

# *Management of a persistent ileo-ureteric anastomotic leak with bilateral ureteric occlusion using angioplasty balloon catheters*

James C. Forde, MD,<sup>1</sup> Kevin M. O'Connor, MD,<sup>1</sup> Deirdre M. Fanning, MD,<sup>1</sup> Michael J. Guiney, MD,<sup>2</sup> Thomas H. Lynch, MD<sup>1</sup>

<sup>1</sup>Department of Urology, St. James's Hospital, Dublin, Ireland

<sup>2</sup>Department of Radiology, St. James's Hospital, Dublin, Ireland

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*The ileal conduit continues to be the most common form of urinary diversion performed worldwide. As a result of improved surgical technique the perioperative mortality and morbidity for patients undergoing ileal conduit urinary diversion has reduced remarkably.*

*However, one early complication that may occur is that of urinary leak at the ileo-ureteric anastomosis. Urinary anastomotic leaks may be associated with significant morbidity and mortality. Although a small initial leakage postoperatively is common, the problem arises in cases of continued urinary leakage from the ileo-ureteric anastomosis. We report the management of a persistent ileo-ureteric anastomotic leak using angioplasty balloons catheters to occlude both ureters.*

**Key Words:** ileal conduit, ileo-ureteric anastomotic leak, angioplasty balloon catheters

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We report the case of a 76-year-old male who underwent a radical cystoprostatectomy and ileal conduit formation for high grade muscle invasive transitional cell carcinoma (TCC) of bladder. He also received neoadjuvant chemotherapy prior to surgery. The ileal conduit was fashioned with a 15 cm of segment of ileum preserving the terminal ileum. A Wallace Type 1 anastomosis was performed with 3-0 Polyglactin (Vicryl, Ethicon, NJ, USA) between the spatulated ureters and the base of the conduit over 5 French (Fr) infant umbilical catheters (VYGON, Ecouen, France). Umbilical catheters were secured to the base of conduit at the level of the anastomosis and also at spout of ileal conduit with 3-0 Polyglactin (Vicryl Rapide). He also had two abdominal drains which included

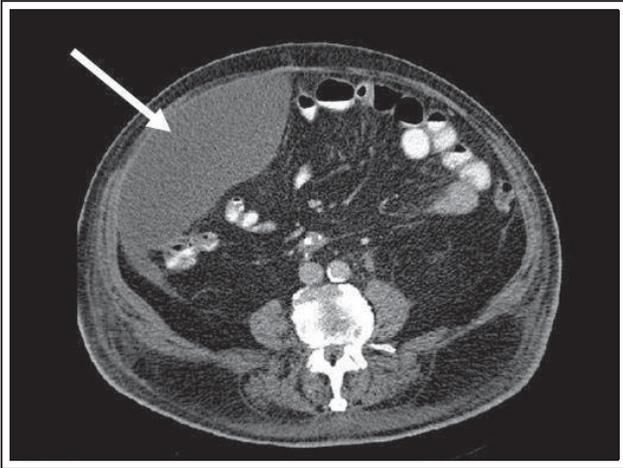
a 20 Fr Robinson drain and a 20 Fr urinary catheter. Final histopathology demonstrated high grade TCC pT3bNOMx. Resection margins were negative as were frozen sections of ureters at time of surgery.

During his initial postoperative course it was suspected he had a urine leak as his urine output was low in comparison to the drain outputs. Creatinine analysis from drain fluid was elevated confirming a urine leak. This was initially treated conservatively which included the placement of a Foley catheter into the stoma but he failed to make a clinical improvement. He complained of right sided abdominal pain, had a prolonged ileus and his abdominal drain continued to drain urine. On the sixth postoperative day a CT abdomen was performed which showed a large fluid collection seen abutting the posterior aspect of the right side of anterior abdominal wall measuring 20 cm x 10 cm, Figure 1. Right and left ureteric stents were noted with an unremarkable ileal conduit and slightly distended right pelvicalyceal system.

