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Case Report

Primary Peritoneal Mesothelioma Affecting the Greater Omentum That Mimicked an Omental Infarction: A Case Report

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Keywords
Malignant peritoneal mesothelioma · Peritoneal carcinomatosis · Asbestos exposure · Ascites · Omental infarction

Abstract
Introduction: Malignant peritoneal mesothelioma (MPM) is a rare cancer that is associated with asbestos exposure. The diagnosis can be difficult given the nonspecific nature of presenting symptoms and the presence of concomitant confounding findings. ***Case Presentation:*** We report a 71-year-old male who presented with right lower quadrant pain and new-onset ascites. CT imaging of the abdomen/pelvis demonstrated omental stranding concerning for a possible omental infarction. Subsequent imaging showed persistent omental edema but no identifiable soft tissue mass. A biopsy of the omentum showed atypical mesothelial proliferation, but pathology was unable to determine if proliferation was a neoplastic versus reactive process. Surgical oncology performed a diagnostic laparoscopy that showed peritoneal studding of the omentum. Subsequent immunohistochemical staining of the omentum demonstrated preservation of BAP1 expression and loss of MTAP expression, consistent with peritoneal mesothelioma. ***Conclusion:*** MPM is a rare and aggressive cancer with an overall poor prognosis. The diagnosis of MPM can be difficult based on the nonspecific clinical presentation, insufficient imaging and laboratory testing, and the presence of concomitant confounding findings, such as with this patient and his admitting diagnosis of omental infarction. This case demonstrates the importance of developing a broad differential while maintaining an awareness of heuristics that can influence clinical decision-making.

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Introduction/Background

Mesothelioma is a malignant neoplasm of mesothelial cells that line serosal surfaces, including the pleura (65–70%), peritoneum (30%), tunica vaginalis, and pericardium (1–2%) [1, 2]. Malignant peritoneal mesothelioma (MPM) is a rare diagnosis. Of the approximate 3,300 cases of mesothelioma diagnosed annually in the USA, only 10–15% affect the peritoneum [3]. While the predominance of male gender has been established for pleural mesothelioma, the prevalence of MPM is equal for males and females in the USA [3, 4]. Mesothelioma has classically been linked to asbestos exposure. However, whereas 80% of pleural mesothelioma cases are linked to asbestos, only 20–50% of MPM cases have reported prior asbestos exposure [1, 5]. Recognizing asbestos exposure is complicated by an estimated latency period as 20–40 years between exposure and the development of mesothelioma [3]. MPM often presents within the 5th to 6th decade of life, slightly earlier than patients with pleural mesothelioma that present within the 7th decade [5]. Initial clinical manifestations of MPM include abdominal distention, abdominal pain that is diffuse and non-localized, ascites, anorexia, and weight loss [1, 4]. Given the lack of symptom specificity, the average time from onset of symptoms to diagnosis is approximately 4–5 months [1]. Overall, MPM has a poor prognosis with an overall median survival time of 8 months [6].

Objectives

The objective of the study was to discuss the diagnostic complexity in a patient with MPM who presented with nonspecific symptoms and a confounding prior diagnosis of omental infarction.

Case Report

The patient was a 71-year-old male with a past medical history of trigeminal neuralgia, open angle glaucoma, gout, and irritable bowel disease who initially presented to his PCP with a chief complaint of right lower quadrant pain concerning for possible constipation versus urinary tract infection. After symptoms failed to improve, the patient presented to the ED where a CT of the abdomen/pelvis showed omental stranding, greatest in the right lower quadrant concerning for an omental infarction. The patient was discharged home but returned 12 days later and was admitted for evaluation of abdominal pain and new-onset ascites. During this admission, a repeat CT of the abdomen/pelvis showed mesenteric and omental edema but no definite soft tissue masses (Fig. 1). Gastroenterology performed an EGD that showed Schatzki's ring within the esophagus but otherwise unremarkable findings. Additionally, the patient's prior colonoscopy from the same year was significant for removal of 5 pedunculated polyps, each less than 10 mm in size. Physical examination showed a mildly distended and tender abdomen predominantly over the right lower quadrant. Subsequent ascitic fluid studies were significant for a SAAG score less than 1.1 with negative cytology for malignant cells. The patient continued to have recurrent hospitalizations and eventually underwent an omental biopsy that was significant for fibrotic adipose tissue with chronic inflammation and mesothelial proliferation with mild atypia. Unfortunately, it was not possible to determine whether the mesothelial cells were reactive or neoplastic in nature based on tissue sample size. The patient was referred to surgical oncology who performed diagnostic laparoscopy that showed peritoneal studding with multiple small masses of the omentum. A 3 cm piece of omentum was obtained and sent for pathology significant for the following:

