Delayed Postoperative Hemorrhage After Laparoscopic Adrenalectomy

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ABSTRACT

Introduction: The current standard surgical approach for benign adrenal disease is laparoscopic adrenalectomy. Both the transperitoneal and retroperitoneal approaches have been successfully used. We describe the unusual complication of delayed retroperitoneal hemorrhage.

Case Description: The patient is a 62-year-old man who underwent retroperitoneal laparoscopic adrenalectomy. The patient did well initially and was discharged home but presented 11 days postoperatively with abdominal pain and a large hematoma seen on computed tomography scan. An interventional radiology approach with splenic artery coil embolization was successful for management of the hemorrhage.

Discussion: Surgeons must be aware of possible severe delayed complications and the appropriate procedure for the laparoscopic approach, including usage of ultrasonic cutting instruments and delayed postoperative hemorrhage.

Key Words: Laparoscopic adrenalectomy, Postoperative hemorrhage, Complication.

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INTRODUCTION

Since its initial report in 1992, laparoscopic adrenalectomy (LA) has become the standard surgical approach for benign adrenal lesions, especially over the past decade.[1] Minimal access surgery has inherent appeal for resection of the adrenal gland, which would otherwise necessitate a large abdominal incision for an open surgical approach. Reports from multiple institutions worldwide confirm the technical feasibility, decreased morbidity, more rapid recovery, and superior cosmesis of laparoscopic adrenalectomy compared with traditional open resections.[2,3]

Transperitoneal and retroperitoneal approaches are the two principal laparoscopic access routes to the adrenal gland. The retroperitoneal approach offers particular advantages, including direct easy access to the adrenal gland, a clear view of the operative field, and good maintenance of the working space.[3–11] Conversely, the retroperitoneal approach requires more skill to overcome the drawbacks of a narrow working space and fewer anatomic landmarks.[10] Retroperitoneal LA is basically a safe and feasible procedure, with reported morbidity of 3.2% to 15%.[2,4–6,8,10,12] Bleeding, visceral injuries, and pneumothorax are reportedly the most common intraoperative complications. Port site and/or deep infections, hematomas, and thromboembolism are the most commonly reported postoperative complications of LA.[2–20] We report a rare complication of LA—delayed massive hemorrhage after a retroperitoneal LA.

CASE REPORT

A 62-year-old man with a 3-year history of hypertension was found to have a left adrenal tumor ~4 cm in size

(**Figure 1**). Blood and urine studies revealed elevated serum and urine catecholamine levels, and the tumor showed positive accumulation on a ^{131}I-MIBG scintigram. The tumor was preoperatively diagnosed as a pheochromocytoma based on clinical history and laboratory data. An LA was performed using the standard lateral retroperitoneal approach.[21] The tumor was located in the inferior part of the left adrenal gland. The left superior adrenal artery, two branches of the left inferior adrenal artery, and the left adrenal vein (central vein) observed in the inferior part of the gland were dissected and ligated with clips. The hand-activated 36-cm Ultracision Harmonic Scalpel (Ethicon Endo-Surgery, Cincinnati, OH) with curved shears, a pistol grip, and the Harmonic generator 300 were used during the procedure, with the coagulation mode used to control small vessels except the vessels described during the dissection. The operation was uneventfully completed after 133 minutes, with an estimated blood loss of 100 mL. The patient recovered from anesthesia without difficulty, resumed a normal diet on the first postoperative day, and was discharged on the fourth postoperative day without any significant postoperative events.

