

Sequential dilatation of two balloons and double D-J stents for therapy of ureteroenteral anastomotic stricture in patients following radical cystectomy and Bricker urinary diversion

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Abstract

Background: To determine the safety and efficacy of successive retrograde dilatation of two balloons and a double D-J stent for the treatment of ureteroenteral anastomotic strictures in patients who had undergone radical cystectomy and Bricker urinary diversion.

Methodology: A total of 25 patients with ureteroenteral anastomotic stricture following radical cystectomy and Bricker urinary diversion were treated with sequential dilatation of two balloons (F18 and F24), while the remaining other 32 patients were only dilated once. All patients were treated with ureteroscope or flexible ureteroscope-guided retrograde implantation of twin D-J stents (F5).

Results: Sequential dilatation required significantly longer hospital stay and surgery time than single dilatation. When sequential dilatation was compared to single dilatation, both the length of stay and the time it took to do the operation were clearly longer. After a follow-up of 6 to 24 months, the success rate of sequential dilatation was 61.5%, in comparison to 58.847.1% for single dilatation ($P=0.83<0.05$). All patients did not appear to have serious complications, such as hemorrhage, intestinal injury, or egression of the stent. No serious complications occurred in all patients, such as hemorrhage, intestinal injury, or egression of the stent.

Conclusion: Sequential retrograde dilatation with two balloons and double D-J stents is thought to be safe and effective for uretero-intestinal anastomotic strictures in patients having with brick ureteral diversions, and it is associated with fewer sequelae. It is worthwhile for clinical purposes.

Keywords: Bricker, Ureteroenteric anastomosis, Stricture, Dilatation

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Introduction

One of the most common consequences that can happen after a radical cystectomy with Bricker urinary diversion is ureteroenteral anastomotic stricture.

The stricture rates range from 2 to 13%¹⁻³. The aetiology is most likely the result of ischaemia at the anastomotic region. The etiology is most likely to be ischemia of the anastomotic site⁴. Open surgery, with the highest success rate, is characterized by great difficulty, multiple complications and great damage to ureters and intestines. Although the success rate of open surgery is the highest, it is difficult, complicated, and more damaging to the ureter and intestines. As a result, Therefore, endoscopic treatment is still the first-line treatment, especially for patients with short stenosis or not suitable for open surgery. endoscopic treatment remains first-line therapy, particularly for patients with short stenosis or who are not candidates for open surgery. In this study, ureteroenteric anastomotic strictures were treated using staged, sequential dilation of two balloons, and double D-J stents after a Bricker urinary diversion. The safety and effectiveness of this method are evaluated compared to conventional balloon dilatation., the safety and effectiveness of this method are evaluated.

Methods

Patients and methods

Between December 2012 and May 2019, 57 people patients who had re-

ceived a the radical cystectomy and a Bricker urinary diversion for ureteroenteral anastomotic strictures were in treated by our department center between December 2012 and May 2019 were included for ureteroenteral anastomotic strictures. In these patients, 25 patients ones (26 ureters) were dilated with a balloon (COOK, F18), and another one (COOK, F24) in 4 weeks later. Double D-J stents (COOK, F5) were placed all the time and removed in 8-12 weeks after in the second operation. The other remaining 32 patients (34 ureters) were dilated only once (COOK, F18) and placed with the same double D-J stents (COOK, F5) for 12 weeks.

Clinical data

The main clinical manifestations were: include low back pain, repeated urinary tract infections, and fever. Nearly half of the patients had impaired renal function (serum creatinine >133 μmol/L). The period from postoperative to treatment was 6-30 months, and the left ureter stricture was the most common site of stricture. All patients underwent Computerized Tomography Urogram (CTU) or Intravenous Urogram (IVU) or antegrade angiography (Figure 1) to assess hydronephrosis and the stenosis length. See the following table for patient information (Table 1).