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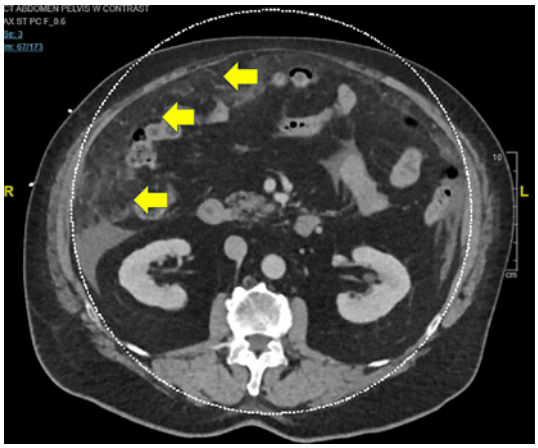

Fig. 1. CT abdomen/pelvis showing omental stranding and edema (yellow arrows).

Histologic sections of the omental biopsy demonstrate adipose tissue fragments with a proliferation of mesothelial cells along the surface and the dividing septa associate with acute inflammatory cells. The identified mesothelial cells were positive for keratin, CK7, WT1, calretinin, and CK5/6 and negative for CK20 as expected. The mesothelial cells show an intact expression of BRCA-1 associated protein (BAP1) and keratin-positive mesothelial cells (Fig. 2) with methylthioadenosine phosphorylase (MTAP) expression loss (Fig. 3), concerning for MPM.

Significant laboratories obtained during this interim included an elevated CRP (154.3), elevated ESR (98), elevated GGTP (443), elevated CA 125 (100.2), negative CA 19-9, normal CEA (1.1), and negative Quantiferon Gold testing for TB. Further review of the patient's history revealed asbestos exposure through employment at a lumber mill when he was 20 years old. The patient also reported restoration of convenience stores, one of which was built prior to 1980. Given these findings, the patient ultimately followed up with hematology/oncology clinic for treatment with heated intra-operative peritoneal chemotherapy. It should be noted that the authors for this case report have completed the CARE Checklist, which is attached as supplementary material (for all online suppl. material, see https://doi.org/10.1159/000538991).

Discussion

This case of primary peritoneal mesothelioma is noteworthy for several reasons, especially regarding the diagnostic challenge even after serologic and histologic work-up was performed. Given that initial presenting symptoms are nonspecific, the diagnosis of MPM is difficult and requires a high degree of clinical suspicion. Our patient's initial clinical picture was confounded by his admitting CT, which was believed to have shown an omental infarction. We were only able to review one similar case in the literature that described a 54-year-old Korean male with new-onset ascites and abdominal pain with MPM that mimicked an omental infarction [7]. To some degree, the initial diagnosis of an omental infarction served as an anchoring heuristic given the lack of specific findings with subsequent serologic studies, ascitic fluid studies, and even the initial core biopsy, which could not definitively rule out a reactive process in the setting of a presumed omental infarction.

