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Research Article

The Long-term Observations of Patients with Subcutaneous Pyelovesical Bypass - Detour Bypass

Andrzej Jerzy Wrona[1]*, Slawomir Gumularz[2] and Dominik Chodor[3]

[1]*Head of Urology Department, E.Biernackiego Hospital in Mielec, Poland*

[2]*Resident of Urology in Urology Department, E.Biernackiego Hospital in Mielec, Poland*

[3]*Urology Specialist, Urology Department, E.Biernackiego Hospital in Mielec, Poland*

***Corresponding Author:** Andrzej Jerzy Wrona, Head of Urology Department, E.Biernackiego Hospital in Mielec, Poland.

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Abstract

Many of Patients have a lot of problem with patency of their own urinary tract. Many of them could not have reconstructed ureter from the own tissues. Detour prosthesis (bypass) is a solutions of made artificial subcutaneous pyelovesical bypass. After the long-term observation we can say that this is a good and safe method dedicated to Patients who can't have reconstructed urinary tract from own tissues.

Keywords: Ureteric Obstruction; Pyelovesical Bypass; Detour

Introduction

Ureteral obstruction is a disease involving the loss of the ability of urine to flow from the kidney to the bladder which symptoms could be obstructive uropathy and consequent acute atrophic renal failure. Ureter obstruction may occur due to its narrowing, damage or pressure caused by proliferations changes (cancer), fibrosis of retroperitoneal tissue and caused by therapeutic process. The most common causes include:

- Iatrogenic [1] - after endourological (URS, ang. ureterorenoscopy, RIRS ang. Retrograde intrarenal surgery), gynecological and surgical procedures - complications after radiotherapy of organs located in the small pelvis and abdomen.
- Neoplastic changes, the most common of which are: advanced inoperable bladder cancer, colorectal cancer, neoplasm's of the reproductive system in women.
- Retroperitoneal fibrosis (Ormond's disease), where despite the repeated replacement of DJ catheters and the progression of the disease, there is an increasing hydronephrosis.

When obstructive uropathy occurs, the basic solution to the problem of ureteral damage is to provide immediate outflow of urine from the kidney by inserting a nephrostomy [2] and the performing appropriate imaging diagnostic allowing for the selection procedure. The priority in each case is the reconstruction of the urinary tract from the patient's own tissues (Boari flap, psoas hitch etc.). If this is not possible and autotransplant of kidney is not taken as an option, Detour should be considered [5]. It allows you to create an artificial way of urine drainage between the kidney and the bladder. It is a minimally invasive, safe method and above all, it is effective in providing the patient with the appropriate quality of life. Like any surgical method, it is fraught with early and late complications. Based on the long-term observation of patients (over 36 months from Detour implantation), we can conclude the

most common complications include: deformation of the silicone part of the Detour prosthesis with its obstruction, the presence of internal incrustation with the formation of stones, recurrent infections, skin fistulas. In order to emphesize the appropriate qualification of patients for the prosthesis implantation procedure, we would like to present case report of a patient in whom, after the Detour prosthesis was placed and diagnostic imaging was extended, an effective attempt was made to reconstruct the urinary tract from her own tissues with the simultaneous removal of the Detour prosthesis.

Material and Methods

The Detour prosthesis consists of an outer 27Ch polytetrafluoroethylene (PTFE) tube and a 17Ch inner silicone tube that extends beyons the outer part at each end. On the side from the kidney end, on the border of the outer and inner tubes, there is a radiosensitive ring, which is to mark the correct position of the prosthesis in the kidney (Figure 1). The Detour prosthesis insertion procedure must be performed under sterile conditions. Before being admitted to the Urology Department (7 to 10 days), the Patient has a bacteriological urine culture performed. In the moment of negative result, he or she is qualified for the procedures on that day. 3 days before the planned implantation, Patient additionally receives a broad – spectrum antibiotic (in the absence of allergies, it is the most often fluoroquinolone). The procedure itself is performed under general anesthesia, under US (ultrasound) and X-Ray control. The individual stages of the procedure can be divided into:

