

Laparoscopic Partial Splenectomy as a Spleen-Preserving Diagnostic Tool in a Case of Isolated Splenic Nodules

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Abstract

Solitary FDG-avid splenic lesions pose a diagnostic challenge due to the rarity of primary splenic tumors and the limitations of conventional biopsy techniques in this vascular organ. We present the case of a patient with a history of colorectal carcinoma who presented with isolated splenic nodules in whom a laparoscopic partial splenectomy was performed to obtain tissue for diagnosis. Histopathological analysis showed a low-grade follicular B-cell non-Hodgkin lymphoma, which led to the need for a completion splenectomy. This case underscores the diagnostic value of laparoscopic partial splenectomy in selected patients and highlights its role as a spleen-preserving alternative to total splenectomy.

Keywords

Partial Splenectomy, Splenic Lymphoma, FDG-Avid Splenic Lesions, Spleen Preserving

1. Introduction

The spleen is an uncommon site for isolated lesions, and FDG-avid nodules often indicate systemic disease rather than a primary splenic process. Biopsy of splenic lesions is rarely performed due to concerns regarding hemorrhagic complications, particularly with core needles or punch biopsies. Complications associated with core needle biopsies include pain, pneumothorax and hemorrhage, sometimes resulting in the need to perform a total splenectomy [1]. Core needle biopsy is associated with a lower diagnostic accuracy than splenectomy [1]. When tissue diagnosis is essential, total splenectomy has traditionally been performed. However, total splenectomy carries risks including infection, overwhelming post-splenec-

tomy sepsis (OPSI), and lifelong alterations in immunity.

Partial splenectomy, while more technically demanding, offers the advantage of tissue acquisition while preserving splenic function. It has been described in the context of trauma and in certain hematological diseases.

We present a case of isolated splenic lesions in a patient with a history of colorectal cancer, in whom a laparoscopic partial splenectomy was successfully employed to establish a diagnosis.

2. Case Report

A 66-year-old female with a prior history of pT1N0 adenocarcinoma of the caecum treated with robotic right hemicolectomy underwent routine oncological follow-up. An ultrasound 3 months after the right hemicolectomy revealed an enlarged spleen with a length of 14.2 cm, which was confirmed on CT imaging. Splenomegaly persisted on subsequent follow-up scans without clinical symptoms.

More than 2 years later, new multiple hypodense splenic nodules appeared, with the largest measuring up to 2.5 cm, along with a subtle contour protrusion at the cranial-dorsal pole. FDG-PET/CT demonstrated hypermetabolic splenic lesions and suspicious foci in the left humeral head and lumbar vertebra L4 (**Figure 1**). A bone marrow biopsy at L4 showed increased myelopoiesis and aberrant lymphoid aggregates with B-cell predominance, but definitive classification was not possible.

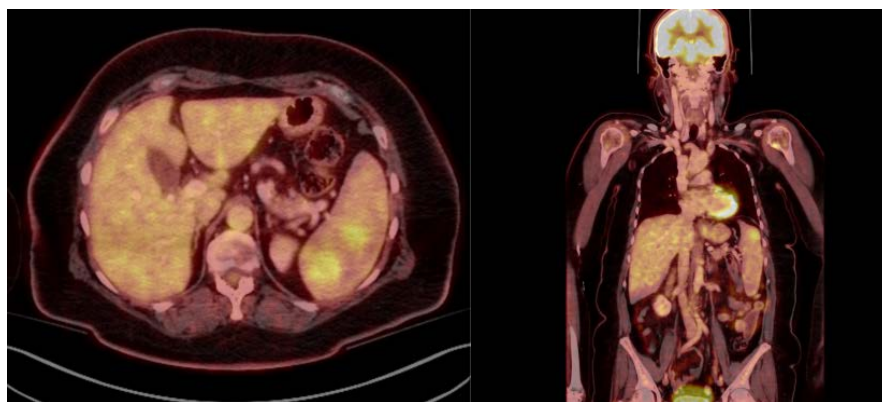


Figure 1. FDG-PET/CT showing hypermetabolic lesions in the spleen.

To obtain a histological diagnosis, core needle biopsy, splenectomy and partial splenectomy were taken into consideration. Due to the oncologic history of colorectal carcinoma, and no presence of lymphadenopathies on imaging, both colorectal metastases and splenic lymphoma were considered possible differential diagnoses. Due to the risk of hemorrhage and to limit the risk of inaccurate biopsy, core needle biopsy was not performed. To avoid infectious complications, partial splenectomy was chosen over total splenectomy.

