

Use of an Over-the-Scope Clip for Closure of an Iatrogenic Nephrocolic Fistula Resulting From Cryoablative Therapy for Renal Cell Cancer of a Transplanted Renal Graft

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ABSTRACT

Although uncommon, cryoablation of tumors can result in collateral damage to adjacent organs resulting in difficult-to-treat perforation and fistulization. Full-thickness closure of defects has been described with the use of over-the-scope clips. We describe the case of a 56-year-old woman who underwent cryoablation of renal cell carcinoma of her transplanted kidney that was complicated by cryoinjury to her sigmoid colon with subsequent nephrocolic fistula and abscess formation resistant to conservative treatment. We report a case of successful abscess drainage and use of over-the-scope clip for closure of an iatrogenic renal graft nephrocolic fistula.

INTRODUCTION

The incidence of de novo primary tumors in transplanted kidney varies between 0.18% and 0.5%.^{1,2} Renal cell carcinoma (RCC) represents 4.6% of all cancers developing in kidney transplanted patients.³ Treatment options include nephron-sparing surgery, radiofrequency, microwave, and thermal ablation, and cryotherapy. Minimally invasive imaging-guided ablation techniques gained ground given their ability to conserve as much of the transplanted kidney as possible maintaining patients' quality of life and life expectancy, in addition to being less invasive particularly for patients who are poor surgical candidates.² However, injury to important adjacent structures can arise as a complication of these techniques resulting in difficult-to-treat perforation and fistulization to adjacent structures.⁴ Initial management of these fistulas can be initially conservative but may necessitate surgery that cannot always be offered to frail patients. Over-the-scope clips (OTSCs) (Ovesco Endoscopy GmbH, Tübingen, Germany) have been developed allowing full-thickness closure of defects and fistulas through a mechanism that involves the 4 prongs of the clip to anchor the lesion from the left and right, which allows for continuously compressing the tissue. We report the use of OTSC to close an iatrogenic nephrocolic fistula complicated by nephrogenic abscess that was resistant to antibiotic treatment.

CASE REPORT

A 56-year-old woman with sarcoidosis, uncontrolled diabetes mellitus, end-stage renal disease requiring renal and pancreatic transplant 18 years earlier with development of renal graft failure that necessitated repeat renal transplant presented for routine imaging after transplant and was found to have a mass on her previous renal graft. She underwent workup that confirmed RCC and subsequently underwent ultrasound-guided cryoablation complicated by watery diarrhea and left lower quadrant abdominal pain.

Sigmoidoscopy revealed a 5-cm semicircumferential sigmoid colonic ulcer, and subsequent computed tomography (CT) scan showed a focal sigmoid colonic perforation (Figure 1). She was treated conservatively with bowel rest, but 3 weeks later, she presented

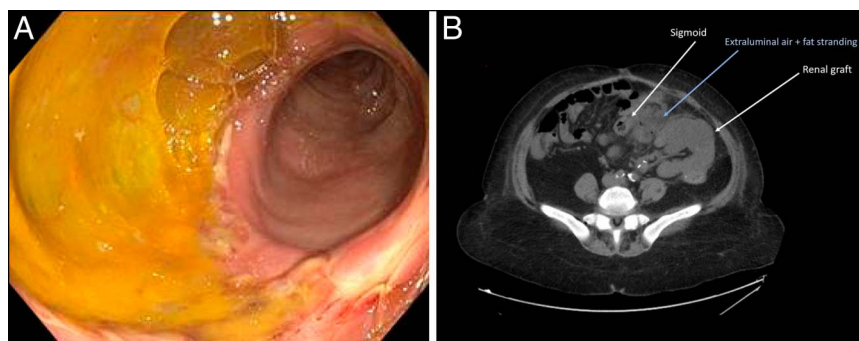


Figure 1. (A) Sigmoidoscopy revealing a 5-cm semicircumferential sigmoid colonic ulcer and (B) computed tomography scan showing a focal sigmoid colonic perforation.

with hemochezia. Repeat sigmoidoscopy demonstrated persistently ulcerated mucosa with successful hemostasis achieved, and repeat colonoscopy 3 months later showed 5-mm fistula at the ulcer site between the sigmoid and cortical treatment bed of the transplanted kidney, evidenced also on CT imaging with oral contrast (Figure 2). During that time, the patient had repeated presentations for fevers and abdominal pain with workup repeatedly demonstrating cortical abscess of the kidney.

Given the persistence of the abscess despite prolonged antibiotic therapy, the decision was made to pursue endoscopic drainage and closure of the fistula with an OTSC. An adult gastroscope with a distal attachment was advanced to the sigmoid colon to the level of the 5-mm fistula. Suction at the fistulous opening resulted in aspiration of copious amounts of purulent fluid. An anchor was used to attempt to draw the mucosa and fistula opening into the cap. However, because of fibrosis of the area, this was not successful. Argon plasma coagulation was applied to the fistula opening followed by successful deployment of an OTSC (Figure 3).