Although routine laboratories cannot establish a diagnosis of MPM, potentially helpful tumor markers include serum mesothelin-related protein, CA 125, CA 15-3, hyaluronic acid, and osteopontin [8]. Peritoneal fluid studies for malignant cells have also been shown to be

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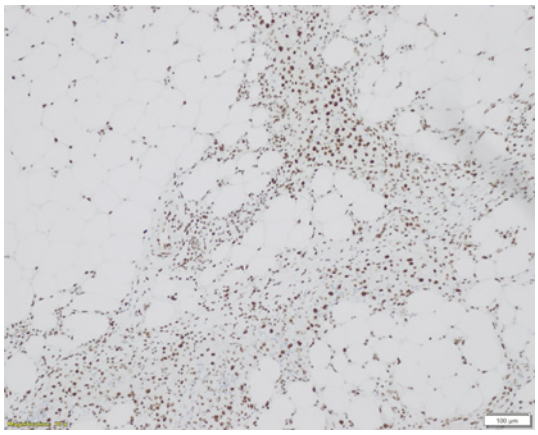

Fig. 2. Omental biopsy showing intact BAP1 expression of mesothelial cells. Magnification ×10.

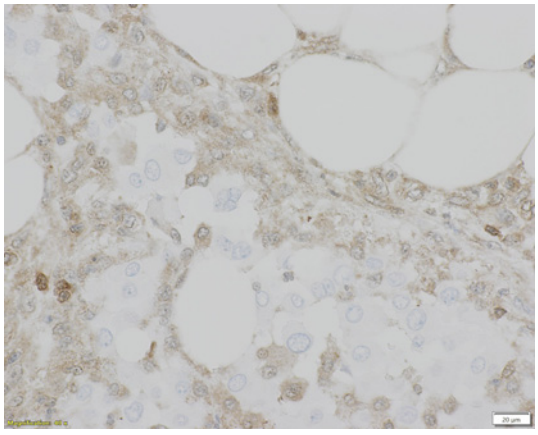

Fig. 3. Omental biopsy showing loss of MTAP expression of mesothelial cells. Magnification ×40.

unreliable [9]. Our patient had similar results with serial negative ascitic fluid studies and an elevated CA 125, which was not initially checked by our team due to low suspicion for cancer. However, we reviewed a study that showed serial maker measurements for CA 125 paralleled tumor growth and regression after cytoreductive surgery and intraperitoneal hyperthermic perfusion [10]. Therefore, we believe obtaining a CA 125 is beneficial and may assist in prognostication.

Regarding imaging, CT may be useful for core-needle or laparoscopic biopsy, but there are no specific CT findings that can distinguish MPM from other tumors [9]. Previously, immunohistochemical staining for the purpose of differentiating between mesothelial cells and mesothelioma was of limited utility. However, Lynggard et al. [11] recently described in 2022 how the loss of cytologic markers BRCA-1 associated protein (BAP1) and/or methylthionadenosine phosphorylase (MTAP) was highly sensitive (78.9 and 80.2% respectively) and specific (100% in both histopathologic groups) in differentiating mesothelioma from reactive mesothelial proliferations. This was the case for our patient whose immunohistochemical staining showed intact expression of BAP1, but a loss of MTAP, thus confirming the diagnosis of MPM.

Finally, the diagnosis of peritoneal mesothelioma is rare with only a few hundred cases per year within the USA. Epidemiological data over time have shown that the incidence of mesothelioma among males peaked in the early to mid-1990s and have remained constant and in relative decline [12]. This decline is likely secondary to low asbestos exposure rates within industrial and domestic settings, which historically has been associated with the

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development of mesothelioma. However, data projections from the Surveillance, Epidemiology, and End Results (SEER) database estimate that approximately by 2040, all cases of mesothelioma will be due to spontaneous tumor formation rather than asbestos exposure [13]. These data also estimate that approximately 15,000 cases of peritoneal mesothelioma will be diagnosed between 2005 and 2050 [12]. Based on these data projections, clinicians are witnessing the vestiges of asbestos-related mesotheliomas during this interim.

Conclusion

In conclusion, MPM is a rare and aggressive cancer with an overall poor prognosis. The diagnosis of MPM is difficult based on nonspecific clinical presentation, insufficient imaging and laboratory testing, and overall weaker association with asbestos. If clinical suspicion is strong, we recommend early surgical consultation for biopsy with subsequent immunohistochemical staining for confirmatory diagnosis.