One week after discharge, the patient suddenly experienced severe left lateral abdominal pain radiating to the left shoulder and was seen in the emergency department. An abdominal computed tomography (CT) scan demonstrated a small amount of ascites, with a small amount of fluid collection in the left retroperitoneum (**Figure 2**), and he was immediately readmitted to the hospital. He developed progressive anemia with a documented hemoglobin level decrease from 11.9 g/dL to 9.7 g/dL. Angiography was performed the following day and showed no active bleeding. He again developed left lateral abdominal pain on the sixth day after readmission, and a second angiogram was performed, this time revealing leakage of contrast medium from a fine branch of the splenic artery (**Figure 3**). The bleeding vessel was successfully controlled with coil embolization via the splenic artery (**Figure 3**). The patient recovered with no further bleeding and was discharged on the seventh day after embolization.

DISCUSSION

Intraoperative and postoperative bleeding are well-known complications of LA and a leading cause of conversion to open surgery. Aggressive tissue handling, inappropriate use of energy devices, and/or disorientation

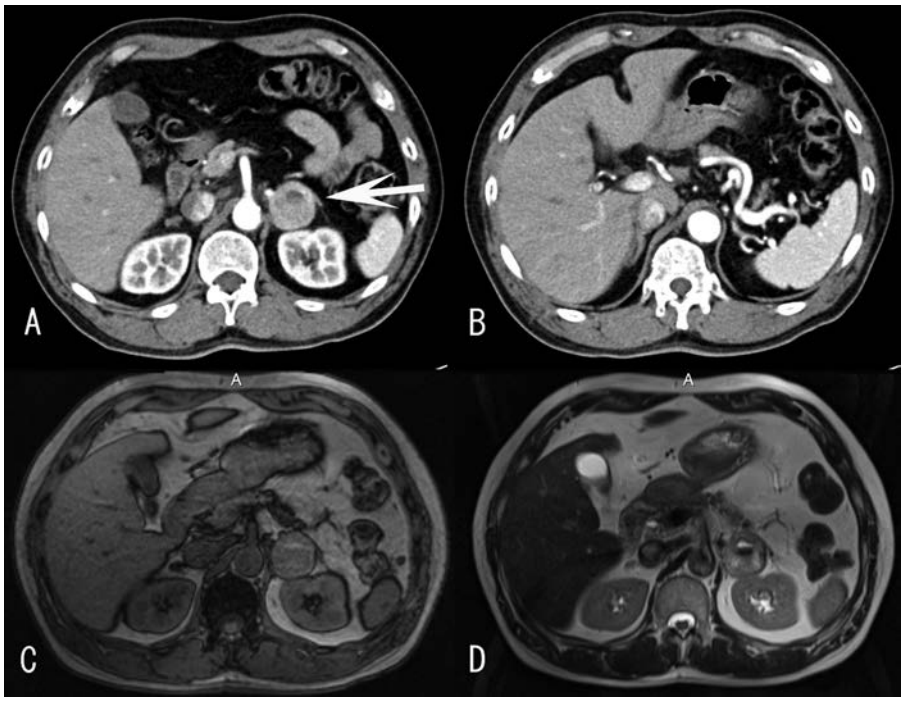

Figure 1. CT and magnetic resonance imaging (MRI) scans of the left adrenal tumor (white arrow). (A, B) Enhanced CT scan; (C) MRI T1-weighted image; (D) MRI T2-weighted image. Preoperative enhanced CT scan demonstrates the meandering splenic artery and several dilated branches (B).

