Primary Malignant Deciduoid Mesothelioma
A Challenging Diagnosis

Meriem Regragui, MD; Nisrine Bennani Guebessi, MD

Primary malignant deciduoid mesothelioma is a rare subtype of epithelioid mesothelioma that was first described in the peritoneum in young women without a history of asbestos exposure. It was thought to be a distinct clinicopathologic entity with ominous prognosis; recent studies have better characterized this entity. On morphology, primary malignant deciduoid mesothelioma is characterized by cytomorphologic features resembling decidualized tissue. Pleomorphism is variable. The immunoprofile is similar to other epithelioid mesotheliomas. The prognosis is the same as other epithelioid mesotheliomas and seems to depend on histological grade. (Arch Pathol Lab Med. 2019;143:531–533; doi: 10.5858/arpa.2017-0461-RS)

P

primary malignant deciduoid mesothelioma (PMDM) is an extremely rare variant of primary mesothelioma representing less than 5% of mesotheliomas.1 It was first described in 1985 by Talerman et al.2 However, the term deciduoid was first used in 1994 by Nascimento.3 This uncommon variant is characterized by cytomorphologic features resembling decidualized tissue3 and was initially thought to behave more aggressively than other epithelioid mesotheliomas.3

CLINICAL FEATURES

The first reported cases of PMDM suggested that this variant affects young women without a history of asbestos exposure and is exclusively located in the peritoneum.4 Some cases of PMDM that occurred during or after pregnancy suggested a potential role for hormonal changes.5 However, more-recent reviews showed that PMDM occurs in both sexes with a slight male predominance.6 Pleural, pericardial, and paratesticular deciduoid mesotheliomas have been described; the pleural location was more common than in the peritoneum.4 In addition, this variant has been reported in a wide age range (8–75 years) and has also been associated with asbestos exposure.1,6–8 Clinical presentation and imaging are not specific. In most cases, patients presented with abdominal distension, chest pain, and anorexia. On imaging, pleural effusion with thickening of the pleura and ascites are the most common findings. Some cases were diagnosed on autopsy.5

HISTOLOGY

Decidual morphology can be focal, predominant, or seen in the entire tumor.1,9 Cells in PMDM are large, round or polygonal, with well-defined borders. They are arranged in solid sheets, trabeculae, and pseudopapillary structures. Their cytoplasm is typically abundant, glassy, and eosinophilic. The nucleus is vesicular with prominent nucleolus.2,9,10 Binucleation and multinucleation are not uncommon.9 Nuclear pleomorphism and pseudoinclusions can be seen (Figure 1).1 The stroma is often fibrous or edematous.9 Mitotic activity varies as does the presence of abnormal mitotic figures.1 Some unusual features such as focal clear cytoplasm foamy cells; rhabdoid cells, or mucinous stroma have been reported.1

ANCILLARY STUDIES

Immunohistochemistry

The immunoprofile of PMDM is the same as other epithelioid mesotheliomas; cells usually have cytoplasmic expression for cytokeratin AE1/AE3, cytokeratin 7, and cytokeratin 5/6. Expression of cytokeratin AE1/AE3 and cytokeratin 7 is diffuse and strong. Cytokeratin 7 results were negative in only 2 reported cases.4,11 Expression of cytokeratin 5/6 is usually patchy (Figure 2). Nuclear expression of Wilms tumor 1 is usually strong. Cells also express epithelial membrane antigen, podoplanin (D2-40) (Figure 3), and mesothelin; the expression is membranous. Calretinin expression is both cytoplasmic and nuclear (Figure 4).1,12,13

Cytogenetics

Cytogenetic studies performed on patients with PMDM showed band aberrations on 1p, 12q, 17, 8q, 19, and 20,14 which are mostly chromosomal gains. Dominak et al.11 reported the first case of translocation with 2 balanced translocations: t(1p;12q) and t(16p;16p).
Electron Microscopy

On ultrastructural examination, PMDM cells show characteristic mesothelial microvilli. Electron microscopy also reveals many intermediate filaments; those filaments give a glassy eosinophilic appearance to the cytoplasm on hematoxylin-eosin slides. It also demonstrates the cytoplasmic nature of the nuclear pseudoinclusions.

DIFFERENTIAL DIAGNOSIS

Immunochemistry combined with morphology is a valuable tool for ruling out diseases in the differential diagnosis. Indeed, PMDM can be confused with a subset of tumors including carcinomas, melanoma, anaplastic large cell lymphomas, rhabdomyosarcoma, and gastrointestinal stromal tumors. A panel of 2 mesothelioma markers and 2 negative markers depending on the differential diagnosis being considered is recommended. Trophoblastic neoplasia and pseudotumoral deciduosis should also be considered in the differential diagnosis in women with peritoneal PMDM.

