Ureteric Angioplasty Balloon Placement to Increase Localised Dosage of BCG for Renal Pelvis TCC

Abstract
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Endoscopic percutaneous resection of a renal pelvis transitional cell carcinoma (TCC) is a viable treatment option in those who would be rendered dialysis dependent following a nephroureterectomy. We report endoscopic percutaneous resection of an upper tract TCC recurrence in a single functioning kidney followed by antegrade renal pelvis BCG instillation with novel placement of inflated angioplasty balloon in the ureter to help localise its effect.

Introduction
Local endoscopic resection of transitional cell carcinoma (TCC) of bladder followed by adjuvant intravesical chemotherapy is very common and routine. For TCC of the upper renal tract this approach is less common with endoscopic percutaneous resection a viable treatment option in those where nephroureterectomy is contraindicated.

Case Report
A 75 year old female previously underwent a radical cystectomy and ileal conduit diversion for TCC of the bladder staged as multifocal pT1 G3 disease. Two years later a surveillance scan suggested of interval development of a urothelial tumour in the left renal pelvis (Figure 1). Longstanding hydronephrosis of the right kidney was again noted that previously had been investigated with a nephrostogram showing no evidence of a stricture or filling defect. An isotope renogram study demonstrated a hydronephrotic non-functioning right kidney.

It was decided to endoscopically percutaneously resect the lesion helping to preserve renal function. After left nephrostomy placement, a superstiff guidewire was inserted down the ureter into the ileal conduit. The percutaneous tract was dilated up to 30 Fr and tumour in the renal pelvis was resected macroscopically using a 24 Fr resectoscope with a 20 Fr Malecot catheter placed at the end. Histology confirmed invasive high grade urothelial carcinoma staged as pT1 G3. The Malecot catheter was replaced with a nephrostomy 5 days later. One ampoule (81mg) of BCG (Medac, Hamburg, Germany) was diluted in 50ml of normal saline and instilled through the nephrostomy. To localise its effect, a 4cm by 8mm angioplasty balloon (Wanda, Boston Scientific, MA, USA) was inserted into the mid left ureter (Figure 2) under fluoroscopy. This was inflated with water up to a maximum pressure of 15 atmospheres prior to each instillation to occlude the ureter and deflated after 1 hour. The angioplasty balloon was removed after 6 weekly courses of BCG. A nephrostogram at the time of balloon removal showed no evidence of a filling defect (Figure 2).

Discussion
The incidence of upper urinary TCC following radical cystectomy for bladder urothelial cancer ranges from 2% to 6% with the majority of recurrences occurring within 3 years \(^1\). The standard treatment for upper tract TCC is radical nephroureterectomy, however, endoscopic percutaneous resection has become a viable less invasive treatment option for those who would be rendered dialysis dependent following nephroureterectomy \(^2\). Resection modality may depend on tumour size and type and may involve cautery, laser, or electrovaporisation techniques \(^2\). Complications include bleeding, perforation of the renal pelvis and tumour seeding along the nephrostomy tract \(^3\). Repeat nephroscopy after 3 months has been recommended with radiological follow up at 6 month intervals \(^4\). Antegrade renal pelvis instillation of BCG post endoscopic percutaneous resection has been shown to be well tolerated with reported lower recurrence rates in the patients with grade 1 TCC tumours, while no benefit was seen in those with grade 2 or 3 disease \(^5\). The largest series compared those treated with BCG post resection of upper tract TCC to those treated with resection alone showed no overall oncologic benefit between groups, but did suggest a role for BCG in the management of upper tract CIS or intermediate or high grade disease in an anatomically or functionally solitary kidney \(^6\). Overall recurrence rates in patients receiving adjuvant BCG are approximately 33% \(^6\). Complications of upper tract BCG administration are uncommon and include BCG dissemination and urosepsis \(^7\). Percutaneous ureteric occlusion has been used in the management of fistulas of the lower urinary tract to allow diversion of urine using a variety of techniques including angioplasty balloons and has been shown to be well tolerated \(^8\). To our knowledge this is the first reported use of an inflated angioplasty balloon in the ureter to help localise BCG following antegrade renal pelvis instillation.

Figure 1: White arrow indicating the urothelial tumour of the left renal pelvis. White circle indicating a non-functioning hydronephrotic kidney.

Figure 2: Nephrostogram showing contrast in the upper renal tract which does not extend below the angioplasty balloon (white arrow) in the mid left ureter.
References


