

Tomasz Górecki¹, Magdalena Ostrowska¹, Barbara Kaszuba¹, Przemysław Nowicki²,
Tomasz Dudzik², Sebastian Wojnowski²

Malignant Peripheral Nerve Sheath Tumor Originating in Neurofibroma of the Mesentery. Case Report

¹Department of Pathomorphology, District Hospital, Konin,

²General Surgery Ward, District Hospital, Konin

An 83-year-old woman was admitted to our hospital because of colicky pain under the right costal arch suggesting cholecystitis. Physical examination confirmed by ultrasound scan indicated a palpable tumor in that location. Laparotomy was performed and the tumor was removed. Histopathological examination revealed malignant peripheral nerve sheath tumor (MPNST) originating in neurofibroma of the mesentery. Macroscopic, histological and cytological features were typical for MPNST. High nuclear pleomorphism, hyperchromasia were observed but on average only two mitotic figures per high power field were seen. The growth fraction determined by Ki-67 immunoreactivity was about 30%. Immunohistochemical stains revealed positivity of individual cells for NK-1(CD57), S-100 protein and NSE. It was lack of positivity for cytokeratin, EMA, vimentin, desmin, SMA, CD34. We report a well documented case of MPNST originating in preexisting neurofibroma of the mesentery. To our knowledge, is the first case in the Polish literature.

Introduction

MPNST is a spindle cell neoplasm with features of neural differentiation with a high probability of local recurrence and distant metastases [2, 4]. The proximal upper and lower extremities and the trunk are the most common sites of the neoplasm development. Almost two-thirds of MPNST arise from neurofibromas. The second in frequency are MPNSTs arising from peripheral nerves. Usually, plexiform neurofibromas and neurofibromas of major nerves are precursors for majority of malignant peripheral nerve sheaths tumors. Approximately 50% of MPNST tumors are associated with neurofibromatosis I and 10% develop at the site of prior irradiation [1, 2].

A Case Description

An 83-year-old woman was admitted to our hospital with complaints of colicky pain under the right costal arch suggesting cholecystitis. The pain protracted before admission to hospital for several days. Physical examination confirmed by an ultrasound scan indicated a tumorous-like mass under the right costal arch (Fig.1). Laboratory tests revealed anemia. Mild fever was noted. Laparotomy was performed and the tumor of the ileal mesentery was removed. The patient's postoperative recovery was uneventful.

Pathological findings

The surgical specimen comprised a tumor faced with peritoneum 12 cm × 9 cm × 8 cm in size (310 g of the weight) and a fragment of the mesentery (Fig. 2). On gross examination two components were seen. The first one – firm, white-gray mass spreading diffusely into the mesentery was neurofibroma. Histologically, elongated, slender, spindle-shaped cells surrounded by collagen fibers were seen (Fig. 3). We found spindle-shaped cells to be positive for NK-1(CD57) (Fig. 4), S-100 protein and CD34 positive cell population at periphery of the lesion. It was lack of positivity for cytokeratin, EMA, NSE, vimentin, desmin, SMA. The second component, constituting majority of the lesion was firm, cream and grey colored mass with foci of hemorrhage and necrosis. The histological features consisted of loosely arranged interlacing fascicles of spindle cells, with light eosinophilic cytoplasm. High nuclear pleomorphism, hyperchromasia were observed but only two mitotic figures per high power field were noted. The growth fraction determined by Ki-67 immunoreactivity was about 30%. Foci of geographic necrosis were seen. Epithelioid cells, gland form-

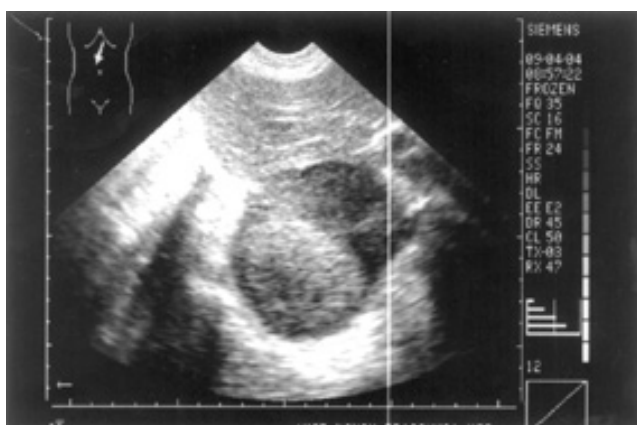


Fig. 1. Ultrasound scan of the tumor situated under the right costal arch.