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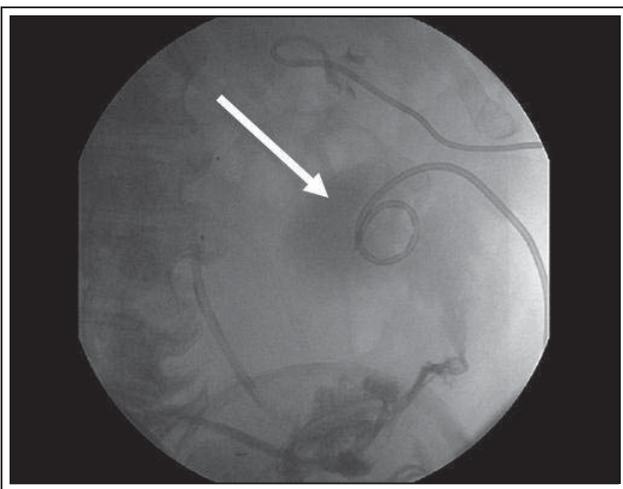
Address correspondence to Dr. James C. Forde, Department of Urology, St. James's Hospital, Dublin 8, Ireland



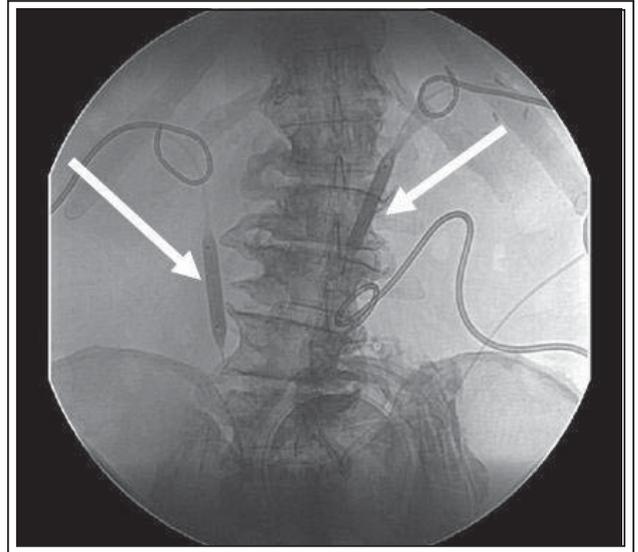
**Figure 1.** CT scan showing collection of urine adjacent to abdominal wall (indicated by white arrow).

An 8 Fr pigtail drain was inserted under ultrasound guidance with over 1800 mL of urine drained post insertion. Following this, continued output from the pigtail drain and abdominal drains was noted. On the tenth postoperative day a decision was made to proceed to bilateral nephrostomy insertion to divert urine away from the ileo-ureteric anastomosis. Subsequent bilateral nephrostograms confirmed a leak from the ileo-ureteric anastomosis to the right flank collection, Figure 2.

Despite bilateral nephrostomy diversion urine continued to drain via the pigtail drain. To ensure complete diversion from the ileo-ureteric anastomosis, bilateral 4 cm by 8 mm angioplasty balloons (Wanda,

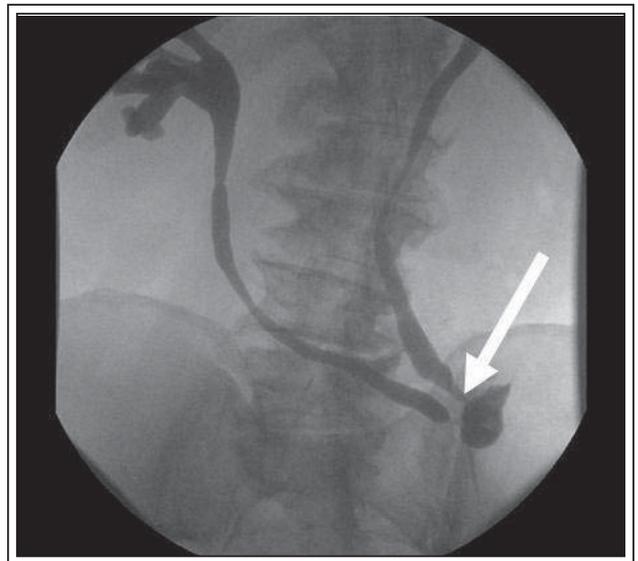


**Figure 2.** Leak from right ileo-ureteric anastomosis to flank collection indicated by white arrow with pigtail drain in situ (note - image taken with patient in prone position).



