

# Hand-Assisted Laparoscopic Splenectomy for Splenic Hemangioma\*

Cem DURAL<sup>1</sup>, Candaş ERÇETİN<sup>1</sup>, Artür SALMASLIOĞLU<sup>2</sup>, Özgür METE<sup>3</sup>, Umut BARBAROS<sup>1</sup>, Yeşim ERBİL<sup>1</sup>

<sup>1</sup> Department of General Surgery, Faculty of Istanbul Medicine, University of Istanbul, Istanbul, Turkey

<sup>2</sup> Department of Radiology, Faculty of Istanbul Medicine, University of Istanbul, Istanbul, Turkey

<sup>3</sup> Department of Pathology, Faculty of Istanbul Medicine, University of Istanbul, Istanbul, Turkey

\* This article has been published in the first issue of Eur J Surg Sci (Eur J Surg Sci 2010;1:22-26)

## ABSTRACT

A 53-years-old female was admitted to the hospital for investigation of a splenic tumor. After imaging studies, splenic vascular tumor was suspected. However, the possibility of a malignant neoplasm could not be ruled out preoperatively. Hand-assisted laparoscopic splenectomy was safely performed for the diagnosis and treatment of the splenic tumor. The histologic diagnosis was hemangioma. In conclusion, hand-assisted laparoscopic splenectomy should be performed in patients with splenic vascular tumors since the lesion could be a malignant neoplasm.

**Key words:** Spleen, Hemangioma, Hand-assisted laparoscopic splenectomy

Received: October 03, 2009 • Accepted: January 21, 2010

## ÖZET

### Splenik Hemanjiyoma için El-Yardımlı Laparoskopik Splenektomi

Elli üç yaşında kadın hasta dalakta kitle şüphesiyle araştırılmak üzere hastaneye yatırıldı. Görüntüleme çalışmaları sonucunda splenik tümör saptandı ancak preoperatif incelemelerde malignite ekarte edilemedi. Hem tanı hem de tedavi amacıyla sorunsuz olarak el-yardımlı laparoskopik splenektomi yapıldı. Histolojik tanı hemanjiyoma olarak bildirildi. Splenik vasküler tümörü olan hastalarda lezyonun malignite potansiyeli de dikkate alınarak el-yardımlı laparoskopik splenektomi uygulanmalıdır.

**Anahtar kelimeler:** Dalak, Hemanjiyoma, El-yardımlı laparoskopik splenektomi

Geliş Tarihi: 03 Ekim 2009 • Kabul Ediliş Tarihi: 21 Ocak 2010

## INTRODUCTION

Splenic hemangioma is a rare disorder but remains the most common benign neoplasm of the spleen. This lesion is usually asymptomatic and discovered on cross-sectional imaging studies<sup>[1,2]</sup>. Although

imaging studies are helpful for the diagnosis and evaluation of pathologic conditions of the spleen, splenic vascular tumors, whether malignant or benign, can be difficult to diagnose pre-operatively<sup>[3-5]</sup>. Therefore, splenectomy is generally necessary from both

diagnostic and therapeutic aspects in patients with splenic vascular tumor<sup>[2-4]</sup>.

Laparoscopic splenectomy was primarily developed for benign hematologic disease. It is technically safe with several advantages over open splenectomy<sup>[6]</sup>. The hand-assisted laparoscopic splenectomy (HALS) is an evolution of the laparoscopic procedure. The use of the hand allows easy exposure, complete exploration, meticulous dissection, and immediate hemostasis<sup>[7-10]</sup>. This report describes a patient with splenic vascular tumors that were successfully treated by HALS.

### CASE REPORT

A 53-years-old female was admitted to the hospital with left upper quadrant pain. Her medical and family history was otherwise unremarkable. Her vital signs on admission were: blood pressure 110/75, pulse 72 and rectal temperature 36.8°C. The physical examination and laboratory investigations were unremarkable. The peripheral blood count revealed a hemoglobin level of 10.5 g/dL, hematocrit value of 33%, platelet count of 110.000/mm<sup>3</sup>, and white blood count of 7000/mm<sup>3</sup>. The liver function tests were within the normal ranges. Chest X-rays were unremarkable.

