Case Report

Splenic metastasis from neuroendocrine tumor of the stomach: A case report✩,☆,☆

Sanae Sninatea,*, Soukaina Allioud, Mohamed Tboudab, Sawssan Razinec, Hounayda Jerguigued, Rachida Latiba, Youssef Omorda

a Radiology Department, National Institute of Oncology, Mohammed V University in Rabat, Rabat, Morocco
b Department of Anatomopathology, Military Hospital Mohamed V of Rabat, Faculty of Medicine and Pharmacy of Rabat, Mohammed V University in Rabat, Morocco
c Department of oncology, national institute of oncology, Rabat, Morocco

doi:10.1016/j.radcr.2021.08.033

ARTICLE INFO

Article history:
Received 31 May 2021
Revised 9 August 2021
Accepted 11 August 2021

Keywords:
Neuroendocrine tumor of the stomach
Splenic metastasis
Imaging

ABSTRACT

Splenic metastasis is extremely rare, and neuroendocrine tumor of the stomach represents one of the rarest primary sources. The present study aimed to describe a rare case of an endocrine tumor of the stomach revealed by a splenic metastasis.

We report a rare case of a 40-year-old woman who presented a pain in her left hypochondriac, associated to sensation of heaviness. Abdominal ultrasound showed splenomegaly with a large lobulated hyperechoic mass associated to splenic vein thrombosis. A magnetic resonance imaging (MRI) confirming the splenomegaly, containing a large lobulated and heterogeneous mass occupying the almost totality of this organ and invading the venous system. The histological study of this splenic mass demonstrated to secondary splenic location of a grade 1 neuroendocrine tumor. As part of an investigation for a primary tumor, fibroscopy was performed and revealed an ulcerating-bourging fundic process with a histological study in favor of a grade 1 neuroendocrine tumor.

© 2021 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)

Introduction

The spleen is a rare location of metastasis from solid tumors. The most frequent primary tumors causing splenic metastases are melanoma, breast cancer, ovary, lung and Colo-rectal carcinoma respectively by order of decreasing frequency. Among the uncommon primary sources of splenic metastases there is neuroendocrine tumor. We report a rare case of an endocrine tumor of the stomach revealed by a splenic metastasis.

Case report

A 40-year-old woman, with fourteen months of pain in her left hypochondriac, associated to sensation of heaviness. A

✩ Competing Interests: No conflict of interest
☆☆ Patient Consent: The patient declares his consent for the production of his case
* Corresponding author.
E-mail address: sninate.sanae@gmail.com (S. Sninate).
https://doi.org/10.1016/j.radcr.2021.08.033
1930-0433/© 2021 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/)
palpable and painful abdominal mass was noted on examination in the same region. Abdominal ultrasound showed splenomegaly with a large lobulated hyperechoic mass (13 cm dimension) associated to splenic vein thrombosis. Abdominal Computed tomography (CT) scan could not be performed because of the patient’s allergy to iodine. A magnetic resonance imaging (MRI) was accomplished confirming the splenomegaly, which measured about 13 cm in longitudinal splenic axis, containing a large lobulated and heterogeneous mass occupying the almost totality of this organ and invading the venous system (splenic vein and splenomesenteric vein confluence). The rest of abdominal structures were without abnormality. An ultrasound guided percutaneous biopsy of the mass concluded to secondary splenic location of a grade 1 neuroendocrine tumor. (Fig 2) Among the explorations carried out in search of a primary tumor, a fibroscopy with biopsy that has objectified an ulcerative-bourgeoning fundi process with a histological study in favor of a grade 1 neuroendocrine tumor. The patient underwent a spleno-pancreatectomy with partial gastrectomy.

**Discussion**

Neuroendocrine tumors of the gastroenteropancreatic system are rare and originate from a diffuse endocrine system located in the gastrointestinal tract and the pancreas with extremely variable clinical manifestations [1]. Neuroendocrine tumors (NETs) of the stomach comprise less than 1% of gastric neoplasms [2].

Gastrointestinal neuroendocrine tumors have a higher risk of developing metastasis, which are present in approximately 50 to 65% of patients at diagnosis [3]. With the availability of new treatment modalities, long-term survival has been noted, even in patients with metastases.

Solitary splenic metastases are very unusual. The pathogenesis of metastases in the spleen may be related to an arterial origin, but it may be from tumor thrombi in the splenic vein [4].

Although the spleen is the most vascular organ in the body, it is an infrequent site of tumor metastasis. The reasons for the low incidence of splenic metastases are not understood. There are mechanical factors that can limit the implantation of cells (angle of the splenic artery and contraction of the organ) and also microenvironmental factors (absence of afferent lymphatics and local anti-tumor activity) that inhibit the growth of metastatic cells. [5]. In a recent study including 6,137 patients with metastases malignant tumors, only 59 (0.96%) have splenic involvement [6].

