



Research paper

Therapeutic difficulties in vesicorectal fistula treatment using several techniques in one center

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ABSTRACT

Introduction: Vesicorectal fistula (VRF) is a rare but devastating condition that may develop after surgery or radiotherapy. Many surgical methods to treat VRF have been described, but there is still no gold standard of VRF treatment.

Aim: The aim of the study is to present our experience in the treatment of VRFs and analyze different surgical techniques applied in our center retrospectively.

Material and methods: From June 2016 to June 2020, 7 patients (5 males and 2 females) aged 59–73 years (average 67.3 years) were treated for VRF in our center. The primary causes of VRFs were complications after laparoscopic radical prostatectomy (LRP), sigmoidectomy, laparotomy with removal of the tumour of the vaginal stump and anterior rectal resection and colostomy, Hartmann's operation due to rectosigmoid carcinoma, radiotherapy, treatment of cervical cancer and transurethral resection of bladder tumor (TURBT). The patients were treated with one of the following methods: transvesical laparoscopic single-site surgery (T-LESS), transanal minimally invasive surgery (TAMIS), transurethral fulguration and radical cystectomy with the Bricker's ileal conduit.

Results and discussion: Five patients underwent T-LESS, 2 TAMIS, 1 transurethral fulguration and 1 radical cystectomy with the Bricker's ileal conduit. The mean postoperative hospital stay was 4 days (range 2–8 days). The mean operative time was 139 minutes (range 100–285 minutes). Only 1 patient had a recurrence of a fistula.

Conclusions: Surgical management of VRFs is obligatory to prevent possible complications. Currently, there is no gold standard for treatment of VRFs. Therefore, this condition requires further investigation.

1. INTRODUCTION

A vesicorectal fistula (VRF) is a rare and abnormal connection between the bladder and the rectum. It can be congenital or it can appear as a result of the damage done to this area. The damage can be the result of (1) complications of surgery, (2) the inflammatory state, (3) a malignancy, or (4) the presence of foreign bodies inside the bladder.^{1–4}

Clinical symptoms of the VRF include persistent infections of the urinary tract, pneumaturia, fecaluria, and presence of urine in the stool.⁵ Diagnosis of VRF usually relies on the examination of the rectum. It can also be discovered by urethrocytostomy or cystography. The most sensitive (90%–100%) and also the most recommended method, however, is computed tomography (CT).⁶

VRF occurs extremely rarely in modern urology, which may explain the fact that there is no gold standard which could be applied to fix it. There are several surgical methods performed in VRF repair. Choosing the particular operation technique, however, depends entirely on the surgeon.^{7,8}

VRF rarely heals spontaneously therefore surgical approach is needed. There is currently a tendency to perform minimally invasive endoscopic methods in urology.^{3,9–11}

Operation methods performed in patients with diagnosed VRF are the following: (1) York-Mason technique, which is being gradually replaced by minimally invasive techniques such as (2) transvesical laparoscopic single-site surgery (T-LESS), (3) transanal minimal invasive surgery (TAMIS), and (4) natural orifice transluminal endoscopic surgery (NOTES), which is carried out through the rectum or bladder.^{12–14}

2. AIM

We present our results of VRF treatment and the safety of the applied operation techniques.

3. MATERIAL AND METHODS

From May 2016 to June 2020, 5 men and 2 women aged between 59 and 73 years (average: 67), were referred to our center for VRF treatment. The demographic data of our patients is presented in Table 1.

Among the 7 patients, 2 patients had a history of prostate cancer, 2 rectal and 2 sigmoid cancers; 1 patient had

both rectal and sigmoid cancer; 1 had a tumor of the vaginal stump, and the last patient was diagnosed with cervical cancer and a bladder tumor.

Patients diagnosed with prostate cancers underwent laparoscopic radical prostatectomy (LRP) procedures ($n = 2$). In a patient with sigmoid cancer, sigmoid was completely resected and the patient underwent four trials to restore the continuity of the gastrointestinal tract. The last attempt was complicated by sudden cardiac arrest and sepsis.

The patient with cancer of the sigmoid colon and rectum underwent the Hartman procedure. The patient with rectal cancer received radiation therapy. The patient with a vaginal stump tumor had laparotomy with excision of the vaginal stump tumor, anterior rectal wall resection and creation of colostomy. The last patient has been diagnosed in the past with cervical cancer; therefore she underwent comprehensive oncological treatment. She also had a bladder tumor which was treated by the transurethral resection of bladder tumor (TURBT) procedure.

