

Laparoscopic urinary undiversion due to recurrent neobladder vaginal fistula: from orthotopic neobladder to ileal conduit

Desderivación urinaria laparoscópica por fístula neo-vesico vaginal recurrente: de neovejiga ortotópica a conducto ileal

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Abstract

Objective: Describe our experience in laparoscopic urinary undiversion due to recurrent neobladder vaginal fistula (NBVF). **Methods:** Retrospective review of patients who underwent laparoscopic urinary undiversion. Complications were characterized according to the Clavien classification. The Patient Global Impression of Improvement (PGII) questionnaire was used at one year of follow-up to assess the quality of life (QOL). **Results:** Three laparoscopic urinary undiversions, from orthotopic neobladder to ileal conduit. Two patients underwent laparoscopic cystectomy due to bladder cancer, and one open pelvic exenteration due to cervical cancer. All patients had received previous pelvic radiotherapy. Complications during the first 2 months were Clavien II (two patients). According to the PGII score, two patients felt "much better" and one felt "very much better." **Conclusion:** Urinary undiversion is a last resort, complex procedure. Even though, it may be the only chance to improve QOL in patients with recurrent or unrepairable NBVF. A laparoscopic approach with neobladder resection, fistulectomy, and intra-corporeal ileal conduit is feasible. Further studies are required to assess the best approach in the management of NBVF.

Keywords: Laparoscopy. Neobladder vaginal fistula. Quality of life. Urinary undiversion.

Resumen

Objetivo: Describir nuestra experiencia en desderivación urinaria laparoscópica por fístula neo-vesico vaginal recurrente (NBVF). **Métodos:** Revisión retrospectiva de pacientes a los que se les realizó desderivación urinaria laparoscópica. Las complicaciones se caracterizaron según la clasificación de Clavien. El cuestionario de Impresión Global de Mejora del Paciente (PGII) se utilizó al año de seguimiento para evaluar la calidad de vida (QoL). **Resultados:** 3 desderivaciones urinarias laparoscópicas, de neovejiga ortotópica a conducto ileal. Dos pacientes se sometieron a cistectomía laparoscópica por cáncer de vejiga y una exenteración pélvica abierta por cáncer de cuello uterino. Todos los pacientes habían recibido radioterapia pélvica previa. Las complicaciones durante los primeros 2 meses fueron Clavien II (2 pacientes). Según la puntuación PGII, dos pacientes se sintieron «Mucho mejor» y uno se sintió «Muchísimo mejor.» **Conclusión:** La desderivación urinaria laparoscópica es un procedimiento complejo y de último recurso. Sin embargo, puede ser la única oportunidad para mejorar la calidad de vida en pacientes con NBVF recurrentes o irreparables. El abordaje laparoscópico con resección de neovejiga, fistulectomía y conducto ileal intracorpóreo es factible. Se requieren más estudios para evaluar el mejor enfoque en el manejo de NBVF.

Palabras clave: Calidad de vida. Desderivación urinaria. Laparoscopia. Neo-vesico vaginal recurrente.

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Introduction

Radical cystectomy in women poses a special challenge from the urinary diversion standpoint. During the last 50 years, reconstruction of the lower urinary tract has evolved from cutaneous incontinence^{1,2} to orthotopic continent diversion to the intact native urethra. Choosing an orthotopic neobladder is appealing from both the cosmetic and functional points of view, but increases the risk of complications such as stress urinary incontinence and neobladder vaginal fistula (NBVF) development.

Initial management of NBVF usually involves an attempt to close the fistula from a vaginal approach. The abdominal approach is less popular among patients and surgeons since the surgery becomes more challenging due to adhesions. There is a high-risk of damaging the neobladder, the ureters, the bowel, and the rectus. Irreparable damage to the neobladder may require removing it and building up a new one or even performing an undiversion to the ileal conduit or heterotopic reservoir. There are few reports regarding vaginal closure of NBVF, and success rates are low^{3,4}. Failure is the most likely outcome after vaginal surgery. In this setting, the next step is to perform an abdominal closure attempt or a urinary undiversion. Since closing the fistula from the abdominal approach is most of the time not feasible, urinary undiversion is the usual way to go.

Urinary undiversion involves highly complex surgical procedures, where the main focus is improving quality of life (QOL). Complications during and after surgery are highly frequent. This probably explains the low number of procedures around the world and the limited number of publications about this subject^{5,6}.

Our aim is to describe the resolution of three cases of laparoscopic urinary undiversion due to recurrent NBVF in a single center.

Materials and methods

We performed a retrospective review of patients who underwent urinary undiversion due to NBVF from January 2015 to 2022. Information was collected from patients' electronic medical records with previous informed consent.

The information assessed was: age medical history, previous oncologic treatments, number of pads used daily, previous closure attempts, characteristics of undiversion surgery, hospitalization time, and postoperative complications according to Clavien classification.

All patients completed the Patient Global Impression of Improvement Questionnaire (PGII) at 12 months of follow-up to assess postoperative QOL.

Surgical technique

A Foley catheter was placed in the fistula. Fanshaped trocar placement was performed, one umbilical 12 mm trocar, two 12 mm trocars in both flanks, and two 5 mm trocars in both iliac fossae. Firstly we performed adhesiolysis followed by neobladder and bilateral ureter dissection. The distal aspect of the neobladder was opened to identify the fistula. The neobladder was fully dissected en bloc with the distal aspect of both ureters using a harmonic scalpel and bipolar cutting device. The specimen was removed in a bag through the vagina. The vaginal defect was closed using a running barbed suture. We selected the ileal portion of the future conduit 20 cm proximally to the ileocecal valve. Enterotomy and entero-enteric anastomosis were performed with mechanical sutures. Termino-lateral ureteral reimplantation was done using absorbable multifilament suture and simple J stents were placed on both ureters intracorporeally. A urethral drainage was placed and the conduit was exteriorized through the right flank port.