Pseudotumoral deciduosis is a rare, benign condition, most commonly seen in pregnant women with twins. It is associated with high progesterone levels. This condition can also be seen in postmenopausal women from adrenal secretion of progesterone. Cells in pseudotumoral deciduosis show less atypia and pleomorphism than does PMDM with no mitotic figures. Expression of estrogen and progesterone receptors and α-inhibin by decidual cells in pseudotumoral deciduosis is also discriminative because those markers are negative in PMDM. Cytokeratin, however, is not a useful marker because it can be expressed in both PMDM and pseudotumoral deciduosis.

Although a subset of mesothelioma expresses human chorionic gonadotropin, no case of human chorionic gonadotropin–positive deciduoid mesothelioma has been reported. Thus, that marker helps differentiate between PMDM and trophoblastic neoplasia. Large cells with eosinophilic cytoplasm can be seen in oxyphilic clear cell renal cell carcinomas. Positivity of PAX8, PAX2, and claudin 4 are suggestive of a renal origin. Metastatic adenocarcinomas, particularly pleomorphic lung...
carcinoma, should also be included in the differential diagnosis. Immunochemistry stain with carcinoembryonic antigen, BER-EP4/EpCAM, thyroid transcription factor 1, and napsin A combined with mesothelial markers discriminates these 2 entities.1,13

The large polygonal cells with pleomorphic nuclei seen in anaplastic large cell lymphoma can mimic deciduoid mesothelioma cells especially when they lose CD45 expression and express epithelial membrane antigen.20 Epithelial membrane antigen–positive anaplastic large cell lymphoma are usually CD30– and anaplastic lymphoma kinase–positive and show the classic anaplastic lymphoma kinase translocation t(2;5)(p23;q35) in 80% of cases.20 However, pathologists remember that a small subset of mesotheliomas has shown a positive reactivity to CD30 and that anaplastic large cell lymphomas may rarely express cytokeratin (pan).19,21

Additional markers can be tested when metastatic melanoma, rhabdomyosarcoma, or gastrointestinal stromal tumors are suspected. These include S100, human melanoma black 45, and Melan-A for metastatic melanoma; CD117 and DOG1 for gastrointestinal stromal tumors; and desmin, myogenin, and MYOD1 for rhabdomyosarcoma.1,9,13,22

CURRENT TREATMENT

Treatment of patients with PMDM is the same as treatment of other subtypes of diffuse mesothelioma and is based on cytoreductive surgery combined with chemotherapy.22,23 Cisplatin and pemetrexed are considered first-line treatment because they have shown significant survival advantage.24 Extensive debulking surgery with intraoperative chemotherapy is associated with better survival, especially in patients without lymph node metastases.7,25 Radiation therapy seems to be associated with less recurrence after surgery and could be a part of a trimodal therapy.20

PROGNOSIS

Although it was thought that PMDM behaves more aggressively than conventional epithelioid mesotheliomas, it seems that this particular variant does not have a worse outcome.1,8 However, a subgroup of PMDM showing marked pleomorphism, decreased cell cohesion, atypical mitotic figures, and high mitotic rate (>5 mitosis/10 high-power fields) seems to have a highly aggressive clinical course.3,18 Hence, grading deciduoid mesothelioma and including that grade in the pathology report may best influence patient treatment and outcome.1,13

CONCLUSIONS

We highlight a particular variant of epithelioid mesothelioma. Pathologists should be aware of this rare malignancy because high-grade PMDM can carry a poor outcome. It also can be easily confused with other neoplastic and nonneoplastic peritoneal lesions.

We thank Mehdi Karkouri, MD, head of the pathology department of Ibn Rochd University Hospital for his support.