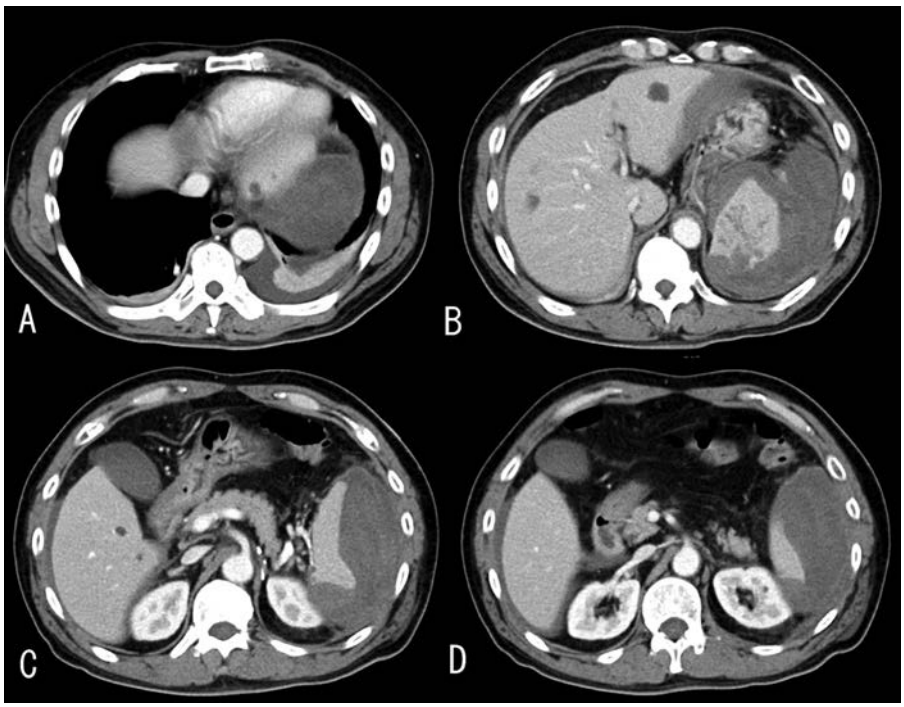

Figure 2. Enhanced CT scan demonstrates a small amount of ascites and a large retroperitoneal hematoma after laparoscopic left adrenalectomy.

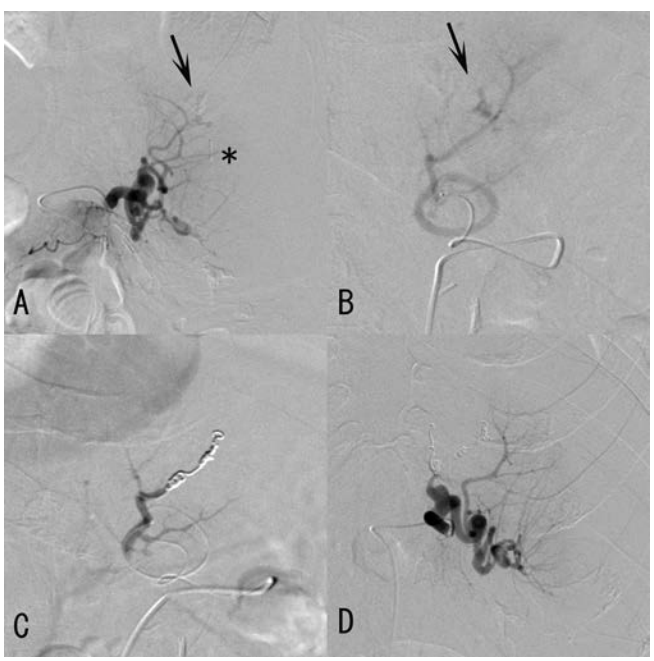

Figure 3. (A, B) Angiography confirmed extravasation from a branch of the splenic artery (black arrow) near a clip from the laparoscopic procedure (A, asterisk). (C, D) The bleeding vessel was successfully controlled with embolization via the splenic artery.

regarding the anatomy may lead to intraoperative bleeding from the adrenal cortex, adrenal vein, renal vein, vena cava, or spleen.[2–8,10–20] Postoperative hemorrhage has been described in ~1% of LA procedures immediately after the initial procedure.[22–25] However, in the present case, delayed-onset retroperitoneal bleeding developed suddenly in the patient 1 week after surgery.

