

Laparoscopic Partial Splenectomy May Be Valuable for the Diagnosis of Malignant Lymphoma: A Case Report

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Abstract. *Background/Aim:* Diagnosing primary splenic malignant lymphoma (PSML) is challenging due to the non-specific nature of splenomegaly, necessitating splenic biopsy for confirmation. However, performing partial splenic resection for diagnostic purposes is an elective procedure due to the risk of major hemorrhage. Despite the longstanding practice of splenectomy over the past few decades, it remains invasive and may result in severe early or late complications. Hence, we present laparoscopic partial splenectomy (LPS) in a patient suspicious of PSML for diagnostic purposes in this study. *Case Report:* An 81-year-old woman presented to our hospital with a one-month history of fever and dry cough. Atypical cells had been detected in her peripheral blood nine months ago. However, at that time, a bone marrow examination did not reveal any atypical cells. The laboratory tests revealed a soluble interleukin receptor-2 levels of 4,667 U/dl and atypical cells were also found in peripheral blood. Abdominal computed tomography showed splenomegaly without any other relevant findings. These findings are suspicious of PSML and LPS without vessel ligation was performed and a small fraction of the spleen from the inferior pole measuring 1.8×1.0 cm

was resected. The operation lasted for 63 min with minimal estimated blood loss. Histopathological findings were compatible with the diagnosis of diffuse B-cell lymphoma. The postoperative clinical course was uneventful, and splenomegaly demonstrated improvement six months after the operation. *Conclusion:* LPS without vessel ligation for biopsy may be valuable for the diagnosis of malignant lymphoma, particularly when there are no swollen lymph nodes, as it offers a less invasive approach.

The spleen is the most common extranodal site in malignant lymphoma (ML). However, splenomegaly is a common non-specific finding, making the diagnosis of primary splenic malignant lymphoma (PSML) very difficult. PSML is a rare subset of B-cell non-Hodgkin lymphomas, accounting for 1-2% of lymphomas (1-3). In many cases of ML, definitive diagnosis is made based on biopsy samples obtained from swollen lymph nodes. However, in cases of PSML, biopsy samples obtained from the enlarged spleen are necessary since there are no swollen lymph nodes in the body (4). Furthermore, partial resection of the spleen for diagnostic purposes is an elective procedure because of the risk of major hemorrhage (5). Here, we present a case of PSML diagnosed using a laparoscopically partially resected sample from the enlarged spleen.

Case Report

An 81-year-old woman, who had been receiving outpatient treatment for hypersensitive pneumonitis, presented to our hospital with a one-month history of fever and dry cough. Atypical cells had been detected in the peripheral blood in 9 months ago; however, a bone marrow differential cell count at that time showed no atypical cells. Upon admission, laboratory tests revealed a white blood cell (WBC) count of $4.1 \times 10^9/l$, C-reactive protein (CRP) levels of 2.49 mg/dl and soluble interleukin receptor-2 levels of 4,667 U/dl. Atypical cells were also found in the peripheral blood. Chest computed tomography (CT) showed diffuse ground glass

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Key Words: Case report, primary splenic malignant lymphoma, laparoscopic partial splenectomy.

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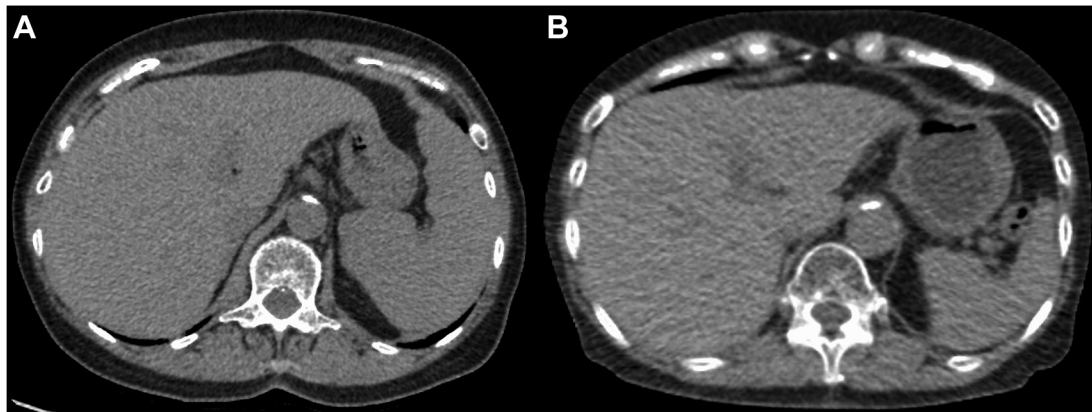


Figure 1. Abdominal computed tomography findings before and after operation. (A) Splenomegaly was detected before operation. (B) The splenomegaly was improved six months after operation.

opacities in bilateral lungs and abdominal CT showed splenomegaly without any other relevant findings (Figure 1A). These clinical examinations and radiographic findings are suspicious of malignant lymphoma, thus biopsy or resection of the spleen was needed for the precise diagnosis due to the absence of swollen lymph nodes. Given the risk associated with percutaneous splenic biopsy due to the patient's use of Dabigatran etexilate for the treatment of an old brain infarction, laparoscopic partial splenectomy was planned.

