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Case report. Endo-ureteral balloon catheter to treat urine leakage and strictures after urinary diversion according to Bricker

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Case report. Endo-ureteral balooncatheter in case of urine leakage and stenosis according to Bricker

Abstract After creating a urinary diversion according to Bricker, leakage and stenosis of the ileo-ureteral anastomosis are recognized as postoperative complications.
In the presented case description both complications are discussed, together with a possible solution using a recently developed double-J stent with an integrated balloon.

Keywords urinary diversion · Bricker · urine leakage · ureteral stenosis · JJ-stent

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Introduction

Patients with an urinairy diversion according to Bricker may have to deal with strictures of the anastomosis of the ureter to the bowel loop. These strictures are described in 10-14% of patients [1]. Postoperatively, leakage of the anastomosis can also occur.

This situation can be accepted if the obstruction or leakage will not cause complaints and also the renal function isn't threatened, but in case of pain, infection or severe loss of renal function the kidney is usually initially drained with a nephrostomy catheter.
Subsequently, a choice will have to be made, keeping the nephrostomy catheter, performing an open re-do of the anastomosis, taking out the kidney or to looking for an endoluminal solution for the stenosis or leakage.
To place a stent, antegrade or retrograde, can keep open the endoluminal way or stop the leak, but followup data are described till now scarcely [2, 3]. The chance that temporary placement of a JJ stent in the long term will provide sufficient patency seems limited.
A balloon dilatation with Acucise®, with the aim of achieving permanent dilation, led to success in 30% of cases [4].
A re-operation for the replacement of the anastomosis is a major intervention, whereby sometimes the Bricker-loop has to be replaced, making it the most radical solution.
Radiologist Overtoom developed recently a JJ catheter with an integrated balloon (fig. 1a).
The intended use of it is to restore the ureter, with a wider passage, after a dilatation a uretero-pelvic stenosis,[5].

There are three channels in the shaft:
a wide channel for the guidewire and the urine flow and two very small channels: an inflation channel to the one-way valve in the balloon, which is filled with contrast agent via the side port of the pusher. The second small channel is in open communication with the balloon and is closed at the distal side of the catheter. The balloon is emptied by cutting off the distal end of the shaft.

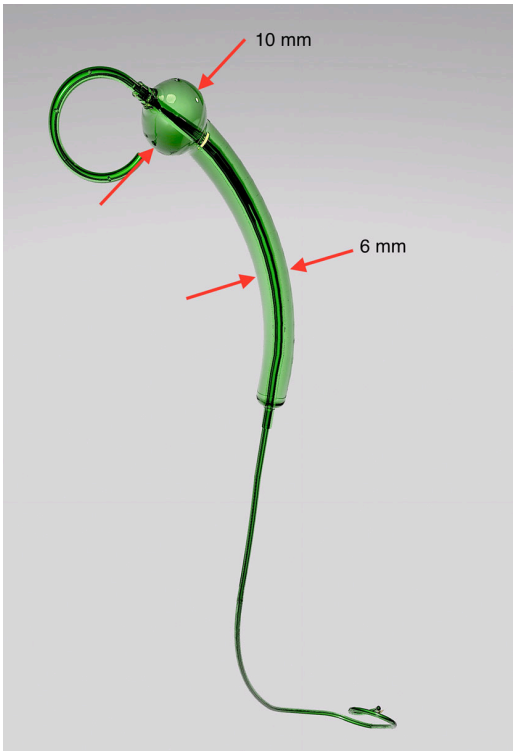

Figure 1a Overview of the Overtoom-ballonkatheter.

We describe three patients with an urostomy according to Bricker with anastomotic problems who could be treated by using this Overtoom balloon double J-catheter (Overtoom Ltd.).
This balloon was used as a kidney blocker (case 1 and 2) and as a spacer balloon (case 3).

Casus 1
A 69-year-old woman underwent a cystectomy 15 years earlier with the construction of a urine stoma for a benign indication.
The Bricker-loop became obliterated due to an unclear cause, resulting in periodic painful dilation of the kidneys. She underwent a Bricker-loop replacement with a new piece of ileum, which was connected to the pre-existing ureter anastomosis (Wallace technique).
Her new loop was found to be leaking on the ureter anastomosis, which turned out when the eighth day postoperatively the single J's, that had been placed peroperatively, were removed.
After placement of an abdominal drain, the stoma no longer produced urine.
At that time the kidneys were not dilated.
In consultation with the interventional radiologist (TO) an attempt was made to block the kidneys and to stop the leakage. The procedure took place at the radiological angiosuite without anesthetics.

Figure 1b Casus 1. Leakage of Bricker-loop after OK bridged by two Overtoom balloons.

We placed a Ch24 bladder catheter through the urostomy, inflated the balloon into the loop and pulled it against the inside of the abdominal wall to close the outside of the loop during the procedure. Contrast was injected through a Y-connector fixed on the bladder catheter to allow the loop to unfold, after which the leakage to the abdominal cavity became visible.
With the aid of a short angiographic catheter through the bladder catheter, a guidewire could be placed in the right and left ureter.
After having inflated an Overtoom balloon catheter (Overtoom Ltd.) with contrast medium on both sides the leak was bridged with the balloons (fig. 1b).
The urine production through the abdominal drain was significantly reduced the next day.
In the following days, the shaft of both Overtoom balloon catheters was blocked, both sides developed hydronephrosis and the kidneys were drained with nephrostomy catheters.
The abdominal drain fell dry and was removed.
Twelve days after placement of the balloons, the balloon catheters were replaced by single-J catheters and after 30 days the nephrostomy catheters could be closed and removed. Six weeks later, the single-J catheters were also removed.
When returning to the outpatient clinic after 15 months, the patient had no complaints, the serum creatinine was normal, there was no obstruction of the kidneys and the Bricker-loop functioned well.

