

# Iatrogenic Renal Rupture in Conduitoscopy - A Diagnostic Trauma

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## Abstract

This unique case is the first published renal rupture with hematoma as a result of conduitoscopy. Whilst cases of renal hematoma following ureteropyeloscopy are a recognized entity, published complications following conduitoscopy are absent from the literature. This case serves as a warning that even simple conduitoscopy can result in life threatening bleeding and demonstrates the need for caution and risk management with diagnostic procedures. It is hoped that by individual patient assessment for specific risk factors, and by harm reduction methods, such complications may be avoided in the future.

**Keywords:** Renal rupture, conduitoscopy, endourology

## Introduction

Here we present a novel case of a severe iatrogenic renal rupture and perinephric hematoma following a conduitoscopy to investigate recurrent macroscopic hematuria following commencement of apixaban for atrial fibrillation. The patient had previously undergone cystectomy and ileal conduit formation 15-years prior for high-grade non-muscle invasive bladder cancer with carcinoma *in situ*. Recurrence of urothelial cell carcinoma post-cystectomy is a well-known risk, typically identified within the remaining urothelial tissue (1). As a result, the assessment of a patient's urological tract in the instance of hematuria must exclude disease recurrence. Whilst upper tract investigation is typically performed using delayed computed tomography (CT), our patient was affected by chronic kidney disease (with GFR 18), hence a flexible conduitoscopy and conduitogram was undertaken.

## Case Report

A 77-year-old female with a background of cystectomy and ileal conduit formation 15-years prior presented to a district hospital for conduitoscopy and conduitogram. The case was complicated by a significant renal rupture causing a right renal interpolar artery pseudoaneurysm, and resulted in a prolonged hospital stay with multiple post-operative complications.

The patient had previously undergone cystectomy for high-grade non-muscle invasive urothelial carcinoma and carcinoma *in situ* of the bladder. Over the past 12 months, she had recurrent macroscopic hematuria in the context of newly started anticoagulation, recurrent urinary tract infections, bilateral severe hydronephrosis with a non-functional, atrophic left kidney, and chronic kidney disease. Pre-operative non-contrast CT demonstrated no clear cause and urine cytology was atypical. The bilateral hydronephrosis was presumed to be a result of ureteric reflux secondary to the ileal conduit. Our patient also had a significant medical history including cervical cancer with prior radiotherapy, recurrent small bowel obstruction, colostomy, hypertension, and being a current smoker. She lived alone and was independent in her activities of daily living. Flexible conduitoscopy was performed under general anesthesia in the supine position with an antibiotic cover. Apixaban had been withheld for 72-hours. An 18Fr Olympus flexible cystoscope was inserted into the ileal conduit with gravity fed normal saline irrigation. The procedure was challenging because of a tortuous distal conduit. The intraoperative conduitogram demonstrated a dilated right-sided collecting system without mucosal abnormalities; the anastomosis could not be visualized endoscopically and visual inspection of the upper tracts was not undertaken (Figure 1). Within the conduit, two polyps were identified and biopsied using a piranha forcep. Second opinion from the on-call colorectal surgeon was gained given the lesions did not appear to be urothelial in nature. A repeat

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conduitogram was completed following biopsy, which did not demonstrate any contrast extravasation. The procedure took approximately 60 minutes and the patient's haemodynamics were stable throughout with systolic blood pressure between 120-140 mmHg. Whilst in recovery, the patient required inotropic support and developed worsening right flank pain. Serial venous blood gas demonstrated a falling hemoglobin 104g/L to 68g/L. A triple phase CT identified a 9.7x9.8x7.4 cm right-sided perinephric renal hematoma with multifocal areas of cortical disruption and contrast extravasation consistent with arterial injury (Figure 2). The patient was resuscitated and stabilized before being transferred to the nearest tertiary facility for interventional radiology management selective embolization. She underwent digital subtraction angiography, which identified an active blush of contrast on the right-side emanating from a 1.5 cm pseudoaneurysm of an interpolar artery (Figure 3). The vessel was successfully mobilised using a 2x5 mm coil.

In the subsequent days, her renal function deteriorated, with peak creatinine reaching 476 before the commencement of hemodialysis. She also developed systemic inflammatory response syndrome (SIRS) with fevers, C-reactive peptide (CRP) 392 and a white cell count (WCC) 16.7. IV ceftriaxone was started to cover the chest, urinary, and infected hematoma source. A chest tube was placed to drain a large, reactionary right-sided pleural effusion. One month following her initial

procedure, she remained on dialysis with ongoing low-grade temperatures. Repeat imaging demonstrated an interval increase in the perinephric hematoma size with stable hemoglobin, so a drain was inserted under radiological guidance. Subsequent draining cultures were positive for *Bacteroides fragilis*. A second drain was placed weeks later due to slow interval size reduction in follow-up imaging, with repeat drain cultures positive for a resistant *Escherichia coli* and *Enterococcus faecalis*. Antibiotics were then changed to IV tazocin and ciprofloxacin. The drains were removed with a daily output under 50 mls of serious fluid.