- Placing patient on his side with a slightly twisted pelvis (easier access to the lumbar and suprapubic area). (Figure 2).
- Perform punctures into the kidney under X-ray and ultrasound control - it is important to make them at the right angle (slightly to the side), so that the prosthesis does not bend at renal end (Figure 3).
- We extend the pyelocalyceal system of the kidney with Alken's extensions (Figure 4).
- Putting on Amplat'z 30Ch sheath through which we insert the Detour prosthesis into the kidney (Figure 5).
- Assessment of the position of the tip of the prosthesis in the kidney under X-ray. A radiosensitive indicator in the proximal part of the prosthesis is used. Proper placement is when the PTFE sheath is covered by the kidney parenchyma and does not penetrate the pyelocalyceal system (Figure 6).
- Using a plastic tube, perform the prosthesis under the skin and the bladder part also under the rectus of the abdomen (Figure 7a and Figure 7b).
- Performing a transverse incision in the abdomen on the operated side. Access to the bladder through the retroperitoneal space (laterally from the rectus abdominis muscle) (Figure 8a and Figure 8b).
- Shortening the distal part of the Detour prosthesis (appropriate length is determined intraoperatively). Then, at this end, sliding the PTFE layer to a length of approx 2 cm and the remaining silicon cover (Figure 9).
- Incision of the bladder wall to a width of about 1cm and then insertion of the prepared silicone end into the lumen of the urinary bladder wall.
- Fixing the outer PTFE sheath to the bladder wall (Figure 10).
- The intravesical Foley catheter is maintained for a minimum of 7 days.

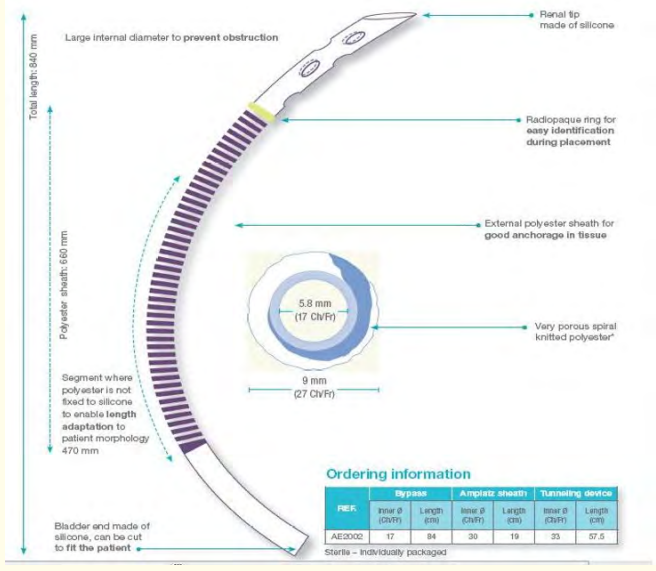
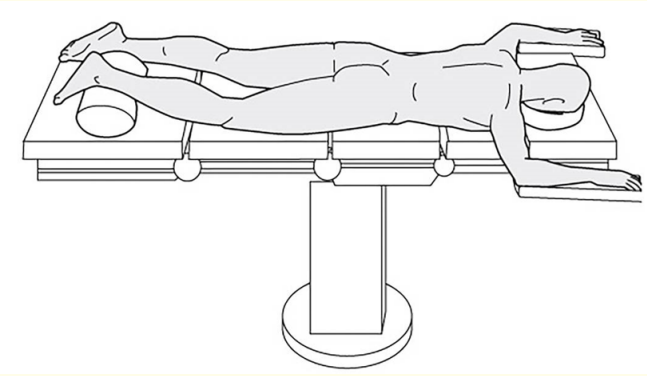


Figure 1: Construction of Detour.