Most of our patients presented symptoms characteristic for vesicorectal fistulas, such as leakage of urine from the rectum, recurrent urinary tract infections, and cloudy urine. In the patient with vesicovaginal and vaginorectal fistulas vaginal leakage of urine was observed.

4. RESULTS AND DISCUSSION

All patients were treated surgically. Six methods were used: T-LESS ($n = 7$; 53.85%), TAMIS – transrectal repair performed through the anal canal with laparoscopic instruments ($n = 2$; 15.38%), transperineal approach ($n = 1$; 7.69%), laparotomy from suprapubic access ($n = 1$; 7.69%), transurethral fulguration ($n = 1$; 7.69%) and radical cystectomy with the Bricker's ileal conduit ($n = 1$; 7.69%).

In 4 patients, 1 procedure was enough to obtain a permanent cure. In 2 patients, 3 surgeries were needed, and in 1 patient 5 attempts were made to completely repair the fistula.

The average post-operative hospitalization was 100 h (range 46–166 h). In patient treated with TAMIS, we observed the shortest post-operative stays – 48 h on average. T-LESS patients stayed in our Clinic for an average of 110 h after surgery. The longest post-operative time of hospitalization occurred in a patient with radical cystectomy (166 h). The duration of surgical procedures varied depending on the chosen method.

Table 1. Demographic data.

Patient no	Age, years	Sex	BMI, kg/m ²	Primary cause	Final method	Diameter of the fistula, mm
1	68	male	33.95	LRP	TAMIS	10.0
2	67	male	33.95	LRP	TAMIS	4.5
3	64	male	19.93	Hartmann's operation	T-LESS	5.0
4	73	female	24.22	cervical cancer and TURBT	Bricker	30.0
5	72	male	27.43	sigmoidectomy	T-LESS	8.0
6	68	male	20.03	radiotherapy of rectal cancer	T-LESS	8.0
7	59	female	23.62	laparotomy and rectal resection	T-LESS	5.0

Table 2. Treatment outcomes.

Patient no	Time between colostomy and VRF repair, months	Final method	No of operations	Operating time, min	Postoperative hospitalization time, h	Effectiveness	Follow-up, months
1	36	TAMIS	5	120	51	success	46
2	No colostomy	TAMIS	3	100	46	success	19
3	3	T-LESS	1	160	100	success	14
4	No colostomy	Bricker	1	285	166	success	13
5	120	T-LESS	1	135	125	failure	11
6	No colostomy	T-LESS	3	175	119	success	9
7	12	T-LESS	1	118	96	success	6
Average	43		2	156	100		17

In patients treated with T-LESS, the mean operation time was 139 minutes (range 100–175 minutes). The next most frequent method was TAMIS; in this case, the times ranged from 110 to 120 minutes (average 115 minutes). Cystectomy with Bricker's conduit lasted the longest – 285 minutes.

All of our patients previously underwent multiple abdominal surgeries. Therefore abdominal access were expected too difficult, hazardous and challenging. This is why we tried to operate with minimally invasive techniques through the bladder or the rectum. After careful investigation including cystoscopy, CT, fistulography and/ or rectoscopy we qualified the patients for appropriate procedure. The patient no. 4 with large radiotherapy – induced complex vesicorectovaginal fistula was treated with cystectomy – Bricker operation. Patients with smaller fistulae accessible transanally were operated on with TAMIS procedure. Because of our experience in T-LESS that requires only small suprapubic incision, the patients with smaller and located in the bladder fundus fistula were qualified to the T-LESS procedure.

In 6 out of 7 cases, the patients were cured, while in 1 patient, despite surgery, the vesicorectal fistula could not be permanently removed, and, due to the Covid-19 pandemic, another attempt was postponed.

Our patients were advised to make a follow-up visit to the urology clinic 3 months after the surgery. To date, our patients' follow-up times have ranged from 6 to 46 months (mean 17 months). A summary of selected treatment outcomes of our patients is presented in Table 2.

A fistula is very difficult to treat, both because of the choice of treatment and its effectiveness. There are several solutions that have been known for a long time and still can be carried out, such as the York-Mason technique, Over The Scope Clip (OTSC) or transanal endoscopic microsurgery (TEM). However, the most innovative methods include minimally invasive surgeries that are much more successful and minimize adverse effects. Therefore, our study is based on an evaluation of the technique that is most suitable, and that might function as a golden standard in VRF treatment.