Two months later, a sigmoidoscopy was repeated that demonstrated resolution of the fistula, and the OTSC was no longer present (Figure 4). A repeat magnetic resonance imaging redemonstrated a fistulous tract between the treated lesion and

adjacent sigmoid, but no abscess was seen, and a subsequent CT performed 2 months later demonstrated a focus of air in the transplanted kidney believed to be secondary to post-treatment changes. There was no abscess, and the patient was doing well clinically.

DISCUSSION

Nephrocolic fistulae are the most common renodigestive fistulae and are typically the result of abdominal trauma or surgery, renal calculi, Crohn's disease, malignancy, or tuberculosis but rarely of thermal injury after RCC treatment.^{5–8} Few reports described these fistulae resulting from percutaneous radiofrequency ablation and cryoablative techniques.⁹ While applying cryotherapy for tumor ablation, the ice ball must extend at least 3 mm beyond the outer tumor margin to result in complete tumor cell death.^{4,10} However, this poses the risk of injury to the adjacent structures. Hollow structures such as the bowel and ureter are at higher risk of injury than solid organs such as the muscle and body wall.⁴

Cryoinjury-induced colonic perforation carries the risk of transmural necrosis, colonic bacterial translocation, and secondary abscess formation. To prevent cryoinjury to adjacent organs, fluid infusion or hydrodissection into perirenal fat to create mass effect and displace the index tumor from the

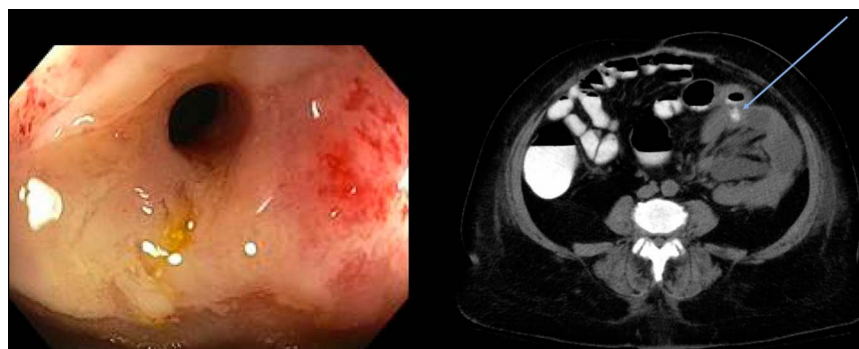


Figure 2. Fistula opening at ulcer site seen on sigmoidoscopy (left) and the computed tomography scan with oral contrast (right) extending between the sigmoid and the cortical treatment bed of the transplanted kidney.

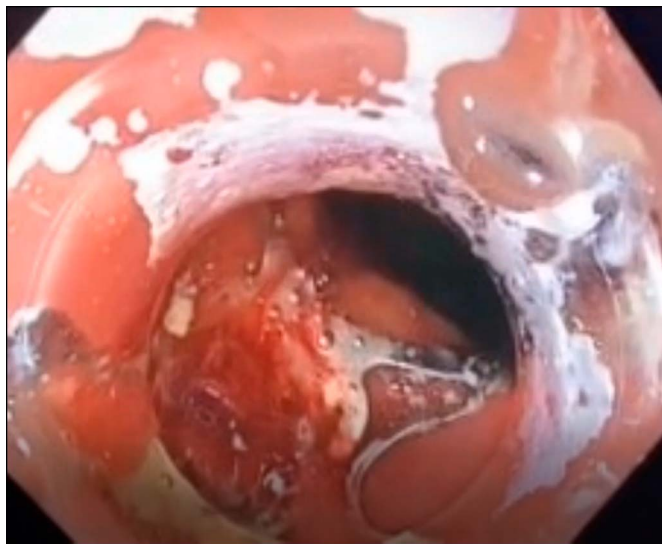


Figure 3. Endoscopic view of the successfully deployed over-the-scope clips.

adjacent structures is performed. Alternatively, the use of CO₂ or more invasively of a balloon has also been described.¹¹ In a published series, the colon was the most common organ requiring hydrodisplacement before ablation.⁴

This patient's dense adhesions from her 2 previous renal transplants prevented an adequate plane and nephrocolic separation, thus resulting in cryoinjury and nephrocolic fistulization. In the event of fistulization, successful conservative management has been previously described.¹² Alternatively, placement of ureteral stent for a cryoablation-associated nephrocolic fistula is an option.¹³ However, this patient's course was complicated by multiple infections, and she was a poor surgical candidate.

The use of OTSC was a viable, minimally invasive option to offer. Chronic fibrotic tissue forms after perforation and fistulization with poor extensibility posing a challenge for full-thickness closure. Successful closure depends on the ability to suction the target lesion into the cap which was challenging in this case. The use of an anchor to draw the indurated tissue into the cap was necessary. Attempts to drain the abscess through the fistula by applying suction through the cap with the anchor placed in the lesion were crucial before OTSC deployment.