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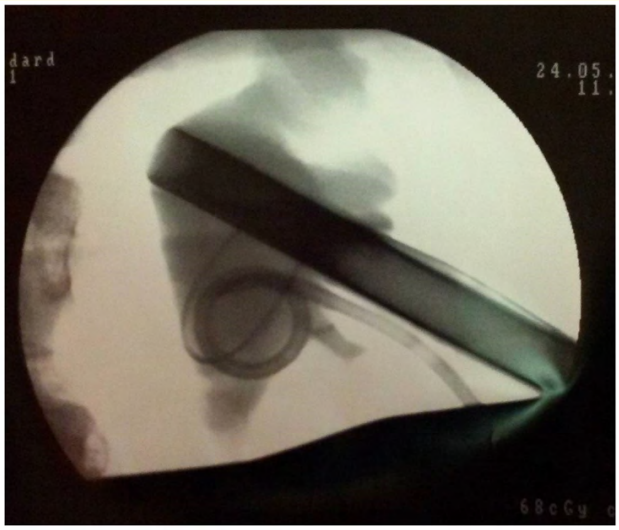

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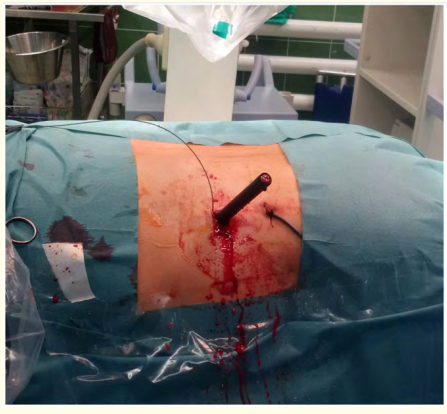

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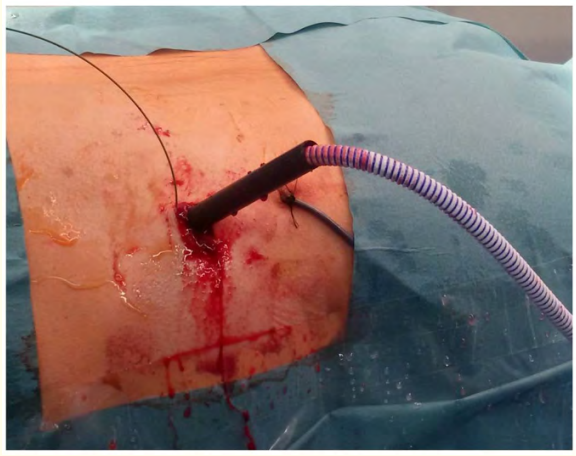

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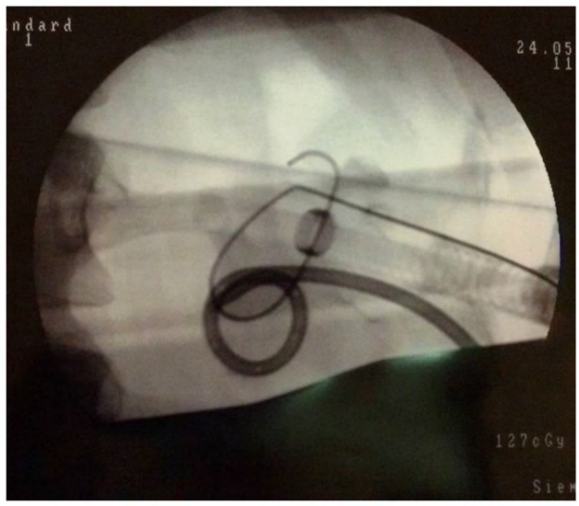