Enhanced computed tomography (CT) scan revealed a large, ill-defined hypodense lesion expanding the spleen (Figure 1A). The T2-weighted images demonstrated a lesion measuring 10 x 9.5 x 8.5 cm with well-defined margins and solid and multiple cystic components, slightly hyperintense compared to the spleen (Figure 1B). The lesion had a close relationship with the left adrenal gland but there was no sign of invasion. On pre-contrast Flash 3D images, the lesion was hypointense (Figure 1C). On post-contrast images, the lesion demonstrated peripheral nodular enhancement (Figure 1D).

HALS was performed because the possibility of a malignant neoplasm could not be ruled out pre-operatively. The intra- and post-operative course was uneventful. The duration of surgery was 55 minutes and the intraoperative blood loss was 45 g. The weight of the spleen was 640 g and it measured 15 x 12 x 11 cm. The cut surface showed a relatively centrally placed, hemorrhagic and thrombotic semi-cystic lesion measuring 9 x 3 x 2 cm. The surround-

ing tissue showed dense, elastic and fibrotic organization areas and infarction changes (Figure 2A). Eleven samples were taken for histopathological examination. Central areas of the lesion showed frankly dilated vascular spaces filled by organizing thrombus, and the surrounding peripheral tissue revealed infarctoid changes and reactive pseudo-capsular reaction. The histological findings were found compatible with splenic hemangioma containing secondary reactive changes (Figure 2B).

### Operative Technique

The patient had been given a vaccine for pneumococcus approximately three weeks pre-operatively. The patient was placed in the right semilateral position with the left side up and a flank cushion was placed under the right side. The surgeon stood on the patient's right side with the camera operator. The first port was placed to the superior and left side of the umbilicus for establishing pneumoperitoneum and for insertion of the 10 mm 30° laparoscope. The 10 mm main operating port was located in the midclavicular line below the level of the inferior pole of the spleen. For a right-hand-dominant surgeon, the left hand is inserted intraperitoneally. An incision was made in the right subcostal region, approximately 7 cm in diameter (equivalent to the surgeon's glove size), and the hand-assisted device (Lapdisc, Johnson & Johnson, USA) was installed (Figure 3A).

The spleen was mobilized from its peritoneal attachments. The intraperitoneal hand provides initial traction on the splenic flexure of the colon and the splenocolic ligament is divided. The omental branches of the gastroepiploic artery were divided and then the short gastric vessels were identified and divided (Figure 3B,C). With the spleen mobilized medially, the hilum of the spleen was exposed, and the tail of the pancreas was identified. The LigaSure Vessel Sealing System (Valleylab, Boulder, CO, USA) was used for the majority of the dissection. At the splenic hilum, the splenic artery and vein were dissected with the Endo GIA vascular linear cutting Stapler (Figure 3D). A retrieval bag (Endo Catch II, Tyco Healthcare, Tokyo, Japan) was introduced into the abdominal cavity to remove the resected specimen. The specimen was delivered out of the abdominal cavity through the 7 cm skin incision. A drain was placed in the splenic fossa.