The advantage of OTSC system is to allow for continuous apposition and compression of the tissue while maintaining blood flow through the interprong space of the clip facilitating wound healing. In a pooled analysis of OTSC use, the average clinical success rate for fistula closure was 52%, the lowest among other indications, including bleeding (85%), perforation (85%), and anastomotic dehiscence (66%).¹⁴ We described a successful abscess drainage and use of OTSC for closure of an iatrogenic renal graft nephrocolic fistula. In conclusion, OTSC is a

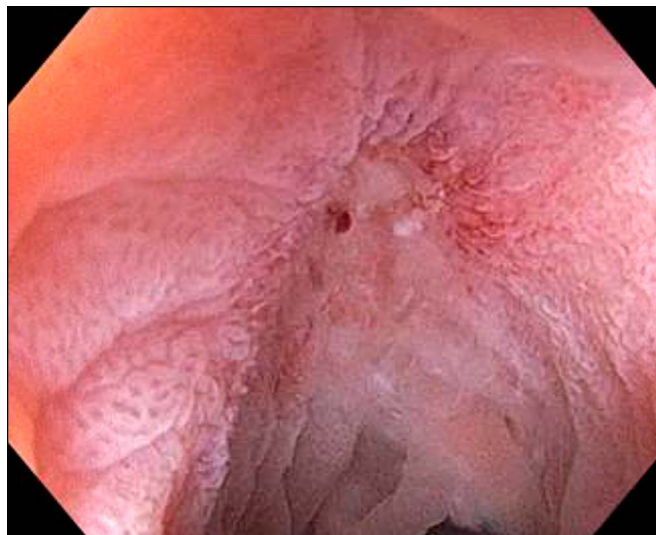


Figure 4. Endoscopic view of the healed site of previous fistula.

minimally invasive viable option for the closure of nephrocolic iatrogenic fistula resulting from cryoinjury.

DISCLOSURES

Author contributions: N. Nassani wrote the manuscript, approved the final version, and is the article guarantor. E. Villa and RE Carroll revised the manuscript for intellectual content and approved the final manuscript.

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Informed consent was obtained for this case report.

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REFERENCES

1. Cornelis F, Buy X, André M, et al. De novo renal tumors arising in kidney transplants: Midterm outcome after percutaneous thermal ablation. *Radiology* 2011;260(3):900–7.
2. Tillou X, Guleryuz K, Collon S, Doerfler A. Renal cell carcinoma in functional renal graft: Toward ablative treatments. *Transpl Rev (Orlando)* 2016; 30(1):20–6.
3. Ribal M, Rodriguez F, Musquera M, et al (eds). *Transplant Proc* 2006;38(5): 1359–62.
4. Bodily KD, Atwell TD, Mandrekar JN, et al. Hydrodisplacement in the percutaneous cryoablation of 50 renal tumors. *AJR Am J Roentgenol* 2010; 194(3):779–83.
5. Abdelaziz H, Adourrouj I, Elabiad Y, et al. Management of renocolic fistula following abdominal trauma from a Gunshot: Two cases reports. *Can Urol Assoc J* 2014;8(3–4):E207.
6. Alster C, Zantut LF, Lorenzi F, et al. An unusual case of pneumoperitoneum: Nephrocolic fistula due to a giant renal staghorn calculus. *Br J Radiol* 2007;80(949):e1–3.
7. Henao DE, Vásquez A. Spontaneous nephrocolic fistula secondary to a staghorn calculus. *Urol Res* 2012;40(5):617.
8. Brust RW, Morgan AL. Renocolic fistula secondary to carcinoma of the colon. *J Urol* 1974;111(4):439–40.
9. Patel BJ, Mathur AK, Puri N, Jackson CS. A rare case of nephrocolic fistula resulting from radio frequency ablation (RFA) of renal cell carcinoma. *ACG Case Rep J* 2014;1(2):93.

10. Shingleton WB, Sewell PE. Percutaneous cryoablation of renal cell carcinoma in a transplanted kidney. *BJU Int* 2002;90(1):137–8.
11. Kam AW, Littrup PJ, Walther MM, Hvizda J, Wood BJ. Thermal protection during percutaneous thermal ablation of renal cell carcinoma. *J Vasc Interv Radiol* 2004;15(7):753–8.
12. Morgan AI, Doble A, Davies RJ. Successful conservative management of a colorenal fistula complicating percutaneous cryoablation of renal tumors: A case report. *J Med Case Rep* 2012;6(1):365.
13. Vanderbrink BA, Rastinehad A, Caplin D, Ost MC, Lobko I, Lee BR. Case report: Successful conservative management of colorenal fistula after percutaneous cryoablation of renal-cell carcinoma. *J Endourol* 2007;21(7):726–9.
14. Kobara H, Mori H, Nishiyama N, et al. Over-the-scope clip system: A review of 1517 cases over 9 years. *J Gastroenterol Hepatol* 2019;34(1):22–30.

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