

Management of a Major Complication of Robotic Partial Nephrectomy

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Abstract

Robotic partial nephrectomy (RPN) offers faster recovery time, shorter hospital stays, and decreased intraoperative blood loss. Thus, it has become a frequently preferred technique. Different major and minor complications may occur in RPN. However, there are insufficient data regarding the management of robotic surgery-related complications. A 62-year-old man presented with an incidental left renal mass. Magnetic resonance imaging demonstrated a 3.3x3.1x3.8 cm solid and contrast-enhanced renal mass localized at the lower pole of the left kidney. The PADUA score was 7. We performed robotic left partial nephrectomy (PN). Perioperative bleeding, warm ischemia time, and operation time were 100 cc, 26 min, and 180 min, respectively. There were no unexpected events during the operation. During the postoperative 2nd hour in the recovery room, the patient had syncope, hypotension, and tachycardia. Urgent ultrasonography demonstrated a 7x6 cm retroperitoneal hematoma. The selective renal angiography and embolization (SRAE) technique was preferred to manage the complication. Intra-arterial access was provided by femoral artery cannulation in the supine position under local anesthesia. Pseudoaneurysm was observed as a sign of bleeding in the lower pole segmental artery. An endovascular coiling procedure was performed on the pseudoaneurysm originating from the lower pole renal artery. The patient's post-angioembolization course was uneventful, with no other complications after the intervention. The patient was discharged after five days of follow-up. Complications following RPN performed by experienced surgeons can be acceptably low. However, postoperative arterial malformation leading to hemorrhage can be life-threatening. It has been reported that minimally invasive PN increases the risk of arterial malformation compared with open PN, and the reported incidence varies by approximately 3-10%. In our case, we preferred SRAE because surgical exploration had a potential risk of nephrectomy. SRAE is a technically feasible and safe option for managing arterial hemorrhage after RPN.

Keywords: Arterial embolization, complication, endourology, radiology, robotic partial nephrectomy, urooncology

Introduction

Partial nephrectomy (PN) is the surgical method of choice for small renal masses, and it has been applied for larger and complex renal masses recently (1). Robotic partial nephrectomy (RPN) has become a more beneficial and frequently preferred technique because it offers faster recovery time, shorter hospital stays, and decreased intraoperative blood loss (2). It has been reported that complications following RPN are approximately 30%, with a major (Clavien \geq 3) complication rate of 3-6% (3). However, there are insufficient data regarding the management of robotic surgery-related complications. Therefore, it is crucial to determine the perioperative and postoperative management of complications in robotic surgery.

In this video presentation, we present our initial experience with managing a major complication in a patient with a segmental artery hemorrhage after a robotic PN.

Case Presentation

From 2018 to 2022, robotic PN was performed on 40 patients (24 males, 16 females). The mean age was 52.75 (34-72) years. There were no other complications other than hemorrhage (in 3 patients). A 62-year-old man presented with an incidental left renal mass. The patient had no other disease or drug use. The patient's physical examination was normal. The preoperative hemoglobin/hematocrit (Hgb/Hct) was 11.3/34. Magnetic resonance imaging demonstrated a 3.3x3.1x3.8 cm solid and

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contrast-enhanced renal mass localized at the lower pole of the left kidney. The PADUA score was calculated as 7. Preoperative preparations were completed. We performed robotic left PN. Perioperative bleeding, warm ischemia, and operation time were 100 cc, 26 min, and 180 min, respectively. There were no unexpected events during the operation. The postoperative Hgb/Htc was 10.7/32. During the postoperative 2nd hour in the recovery room, the patient had syncope, hypotension, and tachycardia. Urgent ultrasonography demonstrated a 7x6 cm retroperitoneal hematoma. After the evaluation of the hemodynamic parameters and radiological findings, an emergency intervention was planned. The selective renal angiography and embolization (SRAE) technique was preferred to manage this complication. The patient was transferred to the interventional radiology clinic. Intra-arterial access was provided by femoral artery cannulation in the supine position under local anesthesia. A microcatheter was placed distal to the renal artery, and renal angiography was performed. Transfemoral renal angiogram demonstrated a small renal artery pseudoaneurysm arising from a small, laterally directed branch of the left interlobar artery. A microcatheter was advanced into the pseudoaneurysm, and contrast was injected to better define the anatomy. The endovascular coiling procedure was applied to the pseudoaneurysm originating from the lower pole segmental artery. No further extravasation was observed, and only minimal parenchyma was sacrificed. The patient's post-angioembolization course was uneventful, with no other complications after the intervention. The patient was discharged after five days of follow-up. The pathology report showed a clear cell type of renal cell carcinoma with a negative surgical margin (T1N0M0). There was no recurrence or metastasis during the first 18 months of postoperative oncological follow-up. It was observed that renal function was also preserved.

Discussion

SRAE is an effective treatment option in patients with hemorrhagic complications after RPN. RPN is the increasingly preferred surgical technique for small renal masses, allowing the surgeon to approach relatively complex masses and providing the advantages of minimally invasive surgery (4). Complications following RPN performed by experienced surgeons can be acceptably low (5). However, postoperative arterial malformation leading to hemorrhage can be life-threatening. It has been reported that minimally invasive PN increases the risk of arterial malformation compared with open PN, and the reported incidence varies by approximately 3-10% (6). In our series, the incidence of hemorrhage was similar to that reported in the literature, with a rate of 7.5%.

It is crucial to determine the postoperative management of complications following robotic surgery. The majority of acute postoperative bleeding cases can be managed with transfusion and follow-up. Additional interventions, such as surgical exploration or SRAE, may be required in relatively few cases. Acute abdominal signs, high-volume drainage, and hemodynamic instability may indicate additional interventions. Because surgical exploration mostly results in the completion of nephrectomy, SRAE may be preferred in selected cases because of the low incidence of adverse effects (7). In this study, we preferred SRAE because surgical exploration had a potential risk of nephrectomy.

Conclusion

The video demonstrates that SRAE effectively treats major bleeding, avoiding aggressive approaches. SRAE is a technically feasible and safe option for managing arterial hemorrhage after RPN.



Video 1.

Ethics

Informed Consent: Patient consent was obtained.

Authorship Contributions

Surgical and Medical Practices: B.Ö., M.F.Ş., U.A., B.E., F.G., Concept: B.Ö., M.F.Ş., F.G., A.E., Design: B.Ö., M.F.Ş., A.E., Data Collection or Processing: M.F.Ş., U.A., B.E., Analysis or Interpretation: B.Ö., F.G., A.E., Literature Search: M.F.Ş., U.A., B.E., Writing: B.Ö., M.F.Ş., U.A., B.E.

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