



Case report

Urinary tract reconstruction for iatrogenic fistula secondary to radical hysterectomy: Cases from Malawi's Fistula Care Center

Jennifer Draganchuk^{a,*}, Tulsi Patel^a, Ennet Chipungu^b, Patrick Nampaneni^b, Jeffrey Wilkinson^a

^a Division of Global Women's Health, Department of Obstetrics and Gynecology, Baylor College of Medicine, Houston, TX, USA

^b Freedom from Fistula, Fistula Care Center, Lilongwe, Malawi

ARTICLE INFO

Keywords:

Cervical cancer in low-income countries
Complications of radical hysterectomy in low-income countries
Iatrogenic fistula
Fistula repair
Ureterovaginal fistula repair
Urinary tract reconstruction

ABSTRACT

Complications from radical hysterectomy in low-income countries (LICs) are largely unreported in the medical literature. We report on three cases of urinary tract reconstruction performed at the Fistula Care Center (FCC) in Lilongwe, Malawi for iatrogenic fistula following radical hysterectomy. These cases demonstrate the diversity and complexity of reconstruction techniques required and emphasize the need for careful tracking of surgical outcomes of radical hysterectomy.

1. Introduction

For FIGO stage IB2 (FIGO 2018) invasive cervical carcinoma, surgery and radiotherapy both have similar patient outcomes (Bhatla et al., 2021). In Malawi, radiation therapy is not available and surgical management is standard. In many LICs such as Malawi, radical hysterectomy is performed by Gynecologists with advanced training. Patients typically undergo full bilateral pelvic lymphadenectomy because sentinel lymph node detection and frozen pathological assessment are unavailable. Patients present to the FCC in Lilongwe via self or provider referral often from great distances within Malawi or from a neighboring country such as Mozambique. The FCC is staffed by two lead surgeons one of whom is a board-certified Urogynecologist with 20 years of fistula repair experience, and the other is an Obstetrician/Gynecologist with advanced training in fistula repair and 15 years of experience. Many patients learn of the FCC via women in their communities who have undergone fistula repair and now serve as "fistula ambassadors." Medical records in Malawi are maintained via personal health passports and paper hospital records.

We report three cases of urinary tract reconstruction performed at the FCC at Bwaila District Hospital in Lilongwe, Malawi, for iatrogenic fistula following radical hysterectomy and pelvic lymphadenectomy. All cases described were staged as IB2 (FIGO 2018). The extent of resection at the time of radical hysterectomy was not indicated in the records

provided. These three cases: 1) combined ileal interposition and transvaginal vesicovaginal fistula (VVF) repair, 2) Boari flap, and 3) uretero-ureteral anastomosis, were performed between 2021 and 2022. These cases illustrate the breadth of reconstruction techniques required when extensive retroperitoneal fibrosis prohibits direct reanastomosis of the ureter to the bladder for repair of ureterovaginal fistula.

2. Case Descriptions

PATIENT A: Patient A is a 42-year-old female, HIV seroreactive on highly active anti-retroviral therapy (HAART) (undetectable viral load pre-operatively) with a history of squamous cell carcinoma (SCC) of the cervix on cervical biopsy, clinical Stage IB2 on examination, who underwent a radical hysterectomy, bilateral salpingectomy and bilateral pelvic lymph node dissection. Final pathology demonstrated completely excised CIN III with 0/16 positive lymph nodes. Of note, there was no excisional procedure indicated in the records provided to the FCC. On post operative day 22, the patient presented with vaginal vault dehiscence with profuse purulent and watery discharge. Testing for VVF by retrofilling the bladder with methylene blue dye (dye test) was positive and a foley catheter was placed. Four months after initial surgery, the patient presented to the FCC. The dye test was persistently positive with a visually and palpably tethered right vaginal fornix. To perform this test, a speculum was placed, and dye was backfilled into the bladder via

* Corresponding author at: One Baylor Plaza, Houston, TX 77030, USA.