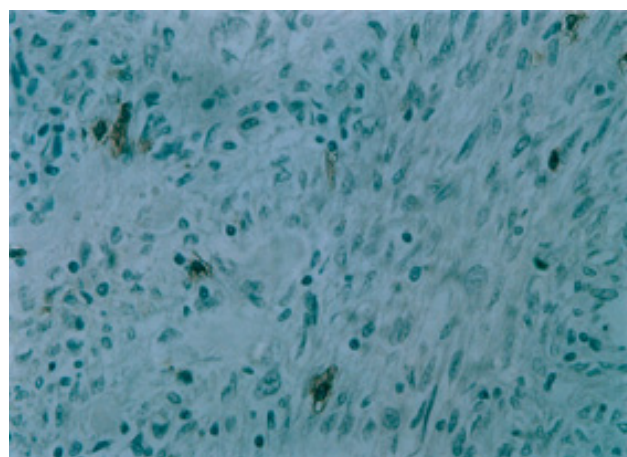


Fig. 4. Neurofibroma component – NK-1(CD57).

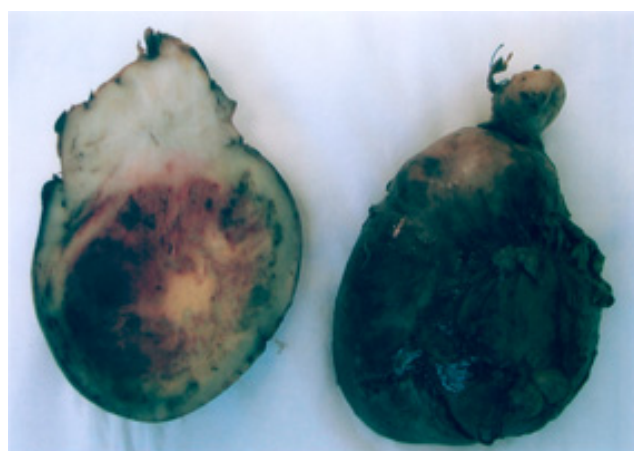


Fig. 2. Gross picture of the tumor with fragment of the mesentery.

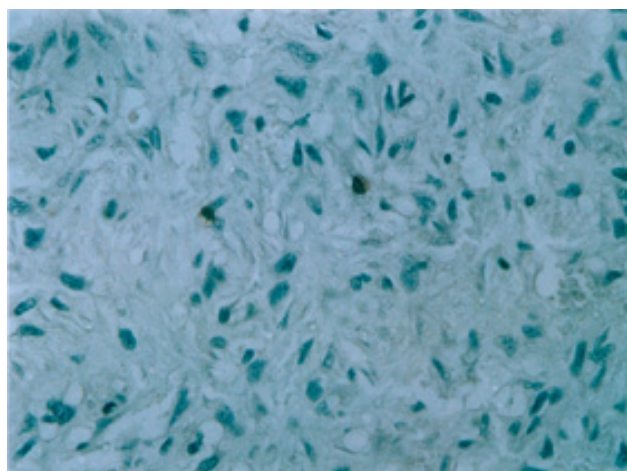


Fig. 5. MPNST component – decreased immunoreactivity for NK-1 (CD57).

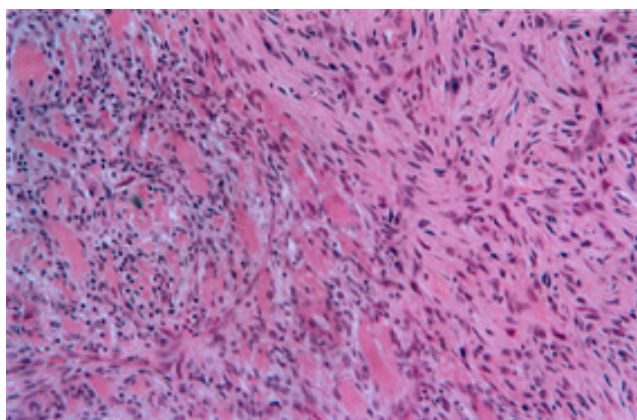


Fig. 3. Neurofibroma component and MPNST (on the right side). HE.

ing epithelium or rhabdomyosarcomatous differentiation were not revealed (Fig. 3). Immunohistochemical stains showed positivity in individual cells for NK-1(CD57) (Fig. 5), S-100 protein and NSE. It was lack of positivity for cytokeratin, EMA, vimentin, desmin, SMA and CD34.