A laparoscopic partial splenectomy was performed. The patient was placed in the supine French position with a 20° reverse Trendelenburg tilt. Four subcostal

trocars were placed. The splenic artery and vein were dissected and ligated, preserving gastric and phrenic collateral flow. The line of demarcation between vascularized and devascularized tissue was used to define the resection plane (**Figure 2**). The lower pole of the spleen was mobilized, and partial splenectomy was completed without complications. The resected specimen had a size of $9 \times 5.5 \times 5$ cm. No lymphadenopathies were seen or procured during the surgery.

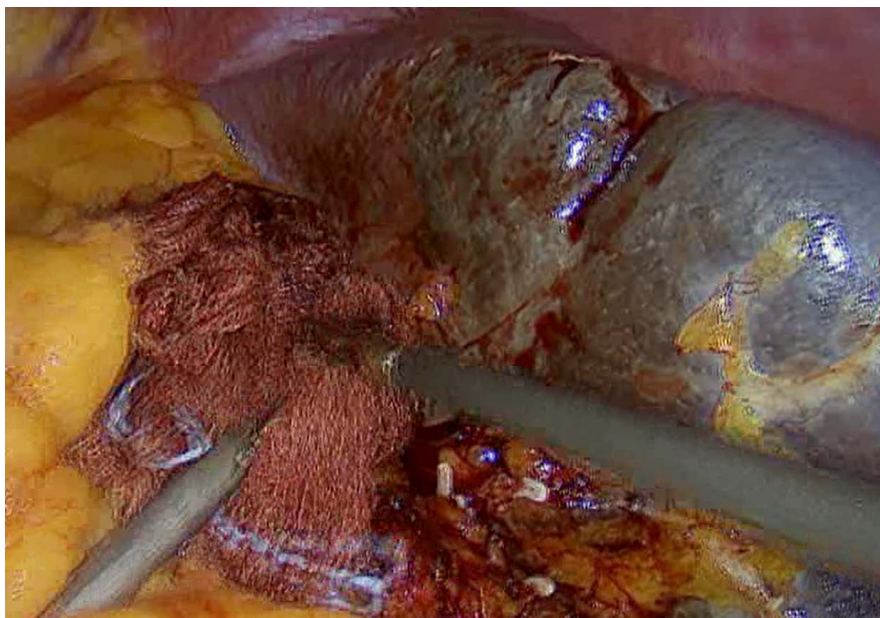


Figure 2. A per-operative image showing a clear demarcation line after ligation of the splenic artery and vein.

The postoperative course was uneventful, and the patient was discharged on postoperative day four.

Histopathological analysis revealed follicle-like lymphoid structures composed of mature small lymphocytes with germinal center phenotype, strongly positive for CD20, BCL2, CD10, and LMO2, consistent with grade 1 - 2 follicular B-cell non-Hodgkin lymphoma. Further review at a tertiary hematopathology center supported this diagnosis, suggesting either primary splenic follicular lymphoma or splenic involvement from a low-grade lymphoma elsewhere.

Further treatment included a laparoscopic completion splenectomy followed by systemic treatment with R-CHOP (rituximab-cyclophosphamide-doxorubicin-vincristine-prednisone).

3. Discussion

Solitary or isolated splenic nodules are a rare finding in clinical practice, often discovered incidentally on imaging performed for unrelated reasons or during oncologic follow-up. When these lesions are metabolically active on PET-CT, such as with increased FDG uptake, the differential diagnosis broadens and may include lymphoproliferative disorders, infectious or inflammatory granulomatous

disease (e.g., sarcoidosis or tuberculosis), primary splenic neoplasms, or metastatic disease. Importantly, the spleen is a frequent site of involvement in systemic lymphomas—splenic involvement has been reported in up to 40% - 50% of patients with non-Hodgkin lymphoma (NHL) at autopsy. However, primary splenic lymphoma (PSL), defined as lymphoma involving the spleen without evidence of systemic disease at the time of diagnosis, remains rare, accounting for only 1% - 2% of all lymphomas [2].

Histological confirmation is essential in differentiating between these various etiologies and in determining the need for systemic therapy. Nevertheless, obtaining splenic tissue for diagnostic purposes remains challenging. Unlike other visceral organs, the spleen is highly vascular and friable, making percutaneous image-guided core needle biopsy or fine needle aspiration (FNA) techniques less frequently used due to concerns over hemorrhagic complications. While a few institutions perform them safely in select cases, such approaches are often limited by technical feasibility and institutional preference [3].