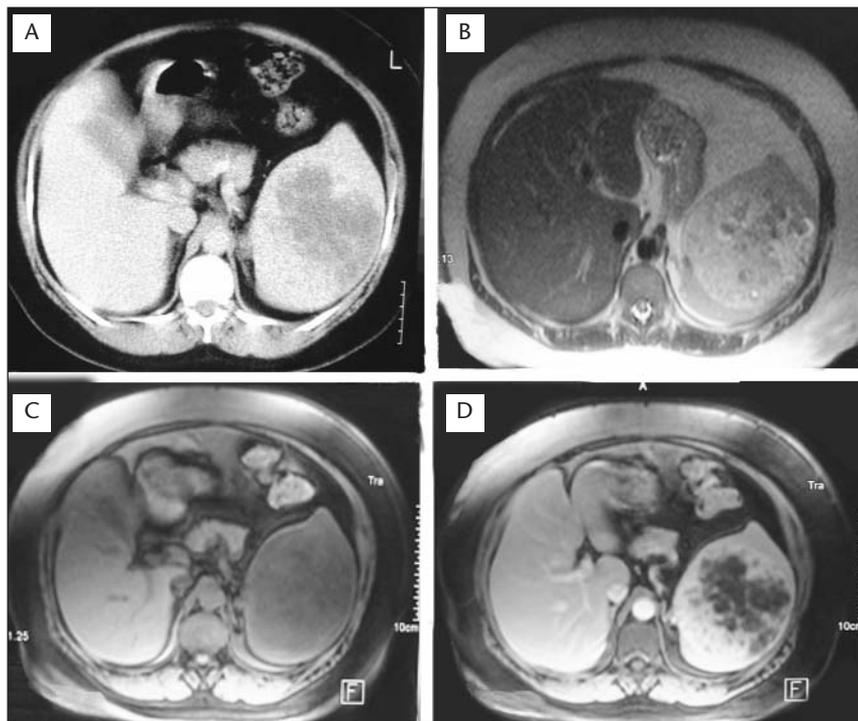


Figure 1. (A) Enhanced CT scan revealed a large, ill-defined hypodense lesion; (B) the T2 weighted images demonstrated a lesion with well defined margins and solid and multiple cystic components, slightly hyperintense compared to the spleen; (C) the lesion had a close relationship with left adrenal gland but no sign of invasion was present. On pre-contrast flash 3D images the lesion was hypointense; (D) on post-contrast images, the lesion demonstrated peripheral nodular enhancement.

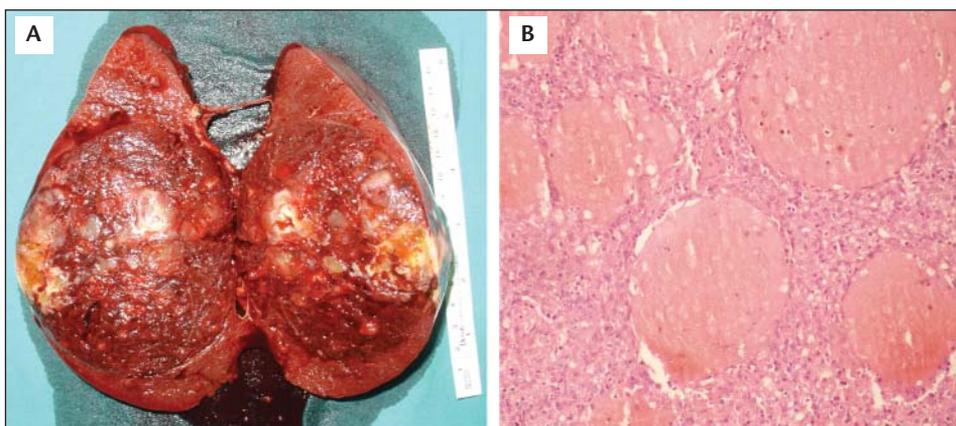
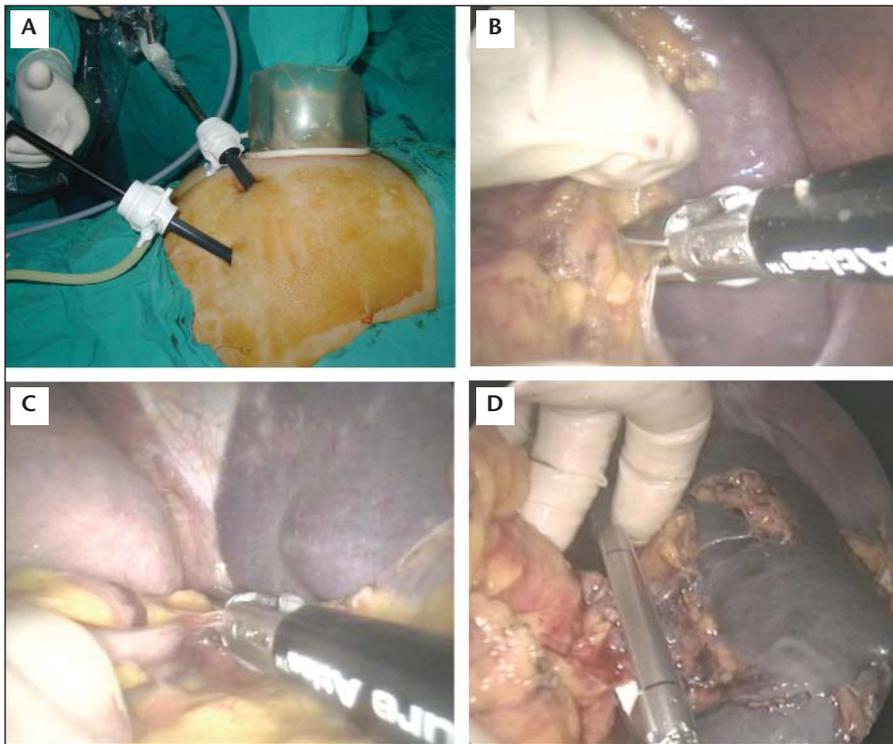


