

## Case Report

# Successful management of a fistula between an external iliac artery and an ileal conduit with endovascular embolization and vascular bypass

Sho Sekito,  Takehisa Onishi, Takashi Terabe and Takuji Shibahara

Department of Urology, Ise Red Cross Hospital, Ise, Mie, Japan

### Abbreviations & Acronyms

CIA = common iliac artery  
CT = computed tomography  
IC = ileal conduit

**Correspondence:** Takehisa Onishi M.D., Department of Urology, Ise Red Cross Hospital, 471-2 Hunae, Ise, Mie 516-8512, Japan. Email: iseredcrossuro@gmail.com

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**Introduction:** Fistula formation between an ileac artery and an ileal conduit after radical cystectomy is a rare complication.

**Case presentation:** A 72-year-old woman underwent laparoscopic radical cystectomy with ileal conduit. After surgery, leakage of ileal-ureteral anastomosis with infection was observed. Five months after surgery, sudden bleeding from the ileal conduit occurred that stopped spontaneously. Contrast-enhanced computed tomography suggested a pseudo aneurysm of the right external iliac artery in contact with the ileal conduit. A fistula between the artery and ileal conduit was suspected. She underwent embolization of the common iliac artery and femorofemoral bypass. She had a good clinical course and no sign of hematuria over 6 months of follow-up.

**Conclusion:** An episode of warning hemorrhage from the urostomy is an important sign of fistula, and endovascular treatment is a feasible approach to treat this condition.

**Key words:** aneurysm, endovascular embolization, external iliac artery, fistula, ileal conduit.

## Keynote message

Fistula formation between an artery and IC after radical cystectomy is very rare. Massive bleeding from the IC could be an important sign of fistula formation. Endovascular treatment might be a feasible approach for this condition.

## Introduction

Fistula formation between the external iliac artery and IC after radical cystectomy is rare and can be life-threatening. Rapid diagnosis and emergency treatment are required in case of bleeding from the urostomy, and a fistula should be considered in this condition. Here, we present a case of fistula formation between an external iliac artery and IC following laparoscopic radical cystectomy that was treated with vascular intervention. A short review of the literature is provided to evaluate the possibility of diagnosis and treatment of arterial fistula formation resulting in a clinical benefit.

## Case presentation

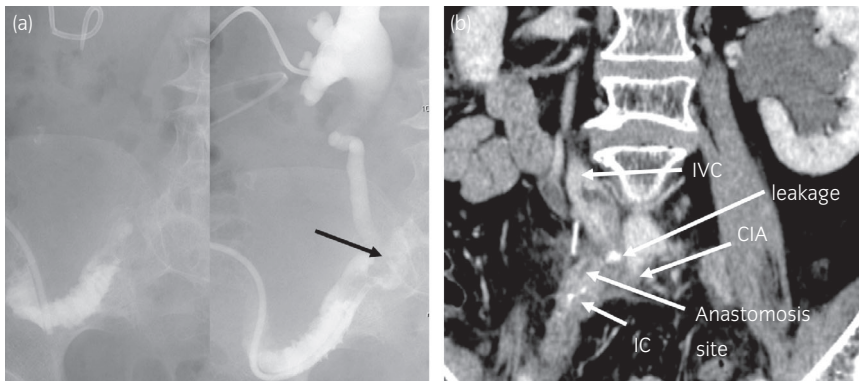
A 72-year-old woman was diagnosed with muscle-invasive bladder cancer at the bladder neck and underwent laparoscopic radical cystectomy with IC urinary diversion and bilateral pelvic lymph node dissection following neoadjuvant chemotherapy. Wallace anastomosis was carried out, and ureteral stents were inserted. At the operation, we covered the exposed external iliac artery with fat to prevent direct contact with the ureter. The right ureteral stent fell out spontaneously 6 days after surgery. She had a fever 8 days after surgery. Ultrasound scan showed right hydronephrosis and laboratory tests revealed high levels of serum creatinine (3.32 mg/dL), white blood cells ( $9.0 \times 10^3/\mu\text{L}$ ), and C-reactive protein (10.39 mg/dL). We diagnosed right pyelonephrosis, and right percutaneous nephrostomy was performed,