Figure 6

Figure 7a

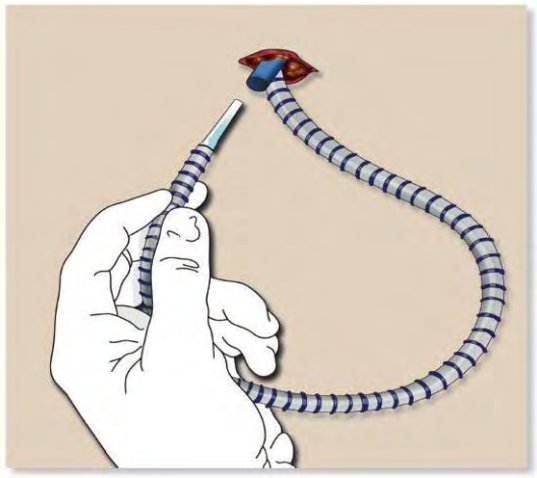

Figure 7b

Figure 9

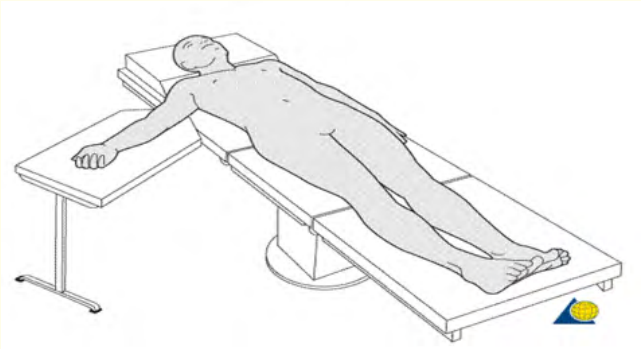

Figure 8a

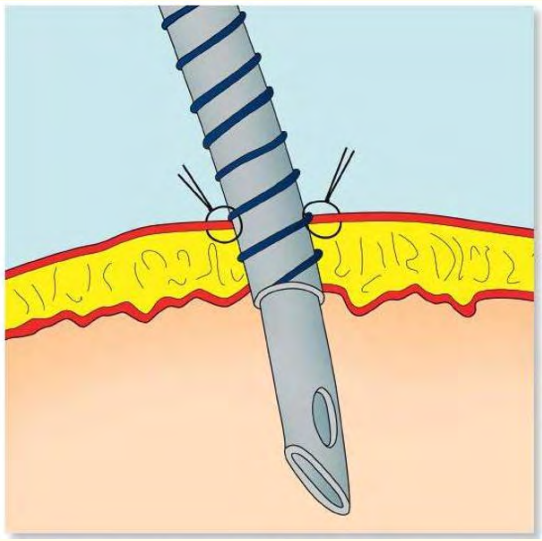

Figure 10

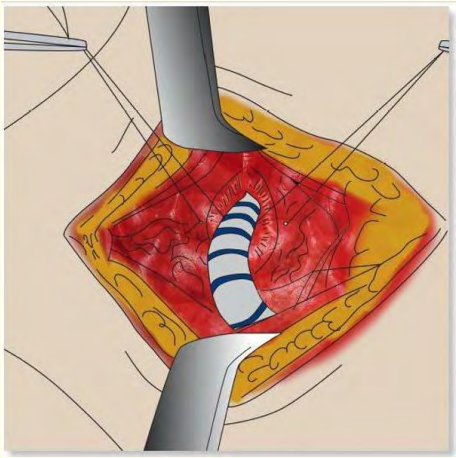

Figure 8b

Results

At our Department we performed 50 implantation of Detour prosthesis but only 15 Patients are currently under long term monitoring. The criteria for late complications were adopted as .

- Observation minimum 3 years after implantation of the prosthesis.
- Periodic and regular control at the Urology Department .

Fifteen patients meet the above criteria. Thirteen of them had a prosthesis inserted in our Department, and 2 another Patients in other Urology Departments in Poland but operated by the same Doctor. By analyzing the above cases, it can be determined that the most common etiology of onset of development complications is the deformation process of internal – silicone- Detour tube. This process take place in distal – the bladder segment of the prosthesis where two tubes are not fused together. It is this process that is the trigger for the development of complications. The most common process is the reduction of the bypass lumen(C-shape deformation (Figure 11a and Figure 11b)). There is a development of progressive obstructive uropathy, the formation of incrustations inside the tube (Figure 12) and recurrent urinary tract infections confirmed by microbiological tests. Moreover, it has been noticed that a channel forms between the outer and inner parts with the present leakage of urine and inflammatory reaction often forming around the tube. In some patients we observed a skin fistula formation – especially in the area of the bladder. The first goal is bacterial eradication of the urine tract – empirical antibiotic therapy is used and then targeted according to the bacteriological result. The choice in the procedure is endoscopic revision of the Detour prosthesis and an attempt to remove endoscopic incrustation. In the case of the presence of a cutaneous fistula or endoscopic failure, open revision of the bladder end Detour is recommended by uncovering it, cleaning it and re-implanting in the bladder. However, this all procedures has only temporary effect.