Traditionally, total splenectomy has been the standard surgical approach when histological diagnosis is required. However, total splenectomy is associated with significant long-term risks, particularly overwhelming post-splenectomy infection (OPSI), which carries a reported mortality rate of 0.2% - 1.4% and a severe infection rate of up to 3.2% [4]. As the spleen plays a central role in immune surveillance and the clearance of encapsulated bacteria, its complete removal necessitates life-long preventive measures, including vaccination and, in some cases, antibiotic prophylaxis. For younger and immunocompromised patients in particular, preserving splenic immune function is of paramount importance.

Laparoscopic partial splenectomy (LPS) has emerged as a minimally invasive, spleen-preserving alternative that allows for both diagnostic and therapeutic resection of focal splenic lesions while retaining part of the splenic parenchyma. The technique was initially developed for benign hematologic conditions, such as hereditary spherocytosis and thalassemia, where partial resection (typically 85% - 95% of the parenchyma) was aimed at reducing erythrophagocytosis and alleviating cytopenia while preserving residual immune function. In recent years, its indication has expanded to include trauma-related injuries and localized focal lesions of unknown origin. In trauma cases, partial splenectomy or segmental debulking may be used to control bleeding in patients with subcapsular hematomas or polar injuries, allowing splenic conservation. For focal splenic lesions, particularly those suspicious of malignancy, partial resection provides a means of obtaining tissue for histologic diagnosis with a lower risk of infectious sequelae compared to total splenectomy.

The feasibility and safety of LPS have been increasingly documented in the literature. In a review of the first 457 published cases, Romboli *et al.* reported low morbidity and no procedure-related mortality, with a low conversion rate to total splenectomy [5]. Furthermore, the laparoscopic approach minimizes postoperative pain, reduces hospital length of stay, and accelerates recovery, all while pre-

serving part of the splenic immune function. However, the procedure does require meticulous planning, advanced laparoscopic skill, and precise identification of segmental splenic vasculature to ensure adequate devascularization and a bloodless transection plane.

In our case, laparoscopic partial splenectomy provided sufficient tissue for diagnosis while avoiding the risks of total splenectomy. Ultimately, a completion splenectomy was required for treatment, but the staged approach allowed for a tailored management strategy based on confirmed histology.

4. Conclusion

Laparoscopic partial splenectomy is a valuable diagnostic tool in the evaluation of isolated splenic lesions. It offers a safe and effective method for tissue diagnosis while preserving splenic function, particularly in patients where the etiology of splenic nodules remains uncertain and biopsy is indicated.

Conflicts of Interest

The authors declare no conflicts of interest related to this publication.

Declarations

Informed consent was obtained from the patient to report this case.

References

- [1] McInnes, M.D.F., Kielar, A.Z. and Macdonald, D.B. (2011) Percutaneous Image-Guided Biopsy of the Spleen: Systematic Review and Meta-Analysis of the Complication Rate and Diagnostic Accuracy. *Radiology*, **260**, 699-708. <https://doi.org/10.1148/radiol.11110333>
- [2] Shimono, J., Miyoshi, H., Kiyasu, J., Sato, K., Kamimura, T., Eto, T., *et al.* (2017) Clinicopathological Analysis of Primary Splenic Diffuse Large B-Cell Lymphoma. *British Journal of Haematology*, **178**, 719-727. <https://doi.org/10.1111/bjh.14736>
- [3] Sinit, R.B., Dorer, R.K., Flores, J.P. and Aboulafia, D.M. (2020) Rare Causes of Isolated and Progressive Splenic Lesions: Challenges in Differential Diagnosis, Evaluation, and Treatment of Primary Splenic Lymphomas. *Clinical Medicine Insights. Blood Disorders*, **13**, 1-8. <https://doi.org/10.1177/1179545x20926188>
- [4] Di Sabatino, A., Carsetti, R. and Corazza, G.R. (2011) Post-Splenectomy and Hypo-splenic States. *The Lancet*, **378**, 86-97. [https://doi.org/10.1016/s0140-6736\(10\)61493-6](https://doi.org/10.1016/s0140-6736(10)61493-6)
- [5] Romboli, A., Annicchiarico, A., Morini, A., Castro Ruiz, C., Pagliai, L., Montali, F., *et al.* (2021) Laparoscopic Partial Splenectomy: A Critical Appraisal of an Emerging Technique. A Review of the First 457 Published Cases. *Journal of Laparoendoscopic & Advanced Surgical Techniques Part A*, **31**, 1130-1142. <https://doi.org/10.1089/lap.2020.0769>