Discussion

Neurofibroma of small nerve spreading diffusely into the surrounding tissues as precursor for MPNST is rare. Usually, plexiform neurofibroma or neurofibromas of major nerves are precursors to MPNST. Neurofibromas are common and occur either as sporadic solitary nodules unrelated to any syndrome or, far less frequently in individuals with type I neurofibromatosis. Neurofibroma presents most commonly as a cutaneous nodule or circumscribed mass in a peripheral nerve or as a plexiform enlargement of a major nerve trunk [4]. Neurofibroma of the mesentery without neurofibromatosis is extremely rare [5]. Approximately 50% of MPNST tumors are associated with neurofibromatosis I and in such situation they are characterized by higher histological grade and a very poor prognosis [1, 2, 7]. Two variants of MPNST have higher association with type I neurofibromatosis: glandular and with rhabdomyosarcomatous differentiation (Triton tumor). Epithelioid variant of MPNST shows no association with neuro-

fibromatosis [4]. The incidence of MPNST arising in type I neurofibromatosis is about 4.6% and 0.001% in the general clinic population [2]. Usually, mitotic activity in MPNST is at least 4 mitotic figures per high power field and the growth fraction determined by Ki-67 immunoreactivity is from 5% to 65% [4, 6].

MPNSTs usually show immunoreactivity for S-100, CD57, NSE but most of high-grade MPNSTs display decreased or negative reactivity to CD57 or S-100 compared with neurofibromas and the majority of low-grade MPNSTs, which display diffuse or focal reactivity for CD57 or S-100 [6, 10]. CD34 expression in MPNSTs arising within neurofibroma can be lower in the sarcomatous areas of the tumor [8, 9].

MPNST occurs predominantly in the third to sixth decades of life with the mean age of patients without neurofibromatosis 40–44 years. Neurofibromas are rarely painful and most MPNSTs are rarely antedated by symptoms before detection of mass, excluding MPNSTs that arise from major nerves typically giving pain [4].

Our report on MPNST is interesting because tumor developed in neurofibroma of a small nerve with location in the mesentery. The patient was 83-year-old woman free of type I neurofibromatosis. No more than two mitotic figures per high power field were noted. We have found CD34 positive cell population at the periphery of the neurofibromatous part of the tumor and lack of CD34 expression in MPNST part of the lesion. It was decreased reactivity for NK-1(CD 57) in sarcomatous part compared with neurofibromatous part of the lesion.

References

1. *Ducatman BS, Scheithauer BW*: Postirradiation neurofibrosarcoma. *Cancer* 1983, 51, 1028–1033.
2. *Ducatman BS, Scheithauer BW, Piepgras DG, Reiman HM, Ilstrup DM*: Malignant peripheral nerve sheath tumors. A clinicopathologic study of 120 cases. *Cancer* 1986, 57, 2006–2021.
3. *Kindblom LG, Ahlden M, Meis-Kindblom JM, Stenman G*: Immunohistochemical and molecular analysis of p53, MDM2, proliferating cell nuclear antigen and Ki67 in benign and malignant peripheral nerve sheath tumors. *Virchows Arch* 1995, 427, 19–26.
4. *Kleihues P, Cavenee WK*: Pathology and Genetics of Tumors of the Nervous System. WHO. IARC Press, Lyon 2000, pp163–174.
5. *Magro G, Piana M, Venti C, Lacagnina A, Ruggieri M*: Solitary neurofibroma of the mesentery: report of a case and review of the literature. *Pathol Res Pract* 2000, 196, 713–718.
6. *Matsunou H, Shimoda T, Kakimoto S, Yamashita H, Ishikawa E, Mukai M*: Histopathologic and immunohistochemical study of malignant tumors of peripheral nerve sheath (malignant schwannoma). *Cancer* 1985, 56, 2269–2279.
7. *Ramanathan RC, Thomas JM*: Malignant peripheral nerve sheath tumors associated with von Recklinghausen's neurofibromatosis. *Eur J Surg Oncol* 1999, 25, 190–193.
8. *Watanabe T, Oda Y, Tamiya S, Masuda K, Tsuneyoshi M*: Malignant peripheral nerve sheath tumor arising within neurofibroma. An immunohistochemical analysis in the comparison between benign and malignant components. *J Clin Pathol* 2001, 54, 631–636.
9. *Weiss SW, Nickoloff BJ*: CD-34 is expressed by a distinctive cell population in peripheral nerve, nerve sheath tumors, and related lesions. *Am J Surg Pathol* 1993, 17, 1039–1045.
10. *Zhou H, Coffin CM, Perkins SL, Tripp SR, Liew M, Viskochil DH*: Malignant peripheral nerve sheath tumor: a comparison of grade, immunophenotype, and cell cycle/growth activation marker expression in sporadic and neurofibromatosis 1-related lesions. *Am J Surg Pathol* 2003, 27, 1337–1345.

Address for correspondence and reprint requests to:

Tomasz Górecki
Department of Pathology
District Hospital
Szpitalna 45, 62-510 Konin