References

1. Shia J, Erlandson RA, Klimstra DS. Deciduoid mesothelioma: a report of 5 cases and literature review. Ultrastruct Pathol. 2002;26(6):355–363.
2. Talerman A, Montero JR, Chilcote RR, Okaegaki T. Diffuse malignant peritoneal mesothelioma in a 13-year-old girl. Am J Surg Pathol. 1985;9(1):73–80.
3. Nascimento AG, Keeney GL, Fletcher CD. Deciduoid peritoneal mesothelioma. Am J Surg Pathol. 1994;18(5):439–445.
4. Ordóñez NG. Deciduoid mesothelioma: report of 21 cases with review of the literature. Mod Pathol. 2012;25(11):1481–1495.
5. Urbanczyk K, Hajduk A, Stachura J. Pregnancy-associated diffuse malignant fibrous mesothelioma of the peritoneum: immunohistochemical studies of ectopic decidual reaction and concomitant myofibroblastic and mesothelial proliferations. Pol J Pathol. 1996;47(4):233–237.
6. Sugarbaker PH, Acherman YL, Brun E. Deciduoid peritoneal mesothelioma. Contemp Surg. 2002;58(7):341–346.
7. Shanks JH, Harris M, Banerjee SS, et al. Mesotheliomas with deciduoid morphology: a morphologic spectrum and a variant not confined to young females. Am J Surg Pathol. 2000;24(2):285–294.
8. Wolff-Bar M, Dujsony T, Vlodavsky I, et al. An 8-year-old child with malignant deciduoid mesothelioma of the abdomen: report of a case and a review of the literature. Pediatr Dev Pathol. 2015;18(4):327–330.
9. Ustun H, Astari HM, Sungu N, Ozdemir A, Ekinici C. Primary malignant deciduoid peritoneal mesothelioma: a report of the cytohistological and immunohistochemical appearances. Diagn Cytopathol. 2011;39(6):402–408.
10. Datta S, Kane S, Bhasker S, Kulkarni JN, Somas CS. Malignant peritoneal mesothelioma deciduoid or anaplastic variant: point to ponder. Indian J Pathol Microbiol. 2004;44(2):159–162.
11. Dominiak N, Graybill W, Gunning W III, Richardson MS, Spruill LS. Peritoneal deciduoid mesothelioma: an unusual presentation complicating an already challenging diagnosis. Int J Surg Pathol. 2017;25(4):352–356.
12. Ordóñez NG. Epithelial mesothelioma with deciduoid features: report of four cases. Am J Surg Pathol. 2000;24(6):816–823.
13. Husain AN, Colby TV, Ordóñez NG, et al. Guidelines for pathologic diagnosis of malignant mesothelioma: 2017 update of the consensus statement from the international mesothelioma interest group. Arch Pathol Lab Med. 2018;142(1):89–108.
14. Scattone A, Pennella A, Gentile M, et al. Comparative genomic hybridization in malignant deciduoid mesothelioma. J Clin Pathol. 2006;59(7):764–769.
15. Adhikani LJ, Shen R. Florid diffuse peritoneal deciduosis mimicking carcinoma in a primigravida patient: a case report and review of the literature. Int J Clin Exp Pathol. 2013;6(11):2615.
16. Buttnner A, Bässler R, Theele GH. Pregnancy-associated ectopic decidual decidua (deciduosis) of the greater omentum: an analysis of 60 biopsies with cases of fibrosing deciduosis and leiomyomatosis peritonealis disseminata. Pathology Res Pract. 1993;189(3):352–359.
17. Heatley MK, Maxwell P, Toner PG. The immunophenotype of human decidua and extra-uterine decidual reactions. Histopathology. 1996;29(5):437–442.
18. Okamoto H, Matsuno Y, Noguchi M, et al. Malignant pleural mesothelioma producing human chorionic gonadotropin: report of two cases. Am J Surg Pathol. 1992;16(10):969–974.
19. Galateau-Sallé F, ed. Pathology of Malignant Mesothelioma. London, England: Springer Science & Business Media; 2010:179.
20. Morris SW, Kirstein MN, Valentine MB, et al. Fusion of a kinase gene, ALK, to a nuclear protein gene, NPM, in non-Hodgkin’s lymphoma [published correction appears in Science. 1995;267(5206):316–317]. Science. 1994; 263(5151):1281–1284.
21. Zhang Q, Ming J, Zhang S, Li B, Han X, Qiu X. Cytokeratin positivity in anaplastic large cell lymphoma: a potential diagnostic pitfall in misdiagnosis of metastatic carcinoma. Int J Clin Exp Pathol. 2013;6(4):796–801.
22. Khmou M, Echcharfi S, Kabbaj R, El Khamoussy B. Malignant deciduoid mesothelioma: case presentation of an exceptional variant and review of the literature. BMC Clin Pathol. 2017;17(1):13.
23. Hassan R, Alexander R. Nonpleural mesotheliomas: mesothelioma of the peritoneum, tunica vaginalis, and pericardium. Hematol Oncol Clin North Am. 2005;19(6):1067–1087.
24. Vogelzang NJ, Rusthoven JJ, Symanowski J, et al. Phase III study of pemetrexed in combination with cisplatin versus cisplatin alone in patients with malignant pleural mesothelioma. J Clin Oncol. 2003;21(14):2636–2644.