

“SPLENIC METASTASIS SECONDARY TO SIGMOID COLON CARCINOMA: A CASE REPORT AND LITERATURE REVIEW”

Kabita Chaudhary¹, Sunil Basukala², Milan Neupane³, Bibek Bhulan¹, Kaushal Malla¹, Nabaraj Bhugai³, Kala Shrestha³, and Kunda Shah²

¹Nepalese Army Institute of Health Sciences College of Medicine

²Shree Birendra Hospital

³Nepalese Army Institute of Health Sciences

April 25, 2023

INTRODUCTION:

Spleen is an unusual site of metastasis. and is usually a sign of extensive disease. Splenic metastases from solid tumors, like colon cancers, are considered exceptional (1). The most common primary sources of splenic metastasis in cases of multi -visceral cancer are breast, lung, colorectal, melanoma and ovarian carcinomas and colorectal and ovarian carcinomas in cases of solitary splenic lesion (2,3). Berge reported that the incidence of splenic metastasis from colon and rectal carcinomas as 4.4% and 1.6%, respectively (4).

It is still uncertain whether the rarity of splenic metastasis is due to the splenic immunological functions or the characteristic splenic anatomical position and its bloodstream state. The rarity of splenic metastasis from other organs may be due to the histological peculiarity of splenic sinusoidal architecture and the absence of splenic afferent lymphatics (5). The prevalence of splenic metastasis, although very low, is increasing nowadays with the improvement of imaging technology (6).

Studies have shown that splenectomy followed by adjuvant chemotherapy can improve survival in patients with spleen metastasis from colorectal cancer (7).When left untreated , spleen metastasis can lead to the rupture of the spleen, which can be life threatening. Interval survival following splenectomy ranged from 3 to 84 months, with a mean of 22.5 months (6).It was found that patients who received adjuvant chemotherapy after splenectomy had better survival rates than those who did not.

This case report has been reported according to the SCARE 2020 guidelines (8).

CASE PRESENTATION:

A 71-year-old ex-serviceman was referred to the Department of Surgery from the Department of Oncology with a history of splenic metastasis secondary to colorectal carcinoma. During the initial visit to our hospital two years ago, he presented with complaints of no passage of stool and flatus, abdominal pain, and tenderness, consistent with peritonitis, which had persisted for three days. Immediate resuscitation and investigations were performed, including a computed tomography (CT) scan that revealed an obstructing growth in the sigmoid colon.

Given the patient’s clinical presentation of abdominal pain and tenderness, suggestive of peritonitis, he underwent emergency laparotomy, during which a sigmoid mass was excised, and a loop ileostomy was performed. The postoperative recovery was uneventful. Histopathological examination of the specimen revealed a well-differentiated adenocarcinoma of the sigmoid, perforating the serosa (pT4), with perineural

invasion. The margins were negative, and four out of the 16 lymph nodes were involved, leading to the classification of the tumor as stage III (pT4bN1b, AJCC). The patient subsequently underwent ileostomy reversal two months after the surgery. The patient was discharged and referred to the Department of Oncomedicine for adjuvant chemotherapy.

Two years later, a follow-up CT scan found metastasis in the spleen. PET CT of the whole body with contrast revealed splenic metastasis with multiple FDG avid hypodense lesions, the largest measuring 6.6X4.3 cm with an SUV max of 6.1 cm **Fig1** . However, no recurrence was detected along the anastomotic site in the sigmoid, and no bony or bone marrow lesions were found. Any other remote organ metastases were not found by both CT and PET scanning. Clinical examination did not reveal any palpable spleen, and the patient subsequently underwent laparoscopic splenectomy **Fig 2** . The surgical findings in this case indicate that the metastatic tumor was localized to the spleen without any capsule invasion macroscopically. There were also no metastases detected in other intra-abdominal organs or lymph nodes at splenic hilus or para-aortic site. Therefore, lymphadenectomy was not performed during the operation. The postoperative period was uneventful, and post-splenectomy vaccination and antibiotics were initiated. Histopathological report revealed metastatic adenocarcinoma with no capsule invasion **Fig 3** . Adjuvant chemotherapy was started, and at the one-month follow-up, the patient was doing well.

