

# Bleeding After Right Laparoscopic Adrenalectomy

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## ABSTRACT

The current standard of care for treating benign adrenal disease is laparoscopic adrenalectomy. Surgical tools, such as ultrasonic shears and vessel sealing systems, have increased in popularity and improved surgical outcomes. However, the safety profile of clipless and sutureless adrenalectomy has not been completely established. We report on a complicated 74-year-old male who underwent significant postoperative hemorrhage following laparoscopic adrenalectomy. Interventional radiology with renal artery stent insertion was successful for the management of postoperative bleeding in this high-risk patient.

**Key Words:** Laparoscopic adrenalectomy, Clipless, Stent.

## INTRODUCTION

Today's standard of care for the surgical treatment of benign adrenal disease is laparoscopic adrenalectomy, which was first described in 1992.<sup>1</sup> The laparoscopic approach has also been routinely used for pheochromocytomas and some malignant neoplasms.<sup>2,3</sup> Various clinical studies demonstrate the safety and benefits of this procedure.<sup>4</sup> The introduction of new energy sources, such as ultrasonic shears and vessel sealing systems, in laparoscopic surgery have further improved outcomes, leading to shorter operative times, decreased blood loss, and decreased conversion rates.<sup>5,6</sup> We report a case in which significant postoperative hemorrhage resulted. The bleeding was successfully managed with the insertion of a stent in the renal artery occluding the ostium of the adrenal artery.

## CASE REPORT

A 74-year-old male was found to have an incidental heterogeneous right adrenal mass approximately 6cm in size discovered by an abdominal CT scan. A follow-up MRI further demonstrated concern for malignancy secondary to size (5.8cm x 6.4cm), signs of hemorrhage, and lack of a lipid-rich signal. The patient elected to undergo laparoscopic adrenalectomy. Past medical history is significant for multiple comorbidities including coronary artery disease, obesity, and a history of gastric and aortic surgery.

The procedure required extensive adhesiolysis, but otherwise, dissection of the tumor proceeded without intraoperative complications. A small second right adrenal vein was identified and ligated with bipolar diathermy. The right renal artery was identified and safeguarded. The tumor was successfully removed and closure was without incident. Apart from the main adrenal vein, the dissection was completed utilizing the Harmonic Scalpel (Ethicon Endo-Surgery, Inc., Cincinnati, OH) and LigaSure (Valleylab, Boulder, CO) devices.

The hand activated 36-cm Ultracision Harmonic Scalpel (Ethicon Endosurgery, Cincinnati, OH) with curved shears, a pistol grip, and the Harmonic generator 300 was used. The power settings on the generator were 3 and 5. The "coagulation" mode was used during the entire infe-

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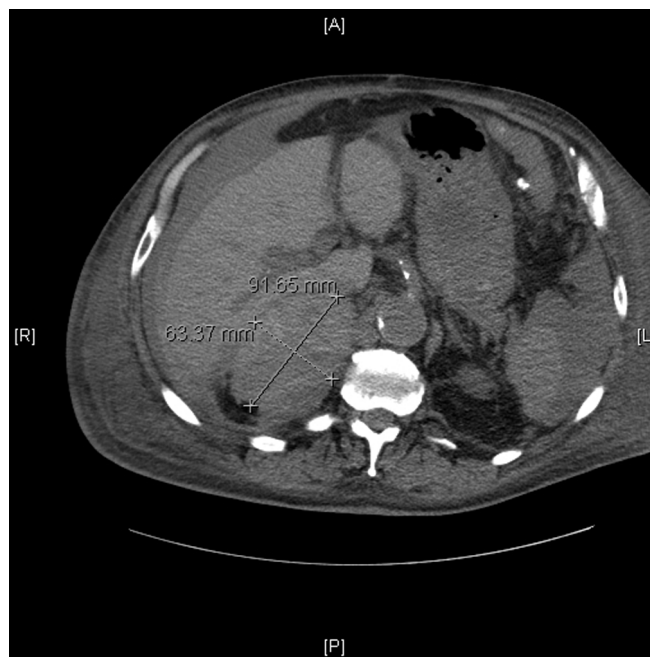
rior and medial dissection of the specimen during the surgery. The 10-mm LigaSure Atlas device was also used for tissue that was felt to be vascular. The adrenal vein was controlled with 5-mm Hem-o-lok clips, but all the other smaller vessels encountered during the dissection were controlled with the LigaSure Atlas or the Harmonic Scalpel.