In our study there were 7 patients whose age varied from 59 to 73, with the average age being 67.29. Most of the patients suffering from this condition are usually within this age group. Crippa et al.¹³ have reported that there are a few exceptions where the fistula occurs at age 50.

For the cases described in our study, there appear to be two main causes of the formation of VRF: (1) prostate cancer and (2) rectal and sigmoid cancer. One of the patients had a uterine cervical cancer and the other one had a bladder tumour. King et al.¹ point out that cancer is the main cause of VRF formation, whereas prostate and colorectal tumours are the most frequent ones. They also highlight congenital and inflammation causes as important factors, but to a lesser extent than neoplasms.

In our study most of the patients received surgery associated with the primary disease. Only 1 patient was not operated on, but was treated with radiotherapy, which in the past was related with more side effects than nowadays.¹⁵ Since the primary causes of the VRF in our study were very similar to those in other reports, the performed techniques were also similar, including laparotomy, radical prostatectomy and Hartmann's surgery.

The majority of our patients presented with urine passing through the rectum or vagina, or with urinary tract infections. By contrast, Kanehira et al.¹⁶ show mostly fecaluria (stool passing through urethra), pneumaturia and presence of urine in the stool as the three most notable signs of fistulae. None of our patients reported fecaluria or pneumaturia; but this only shows that there can be different symptoms of VRF.

The mean diameter of the VRF was 6.75 mm, which can be classified as a small hole. The reported range of fistula diameters is 5–20 mm, whereas the biggest fistula in our study was 10 mm.

Different types of surgical treatment can be distinguished in modern urology. Our patients were operated on mostly with the T-LESS method ($n = 7$). The second most frequent technique was TAMIS ($n = 2$). Tobias-Machado et al.¹² carried out a similar study where they used each of the methods on one of their patients and obtained results similar to ours. Their operation time was more than 1 h longer, but the hospital stay after the T-LESS method was shorter (2 days). Each type of surgery resulted in no complications, but 2 out of the 7 patients had a recurrence of the fistula and needed an additional operation. By contrast, the current study revealed all positive outcomes.

Kanehira et al.¹⁶ described TEM as a method that has outstanding results, including short operating time (127 minutes) with minimal blood loss and no postoperative complications. However, fistulas recurred in 3 patients

(30%). TEM is recommended as the surgery of choice in patients with a history of irradiation or ablation. The only contraindication is when previous attempts at surgical treatment has created tough scar tissue.

Another transrectal method is York Mason technique. This method appears to have a high risk of complications, because the incision on sphincteric muscles may cause incontinence. Nevertheless, Crippa et al.¹³ have not reported such a complication. One patient, however, presented with urinary incontinence (13%), which needed additional surgery and recurrence of the fistula. The transrectal method is better than the peritoneal approach, as it does not cause as much intra and postoperative complications because of its minimal invasiveness.

There is one more method in addition to the transvesical and transanal approaches. Sotelo et al.¹⁷ described the peritoneal laparoscopic technique as one having greater visibility and reduced pain in the abdomen. The mean operation time, however, is 2 h longer and blood loss is more significant than the other techniques. It provides a very convenient access to perform colostomy (which every patient who underwent this procedure needed), as well as access to the ileum, which, according to Mao et al.,⁷ can also be an approach to treat VRF. This technique is recommended in patients with a large defect containing nonviable tissue and the impossibility to decrease the volume of the bladder. Thus, the excised tissue from bladder and anterior rectal wall can be replaced with fragments of the ileum to help preserve natural conditions. However, this type of surgery requires a longer hospital stay and may result in higher morbidity resulting from intestinal anastomosis.

One weaknesses of our study is the fact that it was performed in a single clinical center with a small group of patients ($n = 7$) treated by the same medical crew. This, however, can also be considered an asset, because the operation technique was consistent among patients and provided more precise insight into the optimal treatment method. One of the strengths of the study is that personalized care was provided to each patient, that abundant medical equipment was available during each operation.

5. CONCLUSIONS

- (1) There are several surgical techniques that may be proposed to patients diagnosed with VRF. Each technique has its advantages and disadvantages that need to be taken into account before performing the surgery.
- (2) The T-LESS procedure appeared to be safe and effective. Nevertheless, further experience and observations in this area are necessary for perfecting the treatment of VRF.
- (3) If the center is more experienced in numerous surgical techniques for fistula repair, choosing the proper method is easier.

Conflicts of interest

The authors declare that they have no conflicts of interests.

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Ethics

Ethics committee approval and informed consent were not applicable.

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