followed by treatment with antibiotics. Twenty-nine days after surgery, laboratory tests revealed high levels of serum creatinine and ultrasound scan showed left hydronephrosis. Retrograde ileal conduitography showed leakage at the site of ileal-ureteral anastomosis (Fig. 1a). Bleeding occurred from the conduit suddenly when we inserted a catheter into the IC to inject additional contrast medium. Contrast-enhanced CT showed no source of bleeding, and there was leakage along the inferior vena cava (Fig. 1b). The left ureteral stent was removed, and left percutaneous nephrostomy was performed. The focus of infection appeared to be the urine leakage site, and antibiotic therapy was started. Thirty-three days after surgery, macrohematuria from the IC was observed, but it stopped in a few hours with bed rest. Three months after surgery, antegrade pyelography revealed good flow to the IC and no leakage at the site of the ileal-ureteral anastomosis. The bilateral nephrostomy catheters were removed. She was readmitted 5 months after surgery with sudden bleeding from the stoma, but no source was identified on CT (Fig. 2a). She was kept at rest in bed, and the bleeding stopped on the following day. Massive rebleeding was seen 4 days later with shock, and it stopped spontaneously again. CT suggested an enlarged pseudo aneurysm of the right external iliac artery that crossed the IC. Soft tissue mass surrounding common and external iliac artery which may suggest the existence of inflammation was observed (Fig. 2b). Arteriography revealed an aneurysm at the right external iliac artery and no extravasation from the aneurysm (Fig. 3a). A fistula between the right external iliac artery and IC was suspected. She underwent embolization of the right CIA with endovascular treatment. Under general

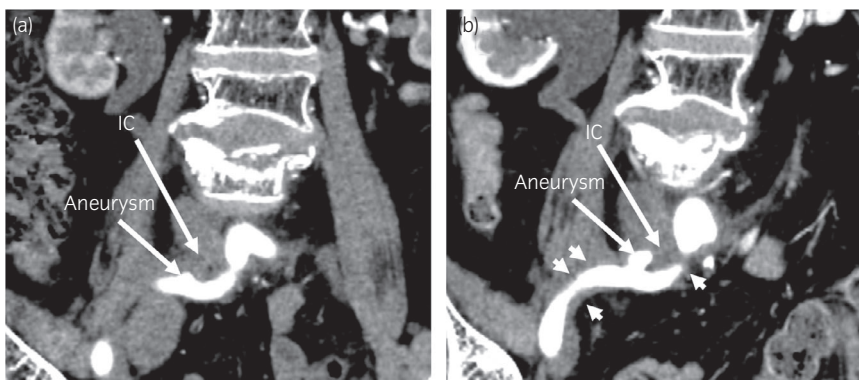
anesthesia, the amplatzer vascular plugs and embolization coils were inserted from the left superficial femoral artery and deployed in the right external, internal and common iliac arteries (Fig. 3b). Femorofemoral bypass was subsequently performed for vascular reconstruction. Postoperative CT revealed no perfusion of the right iliac artery (Fig. 3c). The patient's postoperative course is promising, and she has remained well with no infection or bleeding over 6 months of follow-up.

## Discussion

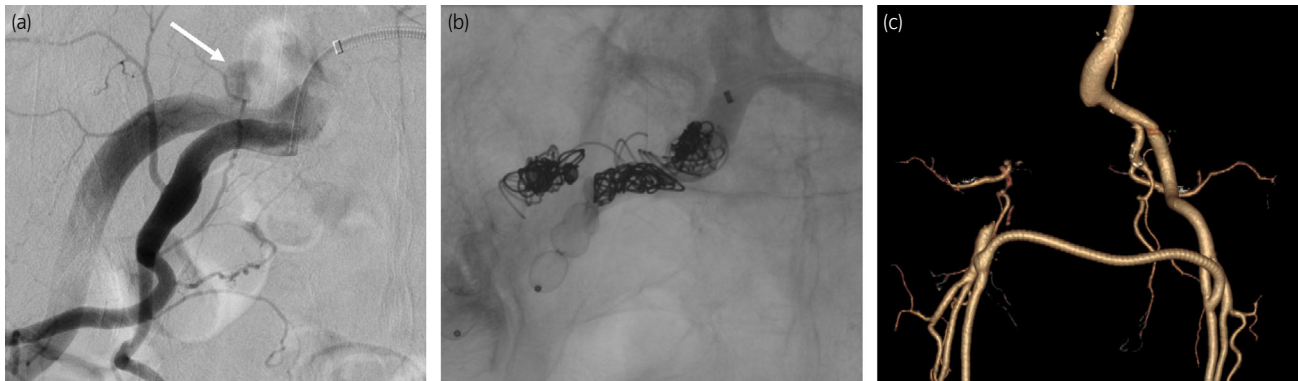
A fistula formation between an artery and the urinary tract is a relatively rare condition that can be life-threatening. Previous pelvic surgery, radiotherapy, an indwelling ureteral stent, urinary diversion, iliac artery pseudoaneurysm, severe atherosclerosis, and chemotherapy and cancer are known risk factors.<sup>1,2</sup> The formation of a fistula between an artery and IC after radical cystectomy is very rare, and only seven cases have been reported (Table 1). Gross hematuria was observed in all patients, and six cases experienced light bleeding episodes from the urostomy before fatal bleeding.<sup>2-8</sup> "Warning hemorrhage" is a very important sign and requires the consideration of a fistula. Contrast-enhanced CT or angiography can help detect an aneurysm or extravasation from the bleeding artery. As some infected aneurysms rapidly expand, repeated inspections are important when aneurysm is suspected.<sup>9</sup> Once a fistula is diagnosed, prompt treatment is needed. Several approaches have been reported. Surgical treatment, such as en block resection of the fistula or artery ligation and construction of an arterial bypass, has been