**Figure 3.** Bilateral ureteric balloon catheters filled with contrast indicated by white arrows (note pigtail drain in situ).

Boston Scientific, MA, USA) were placed in both left and right ureters on the tenth postoperative day, Figure 3. The balloons were filled to capacity with contrast up to a maximum pressure of 15 atmospheres until complete occlusion of both distal ureters was confirmed with bilateral nephrostograms.



**Figure 4.** Patent right distal ureteric anastomosis indicated by white arrow. Despite the presence of bilateral ileo-ureteric anastomotic strictures, contrast passes from both ureters into the ileal conduit without evidence of an anastomotic leak.

To prevent the possibility of pressure necrosis of the ureters developing, the balloons were deflated three times a day for 15 minutes at a time. Repeat nephrostograms were performed weekly to monitor resolution of the anastomotic leak. Although, a nephrostogram performed 5 weeks postoperatively showed the presence of bilateral ileo-ureteric anastomotic strictures, contrast passed from both ureters into the ileal conduit without evidence of an anastomotic leak, Figure 4. Serum creatinine was within normal limits and a renal ultrasound revealed normal upper urinary tracts indicating no functional obstruction.

## Discussion

The ileal conduit continues to be the most widely used form of urinary diversion performed worldwide following total cystectomy for muscle invasive bladder carcinoma. The two most common types of ileo-ureteric anastomoses include the Bricker type, which was first described in 1950,<sup>1</sup> and the Wallace type which described several years later in 1966.<sup>2</sup> The most common urology-specific early postoperative complications are ileo-ureteric anastomotic urine leak, obstruction and urosepsis. The use of a Bricker or Wallace type of anastomosis is generally down to surgeon preference. A recent study by Kouba et al showed both types of anastomoses to provide acceptable low rates of stricture formation.<sup>3</sup> Preservation of blood supply to the ureters and bowel, adequate drainage of the ileo-ureteric anastomosis and prevention of infection are important factors in prevention of leakage of urine at the ileo-ureteric anastomosis.<sup>4</sup>

Previously, documented rates of the occurrence of anastomotic urinary leaks have ranged from 1.5% to 25% with an average of 6%.<sup>5</sup> The routine use of ureteric stents has helped reduce their occurrence.<sup>6</sup> More recent studies evaluating the use of stentograms prior to the removal of stents showed leak rates to vary between 1.5% and 5%.<sup>7,8</sup> Urinary anastomotic leaks may be associated with significant mortality, ranging from 5.5% to 48%.<sup>9-12</sup> Although a small initial leakage postoperatively is common, the problem arises in cases of continued urinary leakage from the ileo-ureteric anastomosis. This may be evident by increased output in the abdominal drain and reduced urinary output from the ileal conduit. One cause may be occult stomal stenosis which leads to high intra-luminal pressure in the conduit and tension at the anastomotic site.<sup>4</sup> Delayed urinary leakage usually occurs 10-14 days postoperatively and may be caused by ischaemic necrosis of the ureters due to devascularisation at the time of surgery.<sup>13</sup> Anastomotic leaks can predispose to periureteral fibrosis and scarring, thus leading to stricture formation.<sup>6</sup>

Management of such leakages should be conservative if possible. If the leakage is as a result of occult stomal stenosis, catheter placement and drainage of the stoma may be beneficial. Otherwise nephrostomy placement is often advocated for anastomotic leaks with ureteric stents left in place until the leak has resolved.<sup>13</sup> Should this not be sufficient to produce closure of the leak then various surgical techniques have been described in the past which may however be difficult.<sup>4</sup> In our case, there was continued output in the abdominal drain despite percutaneous nephrostomy drainage.