Statement of Ethics

The authors of this paper maintain their professional and academic integrity throughout the process of composing this manuscript. This retrospective review of patient data did not require ethical approval in accordance with local/national guidelines. Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images.

Conflict of Interest Statement

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements) or non-financial interest (such as personal or professional relationships, affiliations, knowledge, or beliefs) in the subject matter or materials discussed in this manuscript.

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Author Contributions

Each physician contributed to the manuscript as follows: Dr. Giang (background), Dr. Wahab (case report), Dr. Yakubik (discussion), Dr. Cravero (general editor, abstract, and discussion). Dr. Lopez is faculty staff in pathology and assisted with the pathologic slides and descriptions. Dr. Newman was the attending staff who oversaw all aspects of the paper.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

References

1 Alessio B, Padoan I, Mencarelli R, Frego M. Peritoneal mesothelioma: a review. Medscape Gen Med. 2007; 9(2):32.
2 Ahmed I, Ahmed Tipu S, Ishtiaq S. Malignant mesothelioma. Pak J Med Sci. 2013;29(6):1433–8. https://doi.org/10.12669/pjms.296.3938.
3 Alexander HR, Tanabe KK. Malignant peritoneal mesothelioma: Epidemiology, risk factors, clinical presentation, diagnosis, and staging [Internet]. UpToDate; 2023. [cited 2023 Jul 6]. Available from: https://www.uptodate.com/contents/malignant-peritoneal-mesothelioma-epidemiology-risk-factors-clinical-presentation-diagnosis-and-staging.
4 Kim J, Bhagwandin S, Labow DM. Malignant peritoneal mesothelioma: a review. Ann Transl Med. 2017;5(11): 236. https://doi.org/10.21037/atm.2017.03.96.
5 Thomas A, Chen Y, Yu T, Gill A, Prasad V. Distinctive clinical characteristics of malignant mesothelioma in young patients. Oncotarget. 2015;6(18):16766–73. https://doi.org/10.18632/oncotarget.4414.
6 Rodríguez D, Cheung MC, Housri N, Koniaris LG. Malignant abdominal mesothelioma: defining the role of surgery. J Surg Oncol. 2009;99(1):51–7. https://doi.org/10.1002/jso.21167.
7 Shin MK, Lee OJ, Ha CY, Min HJ, Kim TH. Malignant mesothelioma of the greater omentum mimicking omental infarction: a case report. World J Gastroenterol. 2009;15(38):4856–9. https://doi.org/10.3748/wjg.15.4856.
8 Chua TC, Yan TD, Morris DL. Surgical biology for the clinician: peritoneal mesothelioma: current understanding and management. Can J Surg. 2009;52(1):59–64.
9 Kuribayashi K, Kitajima K, Minami T, Ikeda M, Yamakado K, Kijima T. Malignant peritoneal mesothelioma features shown by FDG-PET/CT. Cancer Diagn Progn. 2022;2(6):654–60. https://doi.org/10.21873/cdp.10156.
10 Kaya H, Sezgi C, Tanrikulu AC, Taylan M, Abakay O, Sen HS, et al. Prognostic factors influencing survival in 35 patients with malignant peritoneal mesothelioma. Neoplasma. 2014;61(4):433–8. https://doi.org/10.4149/neo_2014_053.
11 Lynggård LA, Panou V, Szejniuk W, Røe D, Meristoudis C. Diagnostic capacity of BAP1 and MTAP in cytology from effusions and biopsy in mesothelioma. J Am Soc Cytopathol. 2022;11(6):385–93. https://doi.org/10.1016/j.jasc.2022.07.003.
12 Moolgavkar SH, Meza R, Turim J. Pleural and peritoneal mesotheliomas in SEER: age effects and temporal trends, 1973-2005. Cancer Causes Control. 2009;20(6):935–44. https://doi.org/10.1007/s10552-009-9328-9.
13 Price B. Projection of future numbers of mesothelioma cases in the US and the increasing prevalence of background cases: an update based on SEER data for 1975 through 2018. Crit Rev Toxicol. 2022;52(4): 317–24. https://doi.org/10.1080/10408444.2022.2082919.