

# Endovascular Management of Surgically Uncontrolled Hemorrhage Following Post-Radical Nephrectomy: A Case Report

Radikal Nefrektomi Sonrası Cerrahi Olarak Kontrol Edilemeyen Kanamanın Endovasküler Yöntemle Tedavisi: Olgu Sunumu

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## Abstract

We present an isolated right lumbar arterial hemorrhage following right radical nephrectomy. Surgical re-exploration was unsuccessful therefore active bleeding was diagnosed and treated with endovascular approach.

**Keywords:** Arterial embolization, Lumbar artery, Nephrectomy, Hemorrhage

## Öz

Sağ radikal nefrektomi sonrası gelişen izole sağ lomber arteriyel kanama olgusu sunuldu. Cerrahi re-eksplorasyonda başarısız olunması nedeniyle aktif kanamaya endovasküler yaklaşımla tanı konularak tedavisi yapıldı.

**Anahtar Kelimeler:** Arteriyel embolizasyon, Lomber arter, Nefrektomi, Kanama

## Introduction

Retroperitoneal hematoma secondary to lumbar artery injury is a rare but life-threatening condition (1). Although it may be spontaneous in patients receiving anticoagulants, majority of the cases appear as a consequence of trauma or as a complication following open surgery, laparoscopic surgery or percutaneous interventions (2). Renal injury or vascular injury to the posterior abdominal wall during open or percutaneous interventions may lead to active extravasation, pseudoaneurysm or arteriovenous fistula formation (3). Pseudoaneurysms possibly will give rise to consequent acute or delayed retroperitoneal bleeding since they develop gradually from an overlooked focal arterial wall disruption and an urologist should be aware of this postoperative complication. Clinical spectrum of retroperitoneal bleeding ranges from a self-limiting hematoma to a persistent bleeding leading to hypovolemic shock (4). Treatment options for significant retroperitoneal bleeding include conservative

management, transarterial embolization and surgical exploration. Persistent hemorrhage despite a proper conservative treatment should indicate a surgical or endovascular intervention to avoid severe morbidity and mortality. Conventional management of persistent bleeding has been surgical exploration and ligation of the bleeding artery. Endovascular treatment has been shown to be a very effective procedure in the management of arterial bleeding in various locations and it can also be used in case of persistent bleeding after surgical exploration (2).

## Case Presentation

A 79-year-old male presented to our hospital owing to right flank pain. His physical examination and past medical history was unremarkable. On admission, urine culture was negative and blood urea nitrogen, creatinine; blood electrolyte and hemoglobin levels were within normal limits. Ultrasound (US)

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and computed tomography (CT) scans showed a renal mass measuring 5x3.5 cm in the mid-pole of the right kidney (Figure 1a). An open right radical nephrectomy was performed for treatment. On postoperative follow-up, a sudden decline in the hemoglobin level from 13.3 g/L to 6.96 g/L was monitored. Drainage catheter output was hemorrhagic and above 350 mL/day. The fall in the hemoglobin level persisted despite transfusion of three units of erythrocyte suspension. US, and further CT scans revealed a right retroperitoneal hematoma measuring 16x10 cm and contrast extravasation from a lumbar artery branch (Figure 1b). Emergency surgical exploration was performed. However, no active arterial bleeding could be identified and only an oozing from the iliopsoas muscle was present after evacuation of the hematoma. The patient persisted with hemoglobin decrease following the surgical exploration and the hemoglobin level dropped from 11.5 g/dL to 6.9 g/dL within 24 hours despite 2 units of erythrocyte suspension and 3 units of fresh frozen plasma transfusions. The patient was referred to the interventional radiology unit for diagnostic and therapeutic intervention. Non-selective abdominal angiograms showed no arterial extravasation but selective right third lumbar artery injection revealed active extravasation from a dorsal branch (Figure 1c). This branch was catheterized with a microcatheter and occluded with injection of 1 mL of 15% N-butyl cyanoacrylate (NBCA) (Histoacryl; Braun, Aesculap AG, Germany) diluted with iodized oil (Lipiodol Ultra-Fluide, Guerbet, Aulnay-sous-Bois, France). Control angiograms revealed permanent occlusion of

the dorsal branch of the third right lumbar artery and cessation of extravasation (Figure 1d). Clinical success was achieved after the procedure and the hemoglobin level progressively improved over the following days.

Written informed consent was obtained from the patient.