E-mail address: Jennifer.Draganchuk@bcm.edu (J. Draganchuk).

a foley catheter. Dye visualized within the vagina confirms a VVF, and visualization of urine without dye, suggests a ureterovaginal fistula. This patient's tethered right vaginal fornix was suspicious for a ureterovaginal fistula coexisting with her VVF. Moderate to severe right hydronephrosis was noted on renal ultrasonography. A computerized tomography (CT) urogram was performed to differentiate between combined VVF with right ureterovaginal fistula, versus VVF with complete obstruction of the right ureter. Both VVF and right uretero-vaginal fistula were confirmed. At eight months post op from radical hysterectomy, in 2022, she underwent an exploratory laparotomy, extensive enterolysis and ureterolysis, appendectomy, ileal interposition, placement of suprapubic catheter and transvaginal VVF repair. The cecum and appendix were densely adhered to the right pelvic side wall and iliac vessels, requiring enterolysis and an appendectomy. Extensive retroperitoneal fibrosis was noted. More than two hours of ureterolysis was performed to isolate the right ureter, which was distended and adhered to the sacrum and iliac vessels. Due to a small, immobile bladder and the extent of fibrosis limiting mobilization of the ureter, direct reimplantation or uretero-ureteral anastomosis could not be performed. A 12 cm segment of ileum with the mesentery preserved, approximately 20 cm from the ileocecal junction, was mobilized and anastomosed to the bladder and to the right ureter off tension. An end-to-end, hand-sewn ileal anastomosis was performed. A right ureteric catheter was placed along with a suprapubic catheter to allow for continuous bladder irrigation. The VVF could not be accessed abdominally due to obliteration of the presacral and paravaginal spaces with scar and this was repaired transvaginally. Total operative time was 360 min. Estimated blood loss was 400 mL. The suprapubic catheter was removed on post operative day 21 and the ureteric catheter on post operative day 28. Post operative course was complicated by abdominal wound separation and a small fascial dehiscence which was surgically closed. The patient was discharged on post operative day 40 with a negative post operative dye test and complete resolution of leaking.

PATIENT B: Patient B is a 45-year-old female, HIV seroreactive on HAART (undetectable viral load pre-operatively), with a history of SCC of the cervix on biopsy, clinical stage IB2 on examination, who underwent a radical hysterectomy and bilateral pelvic lymph node dissection. Final pathology was notable for invasive well differentiated SCC, which was completely excised with 0/13 nodes positive. The patient experienced a fascial dehiscence on post operative day 5, which was closed secondarily. On postoperative day 13, the patient experienced leakage of urine. A dye test was performed and was negative for VVF. A foley catheter was placed. On post operative day 42 repeat methylene blue dye test was negative and intravenous urogram (IVU) was inconclusive. The Foley catheter was retained due to a high post void residual of 200 mL. The patient was referred to the FCC for evaluation and management of urogenital fistula. At the FCC, the patient's blue dye test was confirmed negative. She was able to void, and urine was visualized leaking from the left side of her vaginal cuff. Mild left hydronephrosis was noted on renal ultrasonography and a diagnosis of left ureterovaginal fistula was made. Approximately six months following radical hysterectomy, in 2022, she underwent exploratory laparotomy, extensive enterolysis and ureterolysis, incidental sigmoid enterotomy, Boari flap reconstruction, diverting loop sigmoidostomy, and suprapubic catheter placement. Her sigmoid colon was densely adherent to the left pelvic side wall with extensive retroperitoneal fibrosis noted. Greater than 1.5 hours of lysis of adhesions was required to isolate the left ureter and free the sigmoid colon from the left pelvic sidewall. A three-centimeter full thickness sharp injury to the sigmoid was immediately identified and repaired in a two-layer airtight closure with negative bubble test. The left ureter was distended and immobile, adherent to the patient's sacrum. A Boari flap was then employed due to inability to further mobilize the left ureter caudad and concern over tension on the anastomosis. Given the patient's HIV seropositive status, history of postoperative fascial dehiscence and location of the sigmoid injury inferior to the ureteral anastomosis, a diverting loop sigmoidostomy was

performed to allow for optimal healing and prevention of enterovesical fistula formation. A left ureteric catheter was placed along with a suprapubic catheter for bladder irrigation. Total operative time was 273 min. Estimated blood loss was 300 mL. Suprapubic and ureteric catheters were removed on post operative day 26. Post operative course was subsequently complicated by profuse watery diarrhea, which resolved with fluid hydration and metronidazole for suspected *Clostridium difficile* infection (not diagnosable by laboratory studies at this site). The patient was discharged on post operative day 35 with complete resolution of leaking.