Casus 2
A male patient aged 66 years with a muscle-invasive bladder carcinoma underwent a radical cystoprostatectomy.
A urinairy diversion according to Bricker was made with separately anastomosed ureters (left end-to-end, right end-to-side).
After removal of the single-J stents, fever and a creatinine rise occurred.
On a CT scan, fluid collections suspected for urinoma were seen on the end-to-end anastomosis side of the left ureter. In consultation with the interventional radiologist (TO), an attempt was made to bridge the leakage retrograde.
It wasn't possible to place a guidewire along the urinoma to the left kidney and we ended up in the urinoma and between bowel loops.
The right kidney could be reached retrograde.
Subsequently, a puncture was made of the non-dilated chalices on the left side to reach the level of the loop stream down. Finally, with a sidewinder catheter, it was possible to reach the urostomy with the guidewire.
To prevent leakage to the abdominal cavity, an Overtoom balloon catheter was placed on both sides proximal to the leak, while a nephrostomy catheter was left in the left system to prevent further leakage and filling of the urinomas. The distal part of the Overtoom balloon catheters reached the urostomy bag (fig. 2).

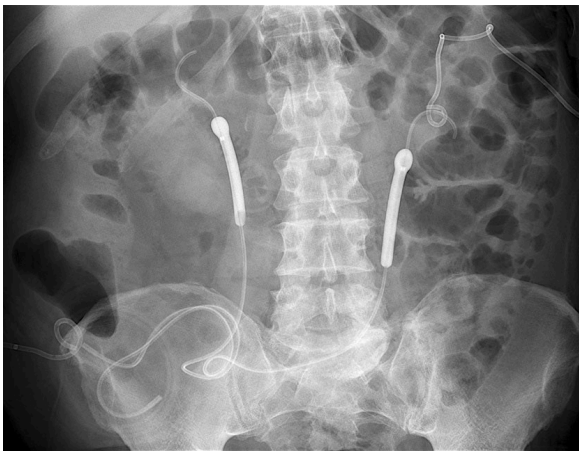

Figure 2 Casus 2. Overtoom balloon catheters were retrogradely placed over both guidewires to bridge the transition from the ureters to the urostomy. It can also be seen that the nephrostomy catheter on the left is left behind.

After a while, the balloon on the right expelled to the urine bag of the urostomy.
On the left side, the nephrostomy possibly prevented the migration of the balloon.
Injecting the loop with contrast, a few days later, showed no filling of the urinomas.
The balloon on the left was replaced after two months by two single-j catheters on the left side, to ensure the drainage, and the nephrostomy catheter could be removed on the left.
Due to disease progression, no further attempts were made to remove these catheters.

Casus 3
The last patient is a 64-year-old man who got a re-re-recurrent stenosis of his ureter-Bricker anastomosis on the left side.
The first time the stricture was dilated with a 6x20 mm cutting balloon (Boston Scientific Ltd.), after which a recurrence stricture developed on the same place for which an open reconstruction was previously performed.
However, a stricture developed again.
The chance of success of a second operation was considered small.

Figure 3 Casus 3. Position of the Overtoom-balloon catheters in both ureters. The distal ends protrude in the urostomy bag.

It was decided to dilate the rigid narrowing with an 8x20mm cutting balloon, followed by stenting with an Overtoom balloon catheter as spacer balloon.
The placement of a single balloon on the left side could jeopardize the nearby anastomosis on the other side. That is why two balloons were placed (fig. 3). The left Overtoom catheter spontaneously fell out of the Bricker-loop after three weeks.
The right catheter was removed four weeks after insertion under examination. There was no nephrodrain in this period present.
This treatment was finally successful.
After a year and a half the patient went well and no relapse occurred.

Discussion

Leakage and stenosis problems following the creation of a urinairy diversion seems to be an underexposed problem in the literature. Usually small series are described about minimally invasive solutions with varying degrees of success. [1 , 2 , 4].

In this series we describe the first experiences with the Overtoom balloon catheter.

This is a JJ catheter to which a balloon is attached, which can be safely placed in the ureter and can remain in situ for several weeks (3-6 weeks).

This balloon can be used as a long-term dilator, for example after dilation of a narrowing with a peripheral cutting balloon for blood vessels (not to be confused with an Acucise® treatment, which completely cleaves the wall).

With this Overtoom balloon catheter, a perforation of an ureter (anastomosis) can also be bridged to eliminate leakage: as a kidney blocker.

The lumen in this JJ catheter allows passage through the catheter, but in practice the lumen can be blocked by debris. In two of the three patients described here, it appeared necessary to place a nephrostomy catheter above the balloon.

When the balloon is allowed to remain longer in situ, there may be a fear that an injury will occur due to pressure necrosis.

Whether injury can be caused by pressure from within is not known.

However, there is a description of pressure necrosis due to pressure from two sides (a JJ stent and a vascular prosthesis) [6]. We have not seen any indications for it in this brief series.

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This article has recently been placed in the Tijdschrift voor Urologie. One fig has now been corrected and some minor text changes have been made.