**Fig. 1** (a) Urine leakage was observed at the site of ileal-ureteral anastomosis based on retrograde ileal conduitography (arrow). (b) Contrast-enhanced CT showed no source of bleeding. Leakage was observed around the site of the anastomosis.



**Fig. 2** (a) A small aneurysm was found at the external iliac artery, but we did not diagnose it at that time. (b) Over a period of 4 days, a pseudoaneurysm developed with a diameter of 10 mm. Soft tissue mass was observed along common and external iliac artery (short arrows).



**Fig. 3** (a) Arteriography revealed a saccular aneurysm at the right external iliac artery. No extravasation from the aneurysm was observed (arrow). (b) The amplatzer vascular plug and embolization coils were deployed in the right internal and external iliac arteries. Embolization coils were deployed in the right CIA. (c) Post-operative three-dimensional CT revealed no perfusion of the right iliac artery and good flow to the right femoral artery through the femorofemoral bypass.

**Table 1** Summary of a reported fistula between an artery and IC

Authors	Site	Stoma bleeding	Treatment and reconstruction	Post treatment outcome
Beaugie <sup>3</sup>	External iliac artery	Yes	Surgical resection, stent graft replacement, uretero-ileal reanastomosis	Died after 12 h
Hindmarsh <sup>4</sup>	CIA	Yes	Ligation, femorofemoral bypass	Rebleeding and died after 3 months
Ishibashi <i>et al.</i> <sup>5</sup>	Aorta	Yes	Endovascular stent graft, femorofemoral bypass	No recurrence at 14 months
Sasaki <i>et al.</i> <sup>6</sup>	External iliac artery	Yes	Surgical resection, common iliac-femoral bypass	Died after 1 month
Castillo <i>et al.</i> <sup>7</sup>	External iliac artery	Yes	Ligation, femorofemoral bypass, ureterocutaneostomy	Discharged
Sukha <i>et al.</i> <sup>8</sup>	External iliac artery	Yes	Ligation, femorofemoral bypass	Rebleeding and died
Morlacco and Zattoni <sup>2</sup>	Iliac artery	Yes	Embolization, endovascular stent graft	Discharged

reported, however most patients died after surgery.<sup>3,4,6–8</sup> Subiela *et al.* reported a uretero-arterial fistula in 94 cases who were treated with endovascular management. Endovascular stent graft placement is the major method for minimally invasive treatment. Possible post-procedural complications are rebleeding, stent thrombosis and infection.<sup>1</sup> In the present case, we did not select endovascular stent graft placement or surgery, since urine leakage spread around the anastomosis site and soft tissue mass was observed surround iliac arteries, which might suggest a high risk of stent graft infection and severe adhesions. Artery embolization is also a less invasive endovascular procedure, but it requires a second procedure to maintain distal artery flow. Successful cases of uretero-arterial fistula treated with embolization have been reported.<sup>1,2</sup> Angiography with embolization and arterial bypass could be a treatment option in cases with infection of the fistula site.

## Conclusion

Massive bleeding from an IC could be an important sign of fistula formation, and rapid examination with contrast-enhanced CT and/or angiography should be performed. Endovascular treatment, such as embolization and arterial bypass, might be a feasible approach for this condition.

## Conflict of interest

The authors declare no conflict of interest.

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