PATIENT C: Patient C is a 51-year-old female, seroreactive on HAART (undetectable viral load pre-operatively), with a history of SCC of the cervix on biopsy, clinical stage 1B2 on exam, who underwent radical hysterectomy with bilateral pelvic lymphadenectomy. Final pathological report was not provided to the FCC. She presented to the FCC three months following radical hysterectomy and noted leaking which started two weeks following surgery. Dye test was negative for VVF, and leakage of urine was noted from the left vaginal apex. Renal ultrasonography demonstrated mild to moderate left hydronephrosis. A diagnosis of left ureterovaginal fistula was made. In 2021, she underwent exploratory laparotomy, extensive enterolysis with multiple small incidental enterotomies, ileal resection and end-to-end, hand-sewn anastomosis and uretero-ureteral anastomosis. Nearly the entire ileum along with the distal jejunum were involved in dense adhesions in the pelvis. The midportion of the ileum was densely adherent to the retroperitoneal space between the bladder and rectus abdominis muscles and two small enterotomies were repaired. Greater than 2 hours of enterolysis was performed to free the small bowel from the pelvis. Extensive retroperitoneal fibrosis was noted during dissection to mobilize the left ureter. The sigmoid colon was adherent to the iliac vessels and the obturator internus. Given its location, it was deemed too dangerous to take down for fear of vascular injury. The length of available left ureter was too short to implant into the bladder directly and the bladder was too small to create a sufficiently long Boari flap. The right ureter was then mobilized, and the left ureter was anastomosed to the right ureter with a catheter placed retrograde into the right ureter and then passed through the anastomosis into the left ureter. Due to the extensive dissection performed to the bowel surrounding the ileal enterotomies, a 12 cm segment of the mid portion of ileum was resected and an end-to-end, hand-sewn anastomosis was performed. Total operative time was 375 min. Estimated blood loss was 600 mL. The ureteric catheter was removed on postoperative day 28 and the patient was discharged on post operative day 35 with complete resolution of leaking.

3. Discussion

At 52.5 deaths per 100,000 every year, Malawi has the highest cervical cancer related mortality in the world and the second highest cervical cancer age-standardized incidence rate in the world at 67.9 per 100,000 per year, second only to Eswatini (Gerstl et al., 2022 Feb 14). Worldwide, women living with HIV are at a sixfold increased risk of cervical cancer compared to those living without HIV (Stelzle et al., 2021 Feb). In Malawi, the prevalence of HIV has been estimated at 9.4 % in women aged 15–49 years old (Malawi Country Fact Sheet, 2021).

Surgery is often the mainstay for treatment of cervical cancer in many LICs like Malawi, where radiation therapy is not available. A systematic review and meta-analysis in 2019 reported on the morbidity of surgical management of cervical cancer in low and middle-income countries (LMICs). Fistula was found in an estimated 2 % of cases following radical hysterectomy. However, due to the inclusion and exclusion criteria of this study, there were no low-income countries represented in the 46 studies analyzed (Allanson et al., 2019). In 2018, Chinula et al. reported on early experiences and outcomes of a competency-based curriculum to rapidly build surgical capacity for treatment of cervical cancer in Malawi. In two years, they reported one VVF which resolved with conservative management and one

perioperative death due to intraoperative hemorrhage and lack of sufficient blood products for transfusion (Chinula et al., 2018).

This case series highlights that radical hysterectomy can be associated with postoperative complications such as a urogenital fistula. These have devastating economic, physical and psychosocial impact including social isolation and stigma due to unrelenting incontinence, offensive odor and worsening poverty (Drew et al., 2016). These challenges are magnified in patients such as ours who were already impoverished and living with HIV, as well as cancer survivorship, in a low resource setting. Adding to this multi-layer burden, was the difficulty of the fistula repairs in the cases presented, owing in large part to the intra- and retroperitoneal fibrosis. We postulate the dissection performed during the index surgery induces fibrosis that is worsened by a systemic pro-inflammatory state induced by HIV and cancer as described by Doersch et al. (2022).

4. Conclusion

To our knowledge, this is the first manuscript detailing the intra operative and post operative course of patients who underwent fistula repair in Malawi following radical hysterectomy. Our aim is to inspire increased reporting of surgical outcomes and complications of the surgical management of cervical cancer in LICs as capacity for radical hysterectomy increases. This will inform optimal patient counseling, refinement of technique, and optimize contextually relevant training in LICs.