Ureteric occlusion was achieved with the use of inflated angioplasty balloons in both ureters thus allowing for complete urinary diversion away from the anastomosis. Resolution of the leak was confirmed on follow up nephrostogram. Previously, ureteric balloon dilation has generally been used for dilatation of ureteric strictures with or without concomitant endoureterotomy.<sup>14</sup> Percutaneous ureteric occlusion has been used in the management of fistulas of the lower urinary tract due to pelvic malignancy to allow diversion of urine using a variety of techniques including isobutyl-2-cyanoacrylate, polymer agents as well Foley and angioplasty balloons.<sup>15,16</sup> Balloon occlusion of the ureter has previously been described as safe and well tolerated in a small case series of seven patients.<sup>16</sup> However, it should be noted that persistent ureteric occlusion with inflated balloon catheters may lead to the development of ureteric strictures from the pressure necrosis of the balloons.<sup>15,17</sup> In our case the balloons were deflated three times a day for 15 minutes at a time to help prevent pressure necrosis developing.

To our knowledge this is the first reported use of bilateral angioplasty balloon placement for ureteric occlusion in the management of a persistent ileo-ureteric anastomotic leak. This technique obviates the need for immediate surgical exploration and ureteral re-implantation. □

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## References

1. Bricker EM. Bladder substitution after pelvic evisceration. *Surg Clin North Am* 1950;30(5):1511-1521.
2. Wallace DM. Ureteric diversion using a conduit: a simplified technique. *Br J Urol* 1966;38(5):522-527.
3. Kouba E, Sands M, Lentz A, Wallen E, Pruthi RS. A comparison of the Bricker versus Wallace ureteroileal anastomosis in patients undergoing urinary diversion for bladder cancer. *J Urol* 2007; 178(3 Pt 1):945-8;discussion 948-949.
4. Eyre RC, Rosenthal JT, Libertino JA, Zinman. Management of urinary and bowel complications after ileal conduit diversion. *J Urol* 1982;128(6):1177-1180.

5. Bystrom J. Early and late complications of ileal conduit urinary diversion. *Scand J Urol Nephrol* 1978;12(3):233-237.
6. Farnham SB, MS Cookson. Surgical complications of urinary diversion. *World J Urol* 2004;22(3):157-167.
7. Regan SM, Beck SD, Bihrie R, Foster RS. Role of routine stentograms following urinary diversion in modern practice. *Can J Urol* 2009;16(3):4660-4663.
8. Touma N, Spodek J, Kuan J, Shepherd RR, Hayman WP, Chin JL. Confirming routine stentograms after cystectomy is unnecessary. *Can Urol Assoc J* 2007;1(2):103-105.
9. Hensle TW, Bredin HC, Dretler SP. Diagnosis and treatment of a urinary leak after ureteroileal conduit for diversion. *J Urol* 1976;116(1):29-31.
10. Jaffe BM, Bricker EM, Butcher HR Jr. Surgical complications of ileal segment urinary diversion. *Ann Surg* 1968;167(3):367-376.
11. Richie JP, Skinner DG, Kaufman JJ. Radical cystectomy for carcinoma of the bladder: 16 years of experience. *J Urol* 1975;113(2):186-189.
12. Schmidt JD, Hawtrey CE, Flocks RH, Culp DA. Complications, results and problems of ileal conduit diversions. *J Urol* 1973;109(2):210-216.
13. Tait NP. Percutaneous management of urinary leaks following ileal conduit urinary diversion. *Minimally Invasive Therapy and Allied Technologies* 1993;(2):205-210.
14. Kristo B, Phelan MW, Gritsch HA, Schulam PG. Treatment of renal transplant ureterovesical anastomotic strictures using antegrade balloon dilation with or without holmium:YAG laser endoureterotomy. *Urology* 2003;62(5):831-834.
15. Avritscher R, Madoff DC, Ramirez PT et al. Fistulas of the lower urinary tract: percutaneous approaches for the management of a difficult clinical entity. *Radiographics* 2004;24(Suppl 1):S217-S236.
16. Horenblas S, Kroger R, van Boven E, Meinhardt W, Newling DW. Use of balloon catheters for ureteral occlusion in urinary leakage. *Eur Urol* 2000;38(5):613-617.
17. Lang EK, Glorioso LW 3<sup>rd</sup>. Antegrade transluminal dilatation of benign ureteral strictures: long-term results. *AJR Am J Roentgenol* 1988;150(1):131-134.