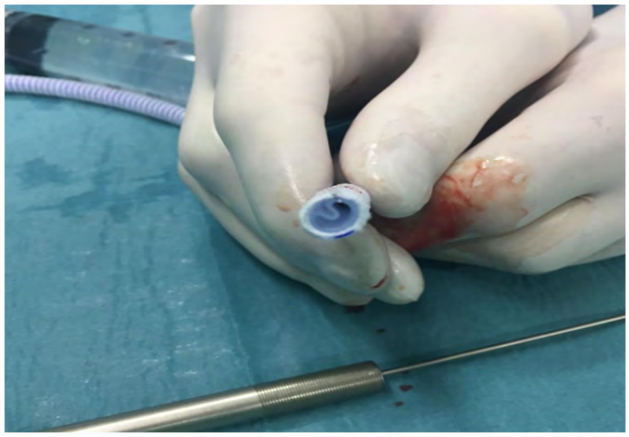

Figure 11: a and b – "C – shaped" deformation of the Detour.

Figure 12

Based on the observation of Patients, the most common complications of long term Detour implantation we show in the table 1.

Deformation of inner part Detour	12
Incrustation of the inner surface Detour	7
Recurrent urinary tract infections	8
Skin fistulas and inflammation in the course of Detour Patients	2
Without complications	4

Table 1

The goal of long-term care for Detour Patient is protection against complications. In our opinion, the deformation of the internal silicone part of the prosthesis in the course of which the secondary obstructive uropathy is formed results from the construction of the prosthesis itself. All intraoperative attempts to straighten the bladder part of prosthesis and repair it were unsuccessful. In the case of accumulation of sediment and incrustation, it is recommended to periodically (every 3-6 months) revision of the Detour prosthesis using the endoscopic method - URS or RIRS is inserted transversely into the prosthesis (vesical part) and mechanically, with the help of a guide wire or lithoclast, the encrustation is separated and subsequently rinsed out. The use of laser is strongly not recommended due to the very high risk of damaging the Detour due to the laser energy used. The mainstay of systematic recurrent urinary tract infection treatment is antibiotic therapy based on bacteriological urine culture. A rarer but no less important complication that we observe in our patients is the formation of inflammatory changes in the course of the Detour prosthesis with possible subsequent formation of skin fistulas – most often the suprapubic region. The treatment of inflammatory changes consists mainly in surgical treatment of the cutaneous fistula and empirical antibiotic therapy, followed by targeted antibiotics.

In the event of advanced inflammatory processes or irreversible deformation of the prosthesis, the patient should be qualified for its removal and surgical treatment of the inflammation. When the clinical condition allows it, there are no contraindications to returning to the applied method with therapeutic success.

The most important thing is to qualify for the Detour prosthesis implantation procedure. It should be in mind that this is a final and last solution, provided that the possibility of reconstructing the urinary tract from the patient's own tissues is exhausted. We would like to present the case of patient who had a Detour prosthesis implanted in June 2021, but the patient later came to our department under observation. The following complications were found in the course of the observation: deformation of the prosthesis with increasing incrustation, recurrent UTIs and skin fistula in the suprapubic region. As a result of another treatment process, i.e. revision of the Detour prosthesis, contrast was administered to it and under X-Ray control, it was visualized in the natural ureter up to the level L5/S1 (Figure 12). Due to the recurrent nature of the ailments and the need of remove the prosthesis (obstruction and advanced cutaneous fistula of the suprapubic region), a successful attempt was made to reconstruct the ureter using Boari Flap and the psoas hitch maneuver. Currently, the patient has properly functioning urinary tract reconstructed from her own tissues.

Based on the long-term observation of patients after the implantation of the Detour prosthesis, we can conclude that it is a safe and functional method of creating an artificial flow of urine between the kidney and the bladder. It is also recomemended for patients who cannot restore the continuity of the urinary tract from their own tissues. It should also be remembered that the alternative is always the installation and regular replacement of a nephrostomy – however, the quality of life of patients with nephrostomy is very low [2]. Currently, the longest follow – up is the patient who had a bilaterally Detour prosthesis established as the first one in our Department almost 9 years ago [6]. We can conclude that this is a method that should be considered not only in palliative terms [3,4]. Based on the experience gained, we recommend regular checks every 3-6months. Endoscopic revision of the prosthesis is recomemended in order to check the patency and remove the encrustations. If the symptoms presented by the patients qualify him for the removal of the Detour prosthesis, there are no contraindications to perform this procedure on the patient again.

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