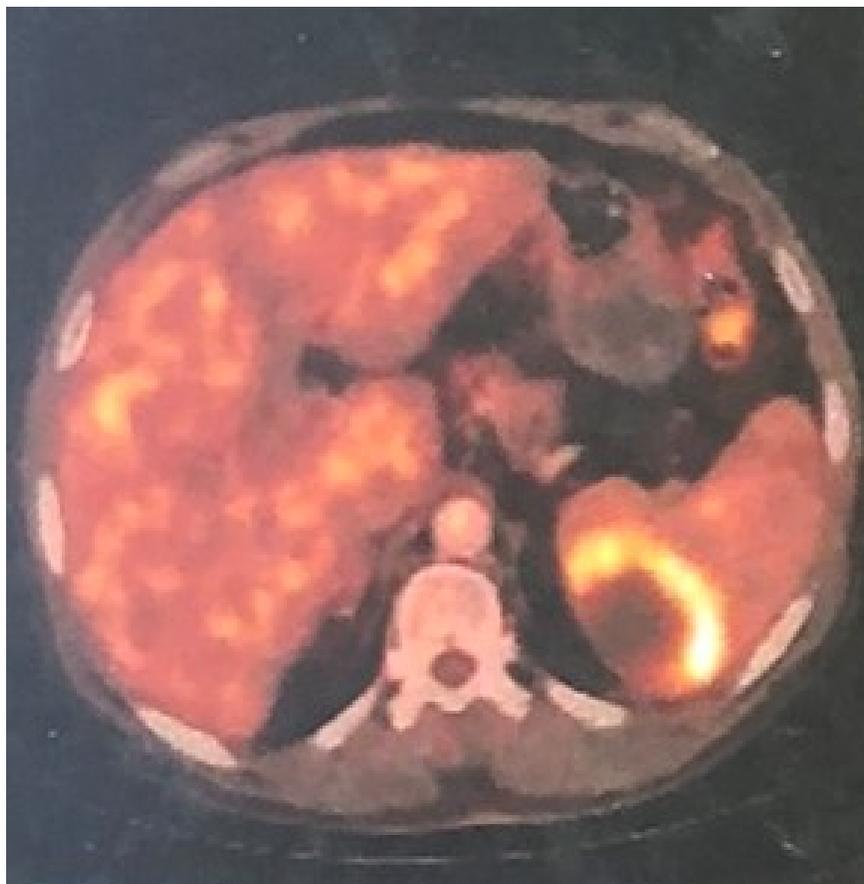
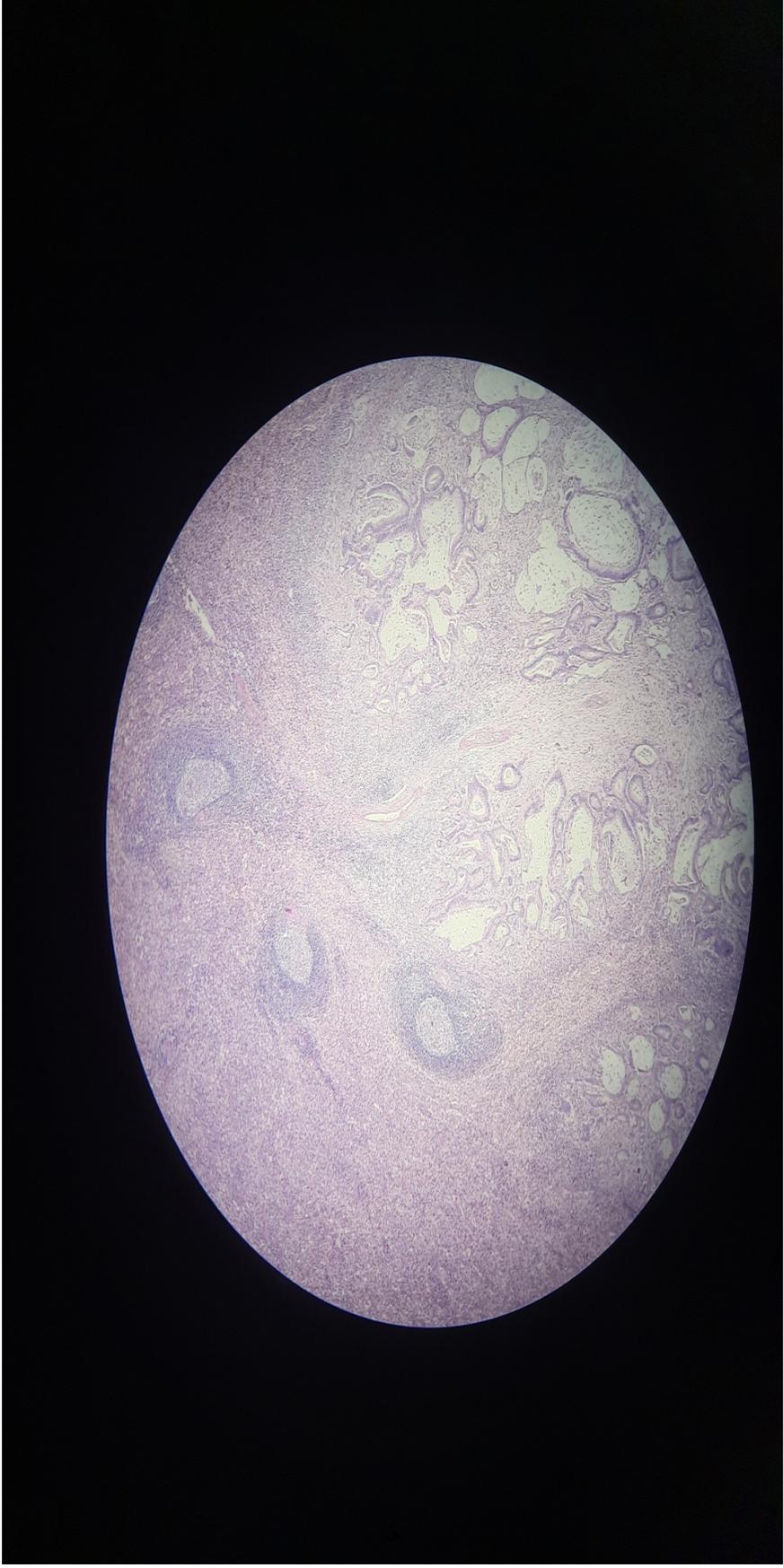