Adhesiolysis was required for extensive adhesions between the small bowel and the anterior abdominal wall due to previous surgery. The adhesions were taken down with cold endoscopic scissors. At the end of the adhesiolysis, there were no problems with exposure to the adrenal anatomy. At the end of the surgery, pneumoperitoneum was decreased to 5mm Hg to ensure that there was no bleeding in the adrenal fossa. The use of a hemostatic agent was considered but not required, because there was no concern about inadequate hemostasis.

The patient underwent a stormy postoperative course. He was admitted to the intensive care unit after suffering a perioperative myocardial infarction and placed on intravenous heparin drip within 24 hours of surgery. On postoperative day one, we noticed a significant drop in hemoglobin that increased appropriately after he received 4 units of packed red blood cells. He remained stable until his date of discharge on postoperative day 6. However, he was admitted to an outside hospital with fatigue, hypotension, and chest pains approximately 12 hours after discharge. The patient was emergently transferred to our hospital via medical evacuation helicopter. A CT scan showed active retroperitoneal hemorrhage (**Figure 1**), and he required 7 units of packed red blood cells. His serum creatinine was 1.9mg/dL. It was decided to perform angiography to localize the bleeding, because the patient was at high risk for re-exploration due to his recent myocardial infarction. An aortogram revealed active bleeding from an adrenal artery off the right renal artery (**Figure 2**). The bleeding vessel was controlled with a covered stent in the renal artery, because embolization of the short adrenal artery stump was not possible. The patient recovered with no further bleeding and was discharged to an extended care facility.

## DISCUSSION

Current advances in laparoscopic surgery have included the use of ultrasonic shears and vessel sealing systems, which have been thought to obviate the need for clips, sutures, or staples for hemostasis when smaller vessels are involved. Recent reports have confirmed the safety of performing laparoscopic adrenalectomy entirely without



**Figure 1.** Computed tomographic imaging with a large retroperitoneal hematoma following laparoscopic right adrenalectomy.



**Figure 2.** Aortography confirms bleeding from right adrenal artery off the renal artery.

the use of clips, including control of the right adrenal vein.<sup>7</sup> Tributaries of the left renal vein, the renal, adrenal and lumbar veins, are routinely controlled with bipolar coagulation. Recently, 2 studies specifically demonstrated favorable results during clipless laparoscopic adrenalectomy. No cases of major secondary postoperative bleeding were found in either study.<sup>5,8</sup>

However, this case demonstrates that caution should still be applied with these new technologies. It is not possible to know with certainty that the placement of a clip would have prevented secondary bleeding, but it was demonstrated that bipolar cautery was not sufficient in this case. In the presented patient, heparinization on the first postoperative day was a major contributing factor, but placement of a clip on the adrenal artery would have likely prevented the complication. However, most adrenal arteries are small and cannot be consistently and individually recognized.

We recommend that the right adrenal vein be managed with locking clips after circumferential dissection of the vessel. We believe that while bipolar coagulation, especially with devices like the LigaSure, will control the right adrenal vein in most instances, occasional loss of control with a short adrenal vein may result in significant caval bleeding. Furthermore, inadvertent caval injury during LigaSure application of the right adrenal vein is possible if the vein is not adequately dissected.

Management of postoperative bleeding with angiography and endovascular stenting or embolization is well recognized. Angiography allows for direct visualization of the site of extravasation, which then allows for a decision of surgical versus endovascular control. However, it is important to note that active bleeding is necessary to identify the source. One particular advantage of percutaneous endovascular stenting is that it allows the management of postoperative hemorrhage in patients who are at high risk for exploratory surgery or who would otherwise have to undergo a major operative procedure to control the bleeding.<sup>9</sup>

## CONCLUSION

This case shows that the clipless surgical technique in laparoscopic adrenalectomy carries a risk of major postoperative hemorrhage in high-risk patients. We suggest

that clips may be considered for hemostasis during laparoscopic adrenalectomy especially for the right adrenal vein. Active bleeding can be adequately managed with angiography and endovascular stenting without having to surgically explore a high-risk patient.

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