Consent

Written informed consent was obtained from the patients for publication of this case series.

Author contributions

1. Jennifer Draganchuk participated in conceptualization, writing of original manuscript draft, manuscript review and editing, medical record review, and patient care.
2. Tulsi Patel participated in manuscript review and editing, medical record review and patient care.
3. Ennet Chipungu participated in manuscript review and editing, patient care and supervision.
4. Patrick Nampaneni participated in manuscript review and editing, medical record review and patient care.

5. Jeffrey Wilkinson participated in conceptualization, manuscript review and editing, patient care and supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We would like to sincerely thank the Freedom from Fistula Foundation for funding the Fistula Care Center in Malawi as well as the dedicated staff at the Fistula Care Center who work tirelessly to provide exemplary care to the fistula patients.

References

- Allanson, E.R., Powell, A., Bulsara, M., Lee, H.L., Denny, L., Leung, Y., Cohen, P., 2019. Morbidity after surgical management of cervical cancer in low and middle income countries: a systematic review and meta-analysis. *PLoS ONE* 14 (7), e0217775. <https://doi.org/10.1371/journal.pone.0217775>. PMID: 31269024; PMCID: PMC6608935.
- Bhatla, N., Aoki, D., Sharma, D.N., Sankaranarayanan, R., 2021. Cancer of the cervix uteri: 2021 update. *Int. J. Gynaecol. Obstet.* 155 (Suppl. 1), 28–44. <https://doi.org/10.1002/ijgo.13865>. PMID: 34669203; PMCID: PMC9298213.
- Chinula, L., Hicks, M., Chiudzu, G., Tang, J.H., Gopal, S., Tomoka, T., Kachingwe, J., Pinder, L., Hicks, M., Sahasrabudhe, V., Parham, G., 2018. A tailored approach to building specialized surgical oncology capacity: early experiences and outcomes in Malawi. *Gynecol. Oncol. Rep.* 4 (26), 60–65. <https://doi.org/10.1016/j.gore.2018.10.001>. PMID: 30364674; PMCID: PMC6197742.
- Doersch, K.M., Barnett, D., Chase, A., Johnston, D., Gabrielsen, J.S., 2022. The contribution of the immune system to genitourinary fibrosis. *Exp. Biol. Med.* (Maywood) 247 (9), 765–778. <https://doi.org/10.1177/15353702221090872>. Epub 2022 May 7. PMID: 35531654; PMCID: PMC9134766.
- Drew, L.B., Wilkinson, J.P., Nundwe, W., Moyo, M., Mataya, R., Mwale, M., Tang, J.H., 2016. Long-term outcomes for women after obstetric fistula repair in Lilongwe, Malawi: a qualitative study. *BMC Pregnancy Childbirth* 5 (16), 2. <https://doi.org/10.1186/s12884-015-0755-1>. PMID: 26732574; PMCID: PMC4702356.
- Gerstl, S., Lee, L., Nesbitt, R.C., Mambula, C., Sugianto, H., Phiri, T., Kachingwe, J., Llosa, A.E., 2022. Cervical cancer screening coverage and its related knowledge in southern Malawi. *BMC Public Health* 22 (1), 295. <https://doi.org/10.1186/s12889-022-12547-9>. PMID: 35164716; PMCID: PMC8842862.
- Malawi Country Fact Sheet, 2021. HIV and AIDS estimates. UNAIDS; 2023. Accessed 26 March 2023. <https://www.unaids.org/en/regionscountries/countries/malawi>.
- Stelzel, D., Tanaka, L.F., Lee, K.K., Ibrahim Khalil, A., Baussano, I., Shah, A.S.V., McAllister, D.A., Gottlieb, S.L., Klug, S.J., Winkler, A.S., Bray, F., Baggaley, R., Clifford, G.M., Broutet, N., Dalal, S., 2021. Estimates of the global burden of cervical cancer associated with HIV. *Lancet Glob Health.* 9 (2), e161–e169. [https://doi.org/10.1016/S2214-109X\(20\)30459-9](https://doi.org/10.1016/S2214-109X(20)30459-9). Epub 2020 Nov 16. Erratum in: *Lancet Glob Health.* 2021 Feb;9(2):e119. PMID: 33212031; PMCID: PMC7815633.