One month later the patient developed fevers and flank pain again with imaging demonstrating a reaccumulation of her perinephric collection. A new drain was inserted and remained for a further 6-weeks with repeat imaging demonstrating



Figure 1. Conduitogram with right-sided reflux

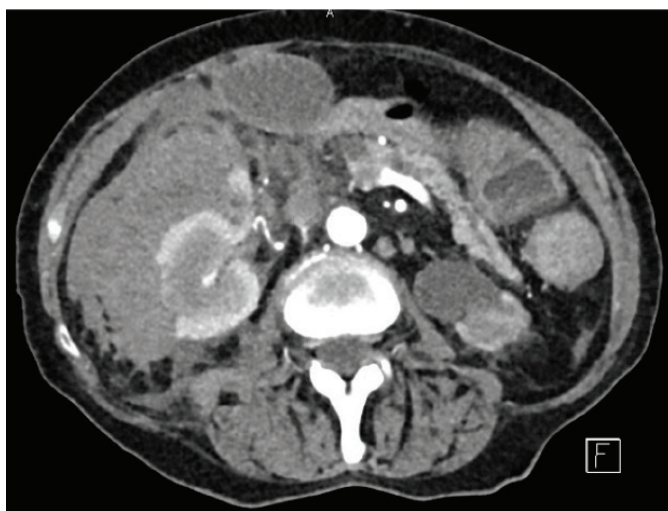


Figure 2. Axial CT with arterial extravasation

CT: Computed tomography

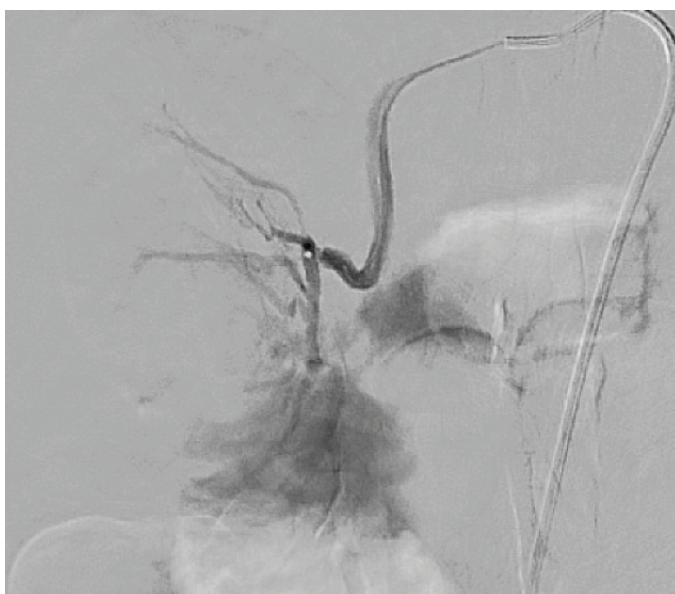


Figure 3. Embolisation of right interpolar artery

almost complete resolution of her collection. At this stage, hemodialysis continues with normalizing interval renal function and reasonable residual cortex of her right kidney. The outpatient follow-up has been arranged with serial imaging. Histology of the large ileal conduit lesions has returned as benign inflammatory tissue.

## Discussion

Conduitoscopy is a procedure with limited indications, and as a result of small case numbers, evidence regarding its complications is not well published in the literature. This is the first reported case of renal rupture following conduitoscopy, a life threatening complication from a fairly innocuous procedure. We believe the tight stoma combined with a longer than anticipated operation and poor pre-existing renal parenchyma resulted in significant reflux, renal rupture akin to an AAST Grade 4 injury, and a renal segmental artery pseudoaneurysm.

A recent systematic review found that ureteropyeloscopy for the management of renal and ureteric stones had a peri-renal hematoma rate of 0.45% (2). Studies within this demographic have identified several risk factors for hematoma development, which include moderate to severe hydronephrosis, large stone burden, renal cortex thinning, prolonged operative durations, low body mass index, hypertension, and high pressure irrigation (2-8). Several of these factors were present in this study and may explain why a reasonably non-invasive procedure was complicated by such significant pathology. However, risk reduction was also undertaken by way of using low-pressure irrigation and the procedural outcome was an unwelcome surprise.

The rationale behind conducting a conduitogram was based on the need for upper tract assessment for urothelial lesions. The non-contrast CT imaging had demonstrated bilateral hydronephrosis but no cause for hematuria was identified. Several factors limit the utility of non-contrast imaging in this setting, including inability to identify small urothelial lesions or arteriovenous pathology. Although CT IVP is the standard form of imaging with a sensitivity of 88-100% in the identification of upper tract urothelial lesions, our patient's renal failure prevented this (9). A study by Razavi et al. (9) demonstrated 69% sensitivity of MR urography for upper tract malignancy, and as a result, this was not undertaken in favor of conduitogram that would allow for radiographic and histopathological assessment (10).

Despite using gravity fed irrigation no more than 60 cm H<sub>2</sub>O and a small French flexible scope, a renal rupture occurred. The message is to use an abundance of caution, avoid high

pressure irrigation particularly in open refluxing anastomosis, and recognize the deteriorating patient early despite them having a minor procedure. In terms of avoiding similar events in the future, we suggest care when investigating, if possible use of CT IVP rather than conduitogram, and ideally perform the procedure under local anesthetic so the patient can provide feedback during the operation.

## Ethics

**Informed Consent:** Informed consent was obtained.

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

## Authorship Contributions

Surgical and Medical Practices: J.K., E.L., Concept: E.L., Design: J.K., Data Collection or Processing: J.K., Analysis or Interpretation: J.K., E.L., Literature Search: J.K., Writing: J.K.

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