Table 1: Patient information

Parameter	Single dilatation	Sequential dilatation	P
Ureteral stricture(n)	32	32	
Left	20(62.5%)	15(60.0%)	0.85
Right	10(31.3%)	9(36.0%)	0.71
Both	2(6.2%)	1(4.0%)	0.70
Mean age (years)	66.4±8.0	65.9±5.9	0.83
Males (n)	25(78.1%)	21(84.0%)	0.57
Mean BMI (Kg/m2)	23.2±2.1	23.5±2.2	0.55
Median months to onset	12.9±14.9	13.2±4.6	0.86
Mean follow-up (months)	14.6±3.9	14.2±4.8	0.71
Mean length (cm)	1.2±4.2	1.1±4.1	0.99

Surgical approach

All patients were operated on under general anesthesia in a state of sterile urine. Preventive antibiotics were used before surgery. A ureteroscope or flexible ureteroscope was used to find locate the a ureterostoma in the ileal conduit. A superslip guidewire (Cook, 0.035"/145 cm) was introduced through the anastomosis anatomosis and verified by B-ultrasound to be placed in the afflicted renal pelvis. If the strictured uret-

erostoma was not foundnot able to be located precisely, an ileal conduit was inserted with a DSA-guided antegrade guidewire.. The balloon was pPlaced the balloon at least 5 cm into the strictured ureter under direct vision, keeping the pressure at 20 atm, and was removed it aftern 5 minutes. Double D-J (D-J) stents (COOK, F5) were placed after obvious expansion of the stricture, and the length of the stricture was recorded. No obvious bleeding or injury was observed in all cases (Figure 2).



Figure 1: Anterograde angiography to assess hydronephrosis and the stenosis length.

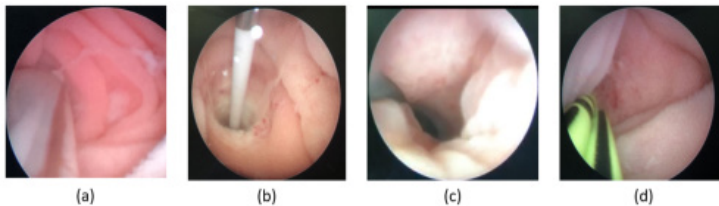


Figure 2: Surgical procedure: The balloon was inserted into the constricted ureter (a); The balloon was filled with saltwater at 20 atm for five minutes (b); Evident growth of the constraint (c); Placement of double D-J stents (COOK, F5) (d).

Follow-up survey

The follow-up time ranged from 6 to 24 months. The first time follow-up was arranged one month after the D-J stent waremoved, and patients were thereafter monitored every three months for up to two years. A computed tomography (CT) or ultrasonography was performed, and the serum creatinine level was reviewed. The disappearance of symptoms and hydronephrosis was considered a cure, and the improvement or disappearance of symptoms and the reduction of hydronephrosis was considered an improvement, both of

which are collectively referred to as success. Failure occurred when the symptoms did not improve and the hydronephrosis did not decrease or worsen.

Statistical analysis

Statistical Product and Service Solutions (SPSS) 26.0 (IBM, Armonk, NY, USA) was used to perform all statistical computations. The two-tailed Student's-t test (continuous variables) and Fisher's exact test were used for univariate statistical analysis (categorical variables). Statistical significance was assigned to tests with $P < 0.05$.

Results

The mean follow-up of the 25 patients (26 ureters) with in the sequential dilatation group was 14.2±4.8 months. Among these patients, 7 ureters were improved and , 9 were cured, and with the a success rate was of 61.5%. The average follow-up period for the other-sof the 32 patients (34 ureters) in the single dilatation group was 14.6±3.9 months. In this group, Nine 9 ureters were improved, seven 7 were cured, and the success rate was 58.847.1%. The success rate was not statistically

different, but increased numericallyin the sequential dilatation group was significantly higher than than in the single dilatation group (p<0.05, Table 2). There were significant differences in operation time and length of stay (Table 2). There was no hemorrhage, significant intestinal injury, or stent gression observed in any of the patients. All the failed patients chose renal fistula or long-term catheterization because they were unwilling to have receive replantation surgery. There was no increase in serum creatinine, even in patients with renal insufficiency.

Table 2: Comparison of patients undergoing different treatments

Patients	Operation time(min)	Length of stay(d)	Success rate (%)
Single dilatation	43.8±4.6	4.1±0.8	47.1%
Sequential dilatation	75.1±6.9	7.2±0.9	61.5%
P	<0.001	<0.001	<0.05

Discussion

Two of the most popular surgical techniques for urine diversion are Bricker and Wallace. Although it has been reported that there is a significant difference in the incidence of anastomotic stenosis between the two operations (Bricker, 25.3% VS Wallace, 7.7%)⁵, Bricker is a simple and convenient operation, and Wallace has a higher risk of blockage due to recurrence at the ureteroenteric anastomosis or the chance of

stones⁶. So in our department, Bricker is the mainstream. Ureteroenteric anastomotic stricture is associated with serious sequelae that lead to total or partial loss of kidney function, infetious complications, and the need for additional procedures. The most likely cause is ischemia in the anastomotic area⁴.