Figure 1 [A. Axial view, B. Coronal view]. Positron Emission Tomography- Computerized Tomography [PET-CT] of the abdomen showing multiple FDG avid hypodense lesions in the Spleen, largest measuring 6.6x 4.3 cm.



Figure 2.Macroscopic image of the surgical specimen (Enlarged Spleen)



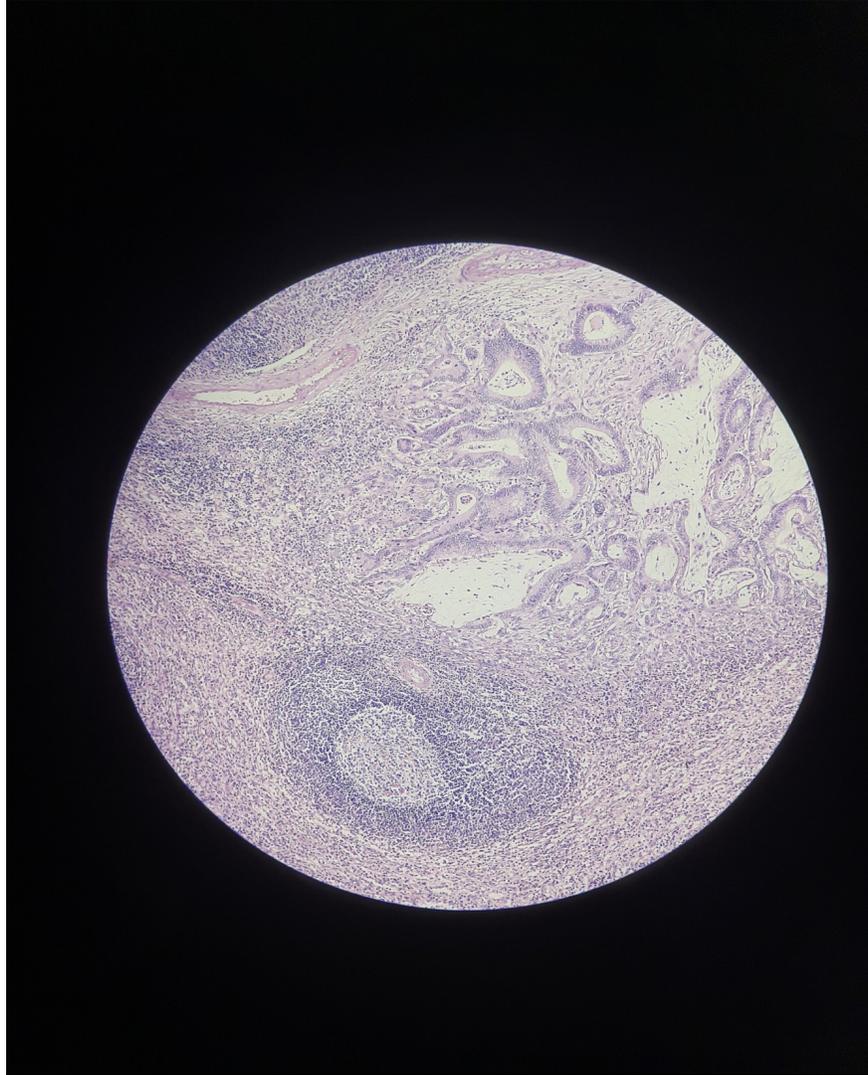


Figure 3. [A & B] shows infiltration of tumor cells forming glands into the splenic parenchyma. Extracellular cellular mucin pools noted.

CLINICAL DISCUSSION:

Isolated splenic metastasis from colorectal cancer is rare, and most commonly occurs as a component of disseminated disease. Studies have shown that isolated splenic metastasis accounts for less than 1% of all splenic metastases (9). The incidence of splenic metastasis was reported as 7.1 % among 7165 autopsy by Breger with 4.4 % for colorectal carcinoma (10). Other causes of splenic metastasis are melanoma (34%), breast (12%), ovarian (12%), and lung (9%) cancers (2).

The rarity of solitary splenic metastasis from colorectal cancer has been attributed to several anatomical and immunological factors. Firstly, the acute angulation at the entry of the splenic artery at its origin in the celiac trunk may act as an anatomical obstruction for tumor emboli to reach the spleen (11). Additionally, the rhythmic contractions of the spleen could prevent tumor cell fixation by forcing blood flow from the sinusoids to the splenic veins(12). The absence of afferent lymphatics to the spleen and anticancer cytokines released by the spleen are also considered to be factors for the low incidence of metastasis(13). Furthermore,

the reticuloendothelial system inhibits the aggregation of the nest of cancer cells in splenic sinusoids (14). Vascular and lymphatic route of transmission of splenic metastasis has been proposed for colorectal cancer .It is believed that vascular transmission is the primary route for the development of splenic metastasis, because the metastasis is reported to be located within the splenic parenchyma, with the lymph nodes at the hilus negative for metastasis in majority of case (10,15,16) .It is hypothesized that probably because of reflux of blood from the inferior mesenteric vein in the splenic vein and then to the spleen is responsible for cancer cells to reach the splenic parenchyma. This is in relation to the localization of the primary tumor to the left hemicolon in the majority of the patients with splenic metastasis (17) .In our case, the primary tumor was in the sigmoid colon which is similar to literatures which suggest left hemicolon as a frequent site.