Figure 2. (A) The cut surface showed relatively centrally placed, hemorrhagic and thrombotic semi-cystic lesion measuring 9 x 3 x 2 cm. (B) Central areas of the lesion showed frankly dilated vascular spaces filled by organizing thrombus and the surrounding peripheral tissue revealed infarctoid changes and reactive pseudocapsular reaction (haematoxylin and eosin, original magnification).



**Figure 3.** (A) An incision was made in the right subcostal region, and the hand-assisted device was installed; (B) the omental branches of the gastroepiploic artery were divided; (C) and then the short gastric vessels were identified and divided; (D) at the splenic hilum, the splenic artery and vein were dissected with the Endo GIA vascular linear cutting Stapler.

## DISCUSSION

The spleen is the largest ductless gland and the largest single lymphatic organ in the body. A wide range of diseases can affect the spleen. Pathologic conditions of the spleen were reported as congenital diseases, trauma, inflammation, vascular disorders, hematologic disorders, benign tumors, and malignant tumors<sup>[1,2]</sup>. Hemangioma is the most common primary benign neoplasm of the spleen and is composed of endothelium-lined vascular channels filled with blood. Splenic hemangiomas are believed to be congenital in origin, but they are usually discovered in adulthood. The hemangiomas are divided into capillary and cavernous types, based on the size of the channels. The lesions may be solitary or multiple. On gross examination, it can be identified from the surface as a more intensely blue/purple area, darker than the normal splenic pulp. The patients are often asymptomatic, but spontaneous rupture has been reported to occur in as many as 25% of this patient po-

pulation. Splenic hemangioma may be isolated or associated with other skin, skeletal, or visceral vascular anomalies<sup>[2,3]</sup>.

The ultrasonography appearance of hemangiomas is non-specific. Lesions may be well-margined and predominantly hyperechoic with occasional calcifications or cysts, depending on the size of the vascular channels<sup>[3,5]</sup>. Findings on unenhanced CT reflect histopathologic findings. Solid areas may be hypo- or isoattenuating relative to normal splenic tissue. The predominantly cystic lesions are avascular, and only the solid components enhance. Calcification may demonstrate a linear or mottled appearance<sup>[2,3,5]</sup>. Magnetic resonance imaging (MRI) findings are also similar to those in liver hemangiomas. The lesions are hypo- or isointense on T1-weighted images and hyperintense on T2-weighted images relative to normal splenic tissue. Calcium, cysts, necrosis, or fibrosis results in atypical patterns on MRI, as in our patient<sup>[3-5]</sup>. Although imaging techniques have

aided in the identification of the splenic vascular tumor, a final diagnosis could only be obtained through postoperative pathologic investigation. Therefore, splenectomy is generally necessary from both diagnostic and therapeutic aspects in patients with splenic vascular tumor<sup>[2-5]</sup>.