The traditional treatment for ureteroenteric anastomotic strictures is open surgery for reanastomosis, Schondorf⁷

reported that the long-term success rate is 91%. However, due to the adhesion formed during the previous operation, it is difficult and traumatic to have another open surgery, and the incidence of complications is high, which may easily lead to wound infection, vascular injury, and intestinal injury. Also, due to the effects of the initial operation, the majority of patients after a radical cystectomy are hesitant to have open surgery once more. Endourologic treatment, due to its simple operation, small trauma, and comparable short-term efficacy with open surgery^{8,9}, has become another option for the clinical management of such complications quickly, including D-J stent or metal stent implantation, balloon dilatation, and stenosis incision.

Motoala et al.¹⁰ compared the efficacy of open surgery and balloon dilatation for ureteral stricture and concluded that dilatation should be the first option as long as the guidewire and catheter could pass through the stenosis segment. However, some recent literature has reported that the long-term success rate of balloon dilatation alone is very low lower than open surgery. Van Son MJ Dimarco¹¹ reported that the open surgery was superior to endourological methods (balloon dilatation included) in terms of patency duration. However, they also found a higher rate to compromise renal function in the open

surgery group compared to the balloon dilatation group. long-term results of balloon dilatation alone in 52 cases with ureteroenteric anastomotic strictures, and found that the success rate was only 5% after 3 years of follow-up.

We improved the endourologic treatment. The fibrous scar in the stenosis segment was fractured first by balloon dilation, and then a larger diameter balloon dilation was used to completely fracture the fiber and its deep tissue in the same part, achieving the effect of "cold-knife incision" while avoiding complications such as hemorrhage and intestinal injury¹². It was substantiated by ureteroscopy after dilatation. When compared to single balloon dilation, the success rate was clearly increased. Although sequential dilatation increased the operation time and length of stay, it still had significant advantages over open surgery⁷. In addition, no significant complications were found in the two groups of patients in this study, which proved that balloon dilatation was a safe and repeatable operation.

Double D-J stents were inserted into the ureter and arranged in parallel for at least 8 weeks. For good urine drainage, the space between the tubes must be big enough to allow for peritubular drainage instead of intraluminal drainage. At the same time, the double D-J stents can also

play a good supporting and expanding role to reduce the occurrence of restenosis¹³. Operations were performed under the direct vision of a ureteroscope or flexible ureteroscope and assisted with B-ultrasound, which could ensure the balloon passed through the stricture smoothly and without damage. After dilatation, a ureteroscope or flexible ureteroscope could pass the stricture to observe the effect of dilatation, judge whether there was hemorrhage or intestinal injury, and measure the length of stenosis. Direct vision could avoid frequent fluoroscopy or angiography during the operation, and reduce the radiation damage to doctors and patients; In addition, the ileum bladder and ureterostoma it could be observed directly the ileum bladder and ureterostoma to prevent the omission of other conditions, such as tumor recurrence and stones.

This study does have some drawbacks. For starters, Firstly, this was a single-center research with a limited samples. Secondly, because of the intestinal folds and villi, it was sometimes difficult to identify the ureterostoma, and DSA was needed in this situation. Thirdly, the length of stay and operation time were increased, as well as hospitalization costs, in the sequential dilatation group. However, it was worthwhile for patients who had been effectively dilated for a long period of time.

Conclusion

According to our preliminary clinical experience, results, sequential dilatation of two balloons and double D-J stents for the treatment of ureteroenteral anastomotic stricture in patients who have undergone radical cystectomy and Bricker urinary diversion is minimally invasive, reasonably safe, and effective. Long-term, extensive research should be undertaken to evaluate this strategy more thoroughly.

Data Availability

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The study design was approved by the Ethics Committee of Southeast University Zhongda Hospital. Informed consent was obtained from all enrolled patients.

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Conflict of Interests

The authors declared no conflict of interest.

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