Since most cases of splenic metastasis are asymptomatic, they are often discovered incidentally during imaging studies such as abdominal ultrasound or CT scans that are performed during routine follow-up visits for cancer patients (4).In our case , a follow-up CT scan performed two years found metastasis in the spleen. However, in some cases, patients may present with symptoms such as pain or discomfort in the upper abdomen, weight loss, or enlarged spleen. In rare cases, splenic metastasis can lead to spontaneous splenic rupture, which is a life-threatening emergency.

The preferred treatment for isolated splenic metastasis is considered to be splenectomy followed by chemotherapy(18). Long-term survival rate following splenectomy in patients with solitary splenic metastasis from colorectal cancer is still unknown. However, the limited data extracted from the case reports in the literature indicate that interval survival following splenectomy ranged from 3 to 84 months, with a mean of 22.5 months(6). The present case is disease-free during the one-month follow up.

CONCLUSION:

Splenic metastases from solid tumors are considered rare, and few cases have been reported in the literature. Common primary sources of splenic metastasis include breast, lung, colorectal, and ovarian carcinomas. This case of splenic metastasis was secondary to colorectal cancer, detected in a follow-up CT 2 years after surgery and adjuvant chemotherapy. Patient underwent splenectomy and referred to oncology for adjuvant chemotherapy. Splenectomy followed by adjuvant chemotherapy has been found to improve survival in patients with spleen metastasis from colorectal cancer

Limitation of the study

Since this study is based on a single case study, its result cannot be generalized to larger population

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval:

The case report is exempt from ethical approval in our institution.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Research registration number

Not applicable.