Results

During the study period, three laparoscopic urinary undiversions were performed in a single center. Patient characteristics and outcomes are shown in [Table 1](#). In all cases, an ileal conduit was built intracorporeally. With a median follow-up of 18 months, there were no long-term complications.

Discussion

Urinary tract diversion is a complex choice after radical cystectomy. Most of the postoperative complications, both in the short and long-term are related to the urinary diversion and the necessary steps to build it. Neobladders may appear as the best possible diversion since they resemble normal urinary tract physiology. Even though, neobladders may come at a high cost, especially in women, when a NBVF is developed.

Refunctionalization of the diverted urinary tract was popularized by Hendren⁷ with favorable results reported by numerous authors. Most cases initially reported were pediatric patients who underwent urinary diversions (UD) for obstruction, myelodysplasia, or vesicoureteral reflux.

Table 1. Clinical cases

	Case I	Case II	Case III
Age	69	71	77
Medical history	Hypertension, smoking, and bladder carcinoma	Hypertension, endometrial carcinoma, and bladder carcinoma	Smoking, cervix carcinoma, and bladder carcinoma
Previous oncologic treatments	Trimodal therapy (2014). Open radical cystectomy (2016)	Open Hysterectomy and pelvic radiotherapy (1985). Neoadjuvant chemotherapy and laparoscopic radical cystectomy (2016)	Chemotherapy and brachytherapy (2010). Laparoscopic radical cystectomy (2017)
Pad use (daily)	6-7	5	8-9
Previous vaginal surgery	2 First attempt: primary closure Second attempt: omental flap	3 First attempt: primary closure Second and third attempt: Martius flap	2 First attempt: primary closure Second attempt: Martius flap
Operative time (days)	320	360	330
Intraoperative complications	None	Ileum perforation during adhesiolysis	None
Estimated blood loss	300 mL	250 mL	700 mL
Hospital stay (days)	7	5	8
Postoperative complications	Ileus	None	Persistent drain discharge
Clavien	2	0	2
PGII at 12 months	7 (very much better)	6 (much better)	6 (much better)

Undiversions to orthotopic continent reservoirs, heterotopic continent reservoirs, and even laparoscopic approaches have been described by different authors⁷⁻¹¹. However, with the increasing number of cystectomies, we believe that more reports of Urinary undiversion are necessary^{12,13}.

The largest single-center urinary undiversion series was reported by Hautmann et al.¹⁴ In 51 cases, secondary or tertiary surgeries were performed for oncologic (n = 23) and nononcologic (n = 28) indications using an open approach. Most reports of urinary undiversion are from an incontinent to a continent reservoir^{8,14-16}. In our three cases, an orthotopic continent reservoir to an incontinent Bricker-type ileal conduit was performed, due to a nononcological complication, a previous unsuccessful surgical fistulectomy. Patients were free of oncologic disease, with a good performance status but severe deterioration of their QOL related to permanent urinary leakage.

In this study, we found that all patients failed the vaginal closure attempts and since abdominal closure was highly challenging, we decided to perform a urinary undiversion and ileal conduit. We decided to perform a new ileal conduit due to the neobladder injury during adhesiolysis associated with the large defect in the urinary fistula.

Despite other authors having described the use of urinary undiversion after the failure of fistula closure^{3,4,17}, we haven't found other reports in the literature

regarding the laparoscopic approach. Other series have described better results in NBVF closure, with success rates of up to 61.5%.^{17,4} All the remaining patients that failed fistula closure underwent urinary undiversion. Our low rate of success in fistula closure may be related to the fact that all of our patients had had previous pelvic radiotherapy. However, another topic to highlight is QOL after NBVF, since other authors that succeeded in closure have described severe stress urinary incontinence¹⁸. In spite of requiring a urinary undiversion, our patients had a high degree of satisfaction according to the PGII.

As previously mentioned, we consider that being an infrequent procedure that requires complexity and experience both in the surgical team and in the perioperative management, an interdisciplinary approach is needed as well as a highly complex intensive care unit, without neglecting that selection of patients is a core principle of urinary undiversion. Patients must be well-informed and determined to undergo this type of treatment. We would like to highlight that the cornerstone of this surgery is to perform it in experienced hands regardless of the chosen approach. However, the laparoscopic approach provides greater benefits in the recovery of our patients.

The primary limitations of our study are the retrospective nature, the low number of patients recruited, and from a single center. Furthermore, we did not

measure the fistula size. However, despite having experience in the resolution of complex fistulas through the vagina, we consider that our casuistry could be relevant due to the scarcity of studies regarding recurrent NBVF solved through the laparoscopic approach.

Conclusion

Urinary undiversion is, despite being a last resort, a complex procedure. Even though, it may be the only chance to improve QOL in patients with recurrent or unreparable NBVF. In spite of this, it is feasible to perform laparoscopy and stands as a valid alternative in patients with recurrent lower urinary tract fistulas. A laparoscopic approach with neocystostomy, fistulectomy, and intracorporeal ileal conduit is feasible but requires a high degree of surgical expertise in laparoscopy. Further studies are required to assess the best approach in the management of NBVF. Even though surgical experience and interdisciplinary management are required, it offers a suitable resolution with clear improvements in the patient's QOL.

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Conflicts of interest

Authors declare that there is no conflicts of interest regarding the publication of this article.

Ethical disclosures

Protection of human and animal subjects. The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. Right to privacy and informed consent. The authors have obtained approval from the Ethics Committee for analysis and publication of routinely acquired clinical data and informed consent was not required for this retrospective observational study.

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