In the preset case, a detailed review of the intraoperative video suggested a possible bleeding point (**Figure 4**). In the lateral retroperitoneal approach, the spleen and tail of the pancreas are located in the left upper portion of the visual field. The splenic vein and artery are not encountered in most cases, and they were not in this case. The meandering splenic artery and several branches were identified on the preoperative abdominal CT scan (**Figure 1**). During dissection of the superior part of the left adrenal gland, ultrasonic shears being used for hemostasis of small vessels near the splenic artery may have passed a little deeper than usual. Just after resection of the tumor, complete hemostasis was confirmed on review of the video and the postoperative clinical course. However, manipulation of the ultrasonic shears and the meandering branch of the splenic artery were thought to be responsible for the observed postoperative retroperitoneal bleeding. Although ultrasonic devices, including the Harmonic Scal-

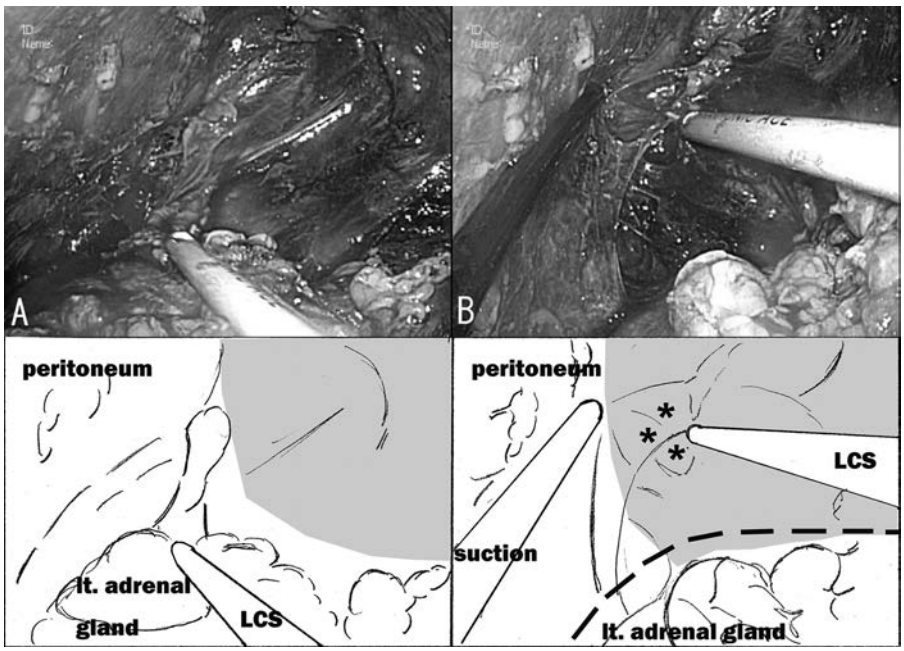

Figure 4. The hand-activated 36-cm Ultracision Harmonic Scalpel (Ethicon Endo-Surgery, Cincinnati, OH) with curved shears was used, in coagulation mode, to control small vessels. (A) Appropriate position; (B) ultrasonic shears slightly deeper than usual, which may have caused delayed postoperative hemorrhage. LCS = LaparoSonic Coagulating Shears). The gray area represents the spleen, pancreas tail, and splenic artery/vein located behind the connective tissue. *Dangerous points of injuring meandering branch of splenic artery; ——–, safe margin for avoiding vessel injury.

pel, are widely used in laparoscopic surgery and thought to be safe and efficient, caution must be exercised in the usage of ultrasonic shears and the chance for developing delayed-onset postoperative bleeding, as illustrated in the present case.

Although laparoscopic surgery is referred to as "minimally invasive surgery," unpredictable severe and fatal complications still sometimes occur. Subcapsular hepatic hematoma from a retraction injury, complete transection of the portal vein (eventually necessitating liver transplantation), and ligation of the left ureter have been reported during LA.[26,27] Surgeons must be aware of these possible severe complications including postoperative hemorrhage. A preoperative review of pertinent anatomy, appropriate use of devices intraoperatively, and precise conduct of laparoscopic procedures are essential and should be emphasized to avoid severe complications such as the one described here.

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