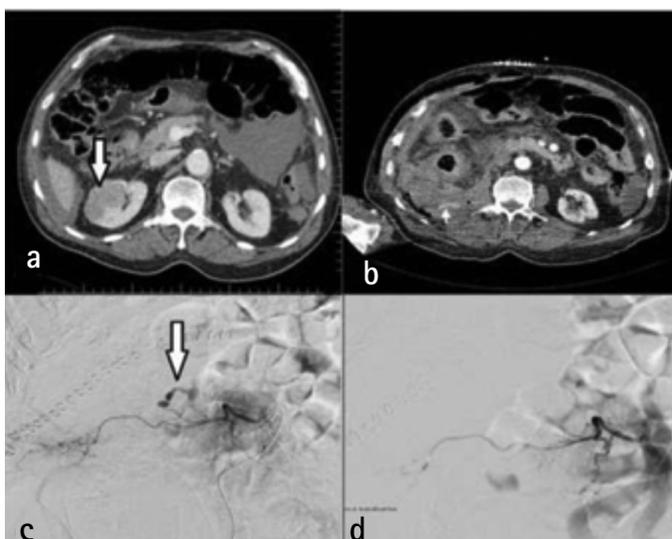
## Discussion

Symptomatic retroperitoneal bleeding requires prompt diagnosis and therapy. Endovascular therapy has been accepted as a minimally invasive, safe and effective procedure for treating acute arterial bleeding. It offers several advantages over surgical exploration for the treatment of acute arterial bleeding: it is performed without general anesthesia and operative blood loss, tamponade effect of the hematoma is preserved, and the patient's recovery time is shorter (2,5).

Lumbar arterial bleeding is an infrequent complication after renal surgery, which may be life-threatening. The lumbar arteries are typically paired vessels that originate from the posterior abdominal aorta. After they surround the vertebral bodies, they split into small branches that supply the psoas muscle and the radicular medullary arteries which accompany the spinal nerve roots to split into anterior and posterior spinal arteries. After then, the arteries split into two branches. The posterior branch of the artery supplies the sacrospinalis muscle and skin of the back. The anterior branch supplies the quadratus lumborum, sacrospinalis muscles and skin of the flank region. These muscular branches that course dorsally to the kidney are prone to injury during any renal surgery or biopsy (6). Significant bleeding due to lumbar artery and/or deep circumflex iliac artery injury has been reported in 3.7% of cases after various laparoscopic procedures (7). To the best of our knowledge, this is the second report in the English literature describing lumbar arterial bleeding following radical nephrectomy. The first case describing lumbar artery hemorrhage complicating radical nephrectomy for renal infarction and perirenal haematoma was reported by Geldof et al. (8).

Lumbar arterial bleeding may present a major diagnostic and therapeutic problem. Selective lumbar arterial angiogram has been shown to be very effective in locating the bleeding artery, which could not be identified with surgical exploration (2,4). In our case, selective lumbar angiography made it possible to detect the source of bleeding which surgical exploration could not.

Co-axial microcatheters and various embolic agents provide selective embolization of the arterial bed at any desired level. Choice of the embolic agent depends on the target vessel size, the target organ to be embolized, and whether permanent, temporary or repeated embolization is required (3). In this case,



**Figure 1.** a) Preoperative abdominal computed tomography scan shows the mass (arrow) located at the lateral side of the right kidney. b) Postoperative abdominal computed tomography shows extensive retroperitoneal hematoma and mild contrast extravasation (arrow). c) Pre-embolization angiogram of the right third lumbar artery shows the active bleeding from a dorsal branch of the lumbar artery. d) Angiogram after embolization of the dorsal branch with 15% N-butyl cyanoacrylate and lipiodol mixture shows cessation of extravasation in the dorsal branch of the right third lumbar artery

permanent distal branch embolization with 15% NBCA-iodized oil mixture was performed after highly selective catheterization of the branch with the co-axial microcatheter since NBCA has been reported to provide faster and more effective embolization in distal branches (2). Proximal embolization with coils was not preferred to prevent retrograde re-bleeding from collateral pathways.

To conclude, urologists should be aware of lumbar artery injury complicating renal surgery in the immediate postoperative period. Highly selective angiograms and embolization of the bleeding artery is an effective procedure and a preferable alternative to surgical exploration for immediate cessation of active bleeding.

### Ethics

**Informed Consent:** Written informed consent was obtained from the patient.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: A.D., U.Ö., Concept: A.D., Design: A.D., Data Collection or Processing: A.D., Analysis or Interpretation: U.Ö., Literature Search: A.D., Writing: A.D.  
**Conflict of Interest:** No conflict of interest was declared by the authors.

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