Under general anesthesia, the patient underwent a four-trocar laparoscopic partial splenectomy (LPS) in a semi-lateral position. Ports of 12-mm were inserted in the umbilical incision and right upper abdomen, and 5-mm ports were inserted in the epigastric region and left upper abdomen. The surgeon stood at the right side of the patient, with the scopist positioned between the patient's legs.

The spleen was enlarged and laparoscopic partial splenectomy was planned in the inferior pole of the enlarged spleen without mobilization. The splenic serosa and parenchyma were pre-coagulated using the HiQ+ suction and irrigation system (Olympus, Tokyo, Japan) with soft coagulation mode using Olympus ESG-400, then the coagulated spleen tissue was dissected without any vessel ligation using an Ultracision Harmonic Scalpel (Ethicon Endo-Surgery Inc, Cincinnati, OH, USA) (Figure 2).

A small fraction of the spleen measuring 1.8x1.0 cm was resected, placed into a bag, and removed from the umbilical port. After checking that the amount of the specimen was enough for the diagnosis, the abdomen was closed. The operation lasted for 63 minutes and the estimated blood loss was minimal. Histopathological findings were compatible with the diagnosis of diffuse B-cell lymphoma. The immunohistochemistry staining showed that tumor cells

were positive for CD5, CD20, and Bcl-2, and negative for CD3, CD10, and CD21. The Ki-67 index was over 95% (Figure 3).

The postoperative clinical course was uneventful, and the chemotherapy for the patient commenced on the nineteenth days after the operation. Splenomegaly showed improvement six months after the operation, as seen on CT image (Figure 1B).

Discussion

PSML is a rare subtype of B-cell non-Hodgkin lymphoma and generally represents 1-2% of all malignant lymphomas, although it has been reported to account for 4.3% in Japan (1-3). PSML is very difficult to diagnose and biopsy samples from the spleen are essential for a definitive diagnosis. In the current case, the patient showed clinical signs of ML and presented with splenomegaly, however, there were no swollen lymph nodes in the body, and no atypical cells were detected in the bone marrow. Therefore, a biopsy sample from the spleen was necessary for the diagnosis.

Fine needle aspiration (FNA) and core needle biopsy (CNB) of the spleen have been reported as valuable diagnostic tools (6, 7). Neal *et al.* reported that percutaneous image-guided FNA and CNB of the spleen were effective for the diagnosis. Among 44 specimens from 39 patients, the non-diagnosis rate was 7%, and cases with subsequent splenectomy showed 100% specificity and 86% sensitivity. The severe complications rate was 6.8% (7). Patel *et al.* summarized previous reports on FNA and CNB of the spleen, indicating that 20- to 25-G FNA, 20- to 22-G CNB and 18- to 19.5-G CNB demonstrated a diagnostic yield of 83.8%, 87.8% and 96.1%, respectively. Major complications rates were 0.3% for 20- to 25-G FNA, 0.8% for 20- to 22-G CNB, 2.6% for 18- to 19.5-G CNB and 12.1% for 14-G CNB (6). Niiya *et al.* also

