia nor mitotic figures were observed. The tumour cells were negative for both PAS and alcian blue staining. There was neither necrosis nor haemorrhage. Amianthoid collagen was seen focally.

Immunohistochemically, the tumour cells were diffusely and strongly positive for vimentin (Amersham, Little Chalfont, UK) and desmin (Bio-science, Em-


1


2


3

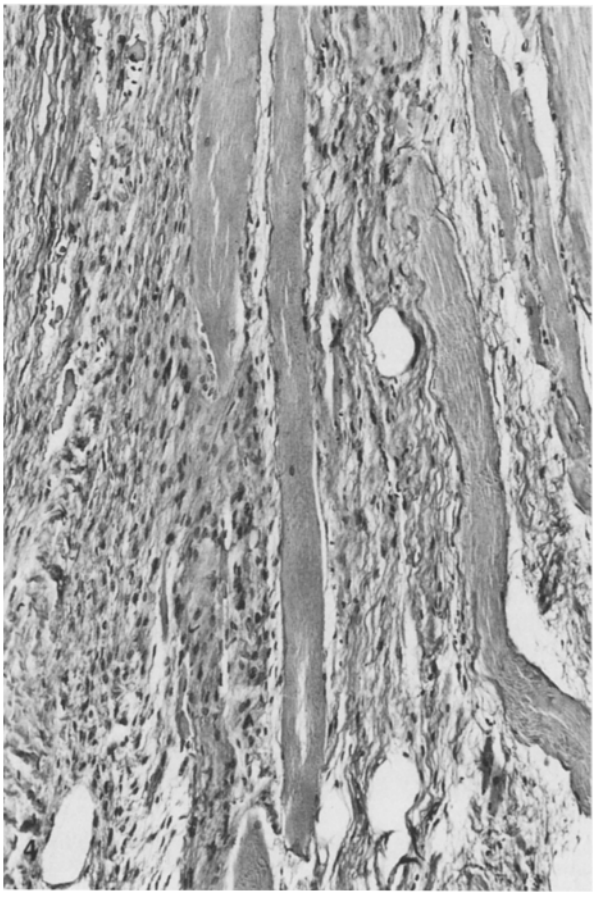

4

Fig. 1 Relatively hypercellular areas alter; in less cellular areas tumour cells are interspersed with myxoid stroma. H & E, ×40

Fig. 2 Myxoid areas with a whorled pattern of spindle tumour cells. H & E, ×100

Fig. 3 A proliferation of benign appearing spindle cells and stellate abnormal collagen deposition (*bottom*). H & E, ×400

Fig. 4 Tumour infiltrating into adjacent skeletal muscle. H & E, ×100

menbrücke, Switzerland). Some cells contained alpha smooth muscle actin (Dakopatts, Glostrup, Denmark). They were uniformly negative for CAM5.2 (Becton-Dickinson, Calif., USA), epithelial membrane antigen (Dakopatts), muscle-specific actin, or HHF35 (Enzo Diagnostics, New York, USA), factor-VIII related antigen (Dakopatts), S-100 protein (Dakopatts), neurofilament (Immunobiology Laboratory, Gunmma, Japan), CD34 (Becton-Dickinson), and CD31 (Dakopatts).

Flow-cytometric analysis using formalin-fixed, paraffin-embedded tissue blocks revealed a diploid DNA content with S-phase fractions of 6.6%. The half-peak coefficient of variation was 6.5%.

Discussion

The current case was histologically and immunohistochemically identical to the previously reported cases of low-grade fibromyxoid sarcomas [3–6, 9–11]. The classic histological features are poor to moderate cellularity, a proliferation of bland-appearing spindle tumour cells with ill-defined palely eosinophilic cytoplasm, and alternating fibrous and myxoid areas with a whorled pattern of the tumour cells. Mitotic figures are few. No defined diffeentiation is observed by light microscopy.

Our immunohistochemical study suggests that the tumour may have a fibroblastic or myofibroblastic nature. In all reported cases, the tumour cells were diffusely positive for vimentin and focal staining of muscle actin was observed in some cases [3, 5, 6, 9, 11]. One case showed diffuse and strong staining for CD34 [9]. CD34 is present in many soft tissue tumours, and its distribution appears increasingly ubiquitous. Its significance is unknown. Ultrastructurally, the morphology resembled fibroblast-like cells with abundant dilated rough endoplasmic reticulum, free ribosomes, large numbers of intermediate filaments [6, 11].