Declaration of competing interest

All authors declare that they have no conflict of interest.

Acknowledgments

The authors wish to acknowledge the patient included in this report. We would also like to thank our head of department of surgery for his guidance for this case report.

Provenance and peer review

Not commissioned, externally peer-reviewed.

References:

1. Comp erat E, Bardier-Dupas A, Camparo P, Capron F, Charlotte F. Splenic metastases: clinicopathologic presentation, differential diagnosis, and pathogenesis. *Archives of pathology & laboratory medicine*. 2007 Jun;131(6):965-9.
2. Berge T. Splenic metastases: frequencies and patterns. *Acta Pathologica Microbiologica Scandinavica Section A Pathology*. 1974 Jul;82(4):499-506.
3. Lam KY, Tang V. Metastatic tumors to the spleen: a 25-year clinicopathologic study. *Archives of pathology & laboratory medicine*. 2000 Apr;124(4):526-30.
4. Gencosmanoglu R, Aker F, Kir G, Tozun N. Isolated metachronous splenic metastasis from synchronous colon cancer. *World journal of surgical oncology*. 2006 Dec;4:1-6.
5. G UREL M. Why is isolated spleen metastasis a rare entity. *Turk J Gastroenterol*. 2010;21(4):452-3.
6. Abdou J, Omor Y, Boutayeb S, Elkhannoussi B, Errihani H. Isolated splenic metastasis from colon cancer: case report. *World Journal of Gastroenterology*. 2016 May 5;22(18):4610.
7. Efaled B, Mazti A, Atsame-Ebang G, Tahiri L, El Bouhaddouti H, Hammas N, El Fatemi H, Chbani L. An unusual site of metastasis: splenic metastasis from a colon cancer. *Journal of Surgical Case Reports*. 2016 Nov 1;2016(11):rjw175.
8. Agha RA, Franchi T, Sohrabi C, Mathew G. Ligne directrice SCARE 2020: mise   jour des lignes directrices du rapport sur les cas chirurgicaux de consensus (SCARE). *Int. J. Surg.*. 2020;84:226-30.
9. Resta G, Vedana L, Marino S, Scagliarini L, Bandi M, Anania G. Isolated splenic metastasis of ovarian cancer. Case report and literature review. *Il Giornale di Chirurgia*. 2014 Jul;35(7-8):181
10. Okuyama T, Oya M, Ishikawa H. Isolated splenic metastasis of sigmoid colon cancer: a case report. *Japanese journal of clinical oncology*. 2001 Jul 1;31(7):341-5.
11. Kim JC, Jeong CS, Kim HC, Yu CS, Kang GH, Lee MG. Isolated splenic metastasis from colorectal carcinoma: a case report. *Journal of Korean medical science*. 2000 Jun 1;15(3):355-8.
12. Kettle EH. Carcinomatous metastases in the spleen. *The Journal of Pathology and Bacteriology*. 1912;17(1):40-6.
13. Avesani EC, Cioffi U, De Simone M, Botti F, Carrara A, Ferrero S. Synchronous isolated splenic metastasis from colon carcinoma. *American journal of clinical oncology*. 2001 Jun 1;24(3):311-2
14. Miller JN, Milton GW. An experimental comparison between tumour growth in the spleen and liver. *The Journal of pathology and bacteriology*. 1965 Oct;90(2):515-21.
15. Warren S, Davis AH. Studies on tumor metastasis: V. The metastases of carcinoma to the spleen. *The American journal of cancer*. 1934 Jul;21(3):517-33. Warren S, Davis AH. Studies on tumor metastasis: V. The metastases of carcinoma to the spleen. *The American journal of cancer*. 1934 Jul;21(3):517-33.
16. Fujita N, Shirai Y, Shimoda S, Yamai K, Hatakeyama K. Clinical significance of splenectomy for colorectal cancer metastases to the spleen. *International Journal of Clinical Oncology*. 2000 Apr;5:121-5
17. Indudhara R, Vogt D, Levin HS, Church J. Isolated splenic metastases from colon cancer. *Southern medical journal*. 1997 Jun 1;90(6):633-6.
18. Abi Saad GS, Hussein M, El-Saghir NS, Termos S, Sharara AI, Shamseddine A. Isolated splenic metastasis from colorectal cancer. *International journal of clinical oncology*. 2011 Aug;16:306-13.