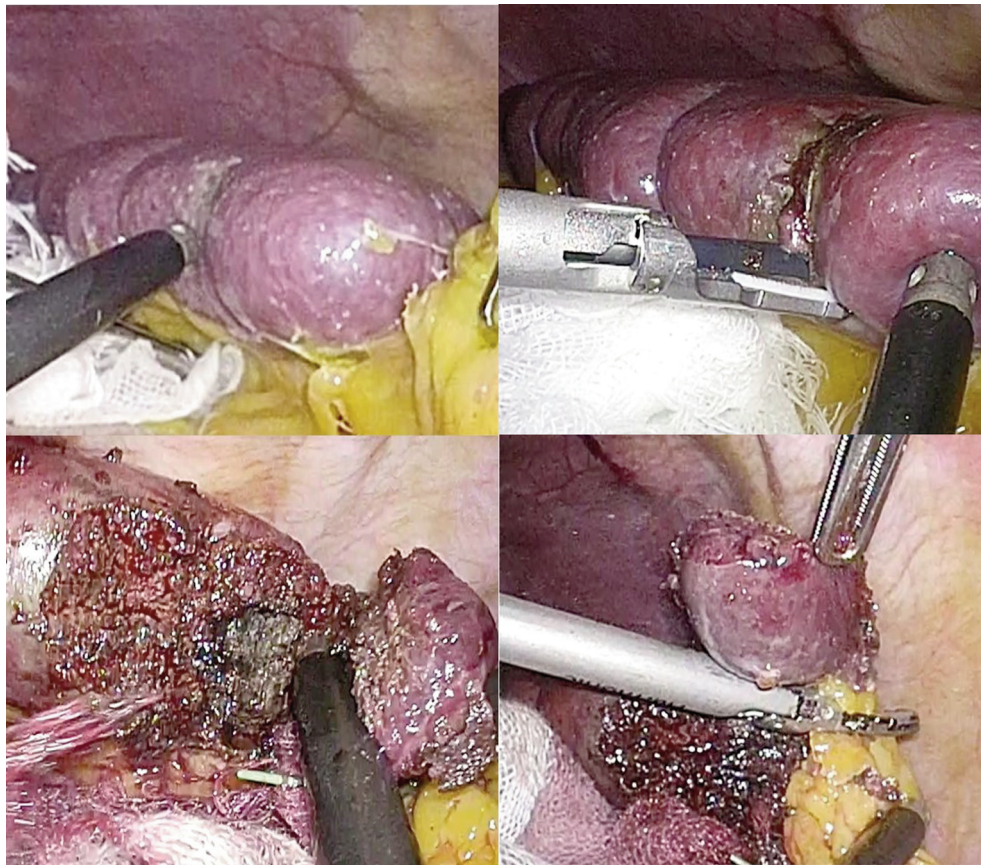


Figure 2. Operative procedures. The splenic serosa and parenchyma were pre-coagulated at soft coagulation mode, then the coagulated spleen tissue was dissected. A 1.8×1.0 cm fraction of the spleen was obtained.

reported the usefulness of endoscopic ultrasound-guided fine needle aspiration for splenic parenchyma (4). In regard to splenectomy, surgical mortality and morbidity were reported to be 2.9% and 37%, respectively, with infection being the main cause (8, 9). Furthermore, especially in patients with fever of unknown origin and splenomegaly, surgical complications occurred in 25.9% of cases, and the one-month operative mortality was 16.7% (10). In the present case, FNA or CNB was not feasible due to the use of Dabigatran etexilate for the treatment of old brain infarction. Hence, laparoscopic partial splenectomy was performed.

LPS is a challenging procedure. Laparoscopic splenectomy (LS) has been reported as a feasible and safety procedure; however, LS can lead to lethal complications such as portal/splenic vein thrombosis and overwhelming post-splenectomy infection (11). Several reports have demonstrated the safety and feasibility of LPS (5, 12-14). In most cases, partial splenectomy with vessel ligation is performed for the treatment. Uranues *et al.* reported on nine cases who underwent LPS for diagnostic purposes. The operation

duration for these cases ranged from 69 to 87 min (mean: 74 min), and no major complications were observed, which is consistent with the findings in the present case (5). Regarding the surgical technique, radiofrequency pre-coagulation prior to parenchymal transection has been reported to be effective (15, 16). The pre-coagulation technique using soft coagulation mode, followed by transection using an Ultracision Harmonic Scalpel, was also useful in the present case.

LPS without vessel ligation as biopsy may be a valuable method for the diagnosis of diseases with splenomegaly, including PSML, particularly when there are no or only a few resectable lymph nodes. Rhodes *et al.* mentioned that laparoscopic splenectomy can be used as a treatment for hematologic disease instead of laparoscopic lymph node biopsy (17). Uranues *et al.* also recommended that diagnostic hemisplenectomy can be simpler and safer than obtaining a biopsy sample from the retroperitoneal lymph nodes (5). In the present case, LPS without vessel ligation for biopsy was effective because there were no swollen lymph nodes in the body.