The main pathologies to be considered in the differential diagnosis include low-grade myxofibrosarcoma [1, 7, 8], myxoid liposarcoma, spindle-cell liposarcoma [2], benign and malignant peripheral nerve sheath tumours and desmoid fibromatosis. Low-grade myxofibrosarcoma differs from low-grade fibromyxoid sarcoma in that it has generally occurred in older adults, is always predominantly myxoid and composed of fusiform cells with hyperchromatic atypical nuclei, and does not metastasize [7, 8]. Low-grade fibromyxoid sarcoma lacks lipoblast and arborizing vascular vessels, which are very characteristic of myxoid liposarcoma. The absence of adipose elements will exclude the possibility of spindle-cell liposarcoma. Low-grade fibromyxoid sarcoma should be readily distinguished from benign nerve sheath tumour by classic histopathological criteria, by the absence of S-100 protein and association with any nerve, and a lesser degree of waviness of individual nuclei than in a benign nerve sheath tumour. Desmoid fibromatosis is poorly defined and shows a greater degree of cellularity, prominent fascicular proliferation, and more interstitial collagen fibres.

This tumour has a diploid DNA content with intermediate S-phase fractions by flow cytometry. Devaney et al. [3] reported a case of low-grade fibromyxoid sarcoma with lung metastasis, mentioning that the tumour had shown no evidence of an aneuploid stem line when examined by flow cytometry and image analysis. However, the result of their image analysis seems to be minimally hyperdiploid. Further cases must be studied with this technique to determine whether DNA ploidy analysis is helpful in predicting aggressive behaviour of this neoplasm. Among 27 reported cases [3–6, 9–11], 15 showed local recurrence and 9 had lung metastases. The interval to lung metastasis ranged from zero (metastases at presentation) to 45 years (median, 5 years). Four patients died of their neoplasms. Thus our patient requires a long period of close follow up.

Low-grade fibromyxoid sarcoma should be included in the differential diagnosis of spindle-cell tumours arising in the deep soft tissue in adolescents and young adults, because this tumour carries a high probability of local recurrence and a significant risk of distant metastasis.

Acknowledgements The authors thank Tae Makino, Masaki Sugimoto, Kazuya Sakurai, Keiko Iwaki, and Yukihiro Takeuchi for their technical assistance, and Michiko Takaki for preparing the photographs.

References

1. Angervall L, Kindblom LG, Merck C (1977) Myxofibrosarcoma. Acta Pathol Microbiol Scand [A] 85:127–140
2. Dei Tos AP, Mentzel T, Newman PI, Fletcher CDM (1994) Spindle cell liposarcoma, a hitherto unrecognized variant of liposarcoma. Analysis of six cases. Am J Surg Pathol 18:913–921
3. Devaney DM, Dervan P, O'neill S, Leader M (1990) Low-grade fibromyxoid sarcoma. Histopathology 17:463–479
4. Evans HL (1987) Low-grade fibromyxoid sarcoma. A report of two metastasizing neoplasms having a deceptively benign appearance. Am J Clin Pathol 88:615–619
5. Evans HL (1993) Low-grade fibromyxoid sarcoma. A report of 12 cases. Am J Surg Pathol 17:595–600
6. Goodlad JR, Mentzel T, Fletcher CDM (1995) Low grade fibromyxoid sarcoma: clinicopathological analysis of eleven new cases in support of a distinct entity. Histopathology 26:229–237
7. Mentzel T, Calonje E, Wadden C, Camplejohn RS, Beham A, Smith MA, Fletcher CDM (1996) Myxofibrosarcoma. Clinicopathologic analysis of 75 cases with emphasis on the low-grade variation. Am J Surg Pathol 20:391–405
8. Merck C, Angervall L, Kindblom LG, Oden A (1983) Myxofibrosarcoma. A malignant soft tissue tumor of fibroblastic-histiocytic origin. Acta Pathol Microbiol Scand [A] 91 [Suppl 282]:7–40
9. Nichols GE, Cooper PH (1994) Low-grade fibromyxoid sarcoma: case report and immunohistochemical study. J Cutan Pathol 21:356–362
10. Paulus W, Slowik F, Jellinger K (1991) Primary intracranial sarcomas: histopathological features of 19 cases. Histopathology 18:395–402
11. Ugai K, Kizaki T, Morimoto K, Sashikata T (1994) A case of low-grade fibromyxoid sarcoma of the thigh. Pathol Int 44:793–799