Laparoscopic splenectomy has been shown to be a safe procedure, resulting in short hospital stays, low post-operative pain scores and good postoperative outcomes<sup>[6]</sup>. Recently, HALS has been reported to be safe and indicated for splenic malignancies as well as benign tumor or large spleen, because intact specimen removal may be expected with both the inspection with laparoscopy and palpation of the tumor, as in open surgery<sup>[7,8]</sup>. The tactile sense may help identify dissection planes, define accessory spleens, and prevent splenic capsular injury by trocars and instruments. The dissection of the splenic hilum is easier with the tactile sense of the hand while maintaining the benefits of a minimally invasive procedure<sup>[7-10]</sup>.

In our case, HALS was performed because the possibility of a malignant neoplasm could not be ruled out preoperatively. This method combines the advantages of both open and laparoscopic techniques. In conclusion, HALS may be a good option for splenic vascular tumors, whether malignant or benign, that are difficult to diagnose pre-operatively.

## REFERENCES

1. Kutok JL, Fletcher CD. Splenic vascular tumors. *Semin Diagn Pathol* 2003; 20: 128-39.
2. Willcox TM, Speer RW, Schlinkert RT, Sarr MG. Hemangioma of the spleen: presentation, diagnosis, and management. *J Gastrointest Surg* 2000; 4: 611-3.
3. Vilanova JC, Barcelo J, Smirniotopoulos JG, Pérez-Andrés R, Villalón M, Miró J, et al. Hemangioma from head to toe: MR imaging with pathologic correlation. *Radiographics* 2004; 24: 367-85.
4. Elsayes KM, Narra VR, Mukundan G, Lewis JS Jr, Menias CO, Heiken JP. MR imaging of the spleen: spectrum of abnormalities. *Radiographics* 2005; 25: 967-82.
5. Warshauer DM, Hall HL. Solitary splenic lesions. *Semin Ultrasound CT MR* 2006; 27: 370-88.
6. Chowbey PK, Goel A, Panse R, Sharma A, Khullar R, Soni V, et al. Laparoscopic splenectomy for hematologic disorders: experience with the first fifty patients. *J Laparoendosc Adv Surg Tech A* 2005; 15: 28-32.
7. Kaban GK, Czerniach DR, Litwin DE, Litwin DE. Hand-assisted laparoscopic splenectomy in the setting of splenomegaly. *Surg Endosc* 2004; 18: 1340-3.
8. Chi DS, Abu-Rustum NR, Sonoda Y, Im HB, Jhamb N, D'Angelica M, et al. Laparoscopic and hand-assisted laparoscopic splenectomy for recurrent and persistent ovarian cancer. *Gynecol Oncol* 2006; 101: 224-7.
9. Yano H, Imasato M, Monden T, Okamoto S. Hand-assisted laparoscopic splenectomy for splenic vascular tumors: report of two cases. *Surg Laparosc Endosc Percutan Tech* 2003; 13: 286-9.
10. Uchida H, Ohta M, Shibata K, Endo Y, Iwaki K, Tominaga M, et al. Laparoscopic splenectomy in patients with inflammatory pseudotumor of the spleen: report of 2 cases and review of the literature. *Surg Laparosc Endosc Percutan Tech* 2006; 16: 182-6.

## Address for Correspondence

Cem DURAL, MD

Department of General Surgery,  
Faculty of Istanbul Medicine, University of Istanbul  
Capa, Istanbul-Turkey

E-mail: cemdural@hotmail.com