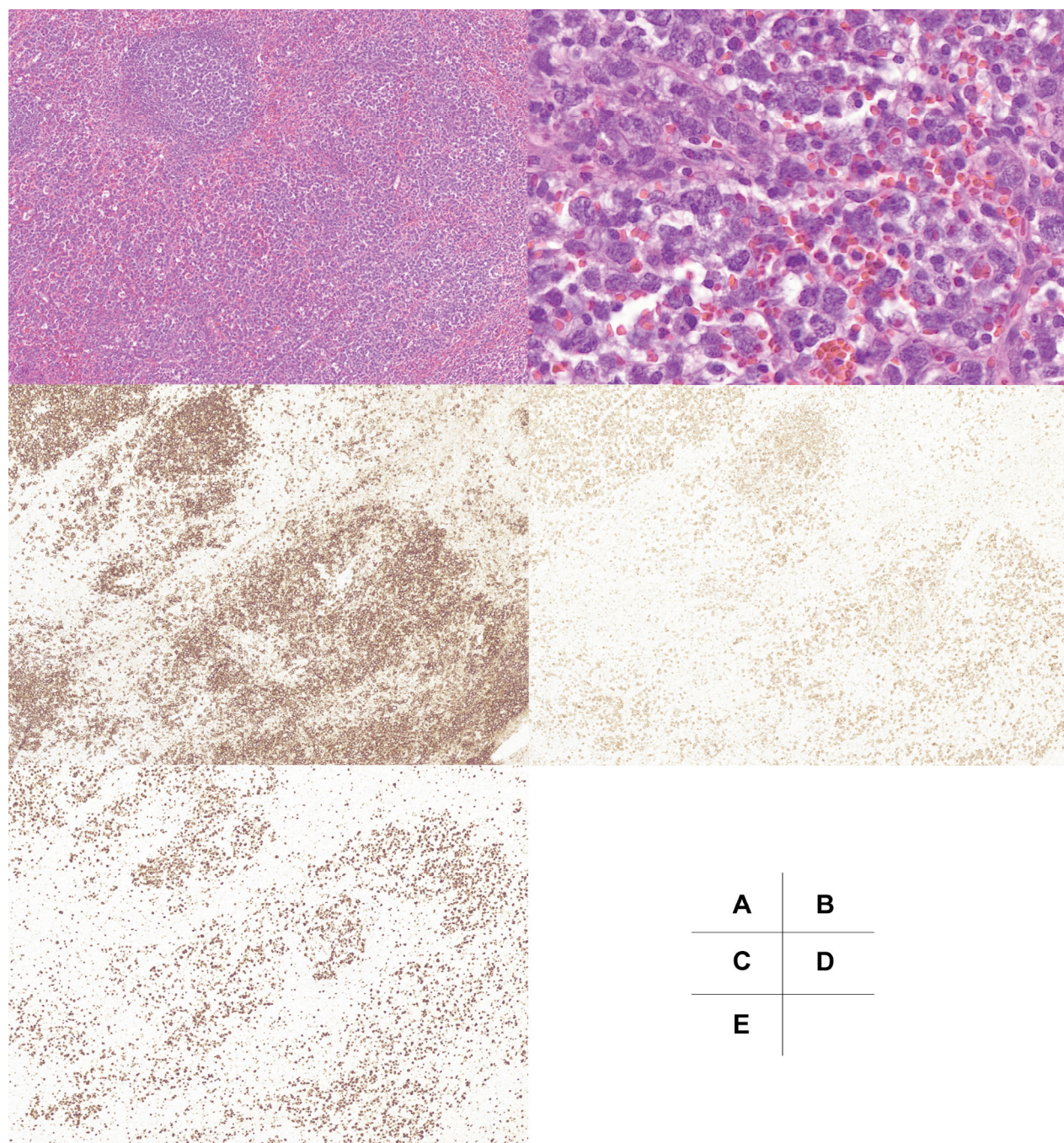


Figure 3. Histopathological findings of diffuse B-cell lymphoma revealing the presence of proliferative large lymphoid cells, including atypical multi-nucleate cells and some mitoses. Diffusely proliferative atypical cells were positive for CD20 and Bcl-2. (A, B) Hematoxylin and Eosin staining; (C) CD20 staining; (D) Bcl-2 staining. The Ki-67 index was over 95%. (E) Ki-67 staining.

Conclusion

Partial splenic resection for diagnostic purposes is a highly elective procedure due to the risk of hemorrhage. However, in this study, LPS without vessel ligation was performed

less invasively and safely. Therefore, LPS without vessel ligation for biopsy may be a valuable method for diagnosis in cases of malignant lymphoma with splenomegaly and no swollen lymph nodes to approach less invasively such as PSML.

Conflicts of Interest

The Authors have no conflicts of interest to declare in relation to this report.

Authors' Contributions

Ogino S was a major contributor and, Fujiyama J and Masuyama M supervised the writing of the manuscript. Ogino S and Ishimoto T performed patient treatment. Bamba M performed the pathological diagnosis. All Authors read and approved the final manuscript.

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