Splenic metastasis of solid tumors is most often seen with extensive multivisceral metastatic disease from breast, lung, ovarian, gastric, and melanoma [7].

Despite an extensive search of the literature including multiple databases (keywords “spleen”, “metastasis”, “neuroendocrine”), there are no reports of patients with metastases to the spleen from neuroendocrine tumors (NETs) of the stomach.
In a study of unusual locations of metastases of neuroendocrine tumors, no metastatic lesions to the spleen were reported [8]. Metastases to the spleen have been reported for bronchial carcinoid tumors [6]. The spleen has been reported to be involved with neuroendocrine tumors of the pancreas, including a tumor thrombus in the splenic vein without a mass in the spleen [9] and as a splenic mass from direct extension and gastric varices [10].

In most of the cases, splenic metastases are diagnosed incidentally in asymptomatic patients. However, splenic metastases, especially the isolated ones, may also occur in association with non-specific clinical manifestations, such as fatigue, weight loss and fever; anemia or thrombocytopenia caused by hypersplenism; pain in the left upper abdominal quadrant; splenomegaly or spontaneous splenic rupture [11],[12]. Symptomatic lesions are more frequently reported in women and in younger patients, and the mean maximum size of the lesions in these patients is usually larger than in asymptomatic patients [11].

Imaging has an important role in localizing the primary tumor and identifying metastatic sites. CT and MRI findings are often characterized as hyper vascular, solid, enhanced mass lesion. Contrast-enhanced CT and MRI are the key imaging modalities. Arterial encasement is more readily visible on the arterial phase, and venous involvement (superior mesenteric vein, portal vein, and splenic vein) is better evaluated in the portal venous phase. Although uncommon, enhancing tumor thrombus in the splenic, mesenteric or portal vein is highly specific for NET.

Splenectomy for splenic secondary lesions is indicated in cases of painful splenomegaly and in cases of isolated metastasis to the spleen. It also can be done to prevent complications such as thrombosis of the splenic vein or a splenic rupture [3].

Conclusion

According to the literature reviewed, splenic metastasis are rare from (NETs) of the stomach. Imaging plays an important role in the diagnostic approach of the tumor, evaluating the relationship of the tumor with vascular structures, especially the invasion of the splenic, mesenteric or portal veins, which is specific to NETs. And also, in carrying out biopsies for a possible histological study.
REFERENCES

[1] Massironi S, Sciola V, Peracchi M, Ciafardini C, Spampatti MP, Conte D. Neuroendocrine tumors of the gastro-entero-pancreatic system. World J Gastroenterol 2008;14:5377–84.

[2] Modlin IM, Kidd M, Latich I, et al. Current status of gastrointestinal carcinoids. Gastroenterology 2005;128:1717–51 [PubMed] [Google Scholar].

[3] Ando K, Kaneko N, Yi L, Sato C, Yasui D, Inoue K, et al. Splenic metastasis of lung cancer. Nihon Kokyuki Gakkai Zasshi 2009;47:581–4.

[4] Sakuma Y, Yasuda Y, Sata N, Hosoya Y, Shimizu A, Fuji H, et al. Pancreatic neuroendocrine tumor with metastasis to the spleen: a case report. BMC Cancer 2017;17(1):1–6.

[5] Comperat E, Bardier-Dupas A, Camparo P, Capron F, Charlotte F. Splenic metastases: clinicopathologic presentation, differential diagnosis and pathogenesis. Arch Pathol Lab Med 2007;131:965–9.

[6] Balmforth D, Skouras C, Palazzo F, Zacharakis E. Laparoscopic management for carcinoid metastases to the spleen. HPB Surg 2011:346507.

[7] Lam KY. Metastatic tumors to the spleen: a 25-year clinicopathologic study. Archives of Pathology & Laboratory Medicine 2000;124:526–30.

[8] Naswa N, Sharma P, Kumar R, Malhotra A, Bal C. Usual and unusual neuroendocrine tumor metastases on 68Ga-DOTANOC PET/CT. Clin Nuc Med 2013;38:e239–45.

[9] Rodriguez R, Overton H, Morris KT. Pancreatic neuroendocrine tumor with splenic vein tumor thrombus: a case report. Int J Surg Case Rep 2014;5:1271–4.

[10] Shah SA, Amarapurkar AD, Prabhu SR, Kumar V, Gangurde GK, Joshi R. Splenic mass and isolated gastric varices: A rare presentation of a neuroendocrine tumor of the pancreas. J Pancreas 2010;11:444–5.

[11] Lam KY, Tang V. Metastatic tumors to the spleen: a 25-year clinicopathologicstudy. Arch Pathol Lab Med 2000;124:526–30.

[12] Peters AM. Why the spleen is a very rare site for metastases from epithelial cancers. Med Hypotheses 2012;78:26–8.