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EVOLVING EXPERIENCE WITH LOWER URINARY TRACT FISTULAS AT A TERTIARY CARE UROLOGICAL CENTRE.

Hypothesis / aims of study
Lower urinary tract (LUT) fistulas are an unfortunate and uncommon complication of pelvic surgery, radiation, or childbirth. Urethrovaginal fistulas (UVF) are managed by transvaginal repair using tissue interposition. Vesicovaginal fistulas (VVF) may be managed by a transabdominal or transvaginal approach. With increasing urologic training in transvaginal surgery, there has been a movement towards transvaginal repairs whenever possible. The objective of this study was to evaluate the etiology, investigation and management of urinary tract fistulas at our institution over a 7 year period. We propose that the vast majority of these cases can be managed successfully via a transvaginal approach. We also propose that suprapubic catheter drainage is not necessary in the majority of uncomplicated cases.

Study design, materials and methods
We performed a retrospective chart review of UVF's and VVF's presenting between April 1, 2002 and March 1, 2009. Cases were reviewed for demographics, etiology of fistula, time to surgical correction, diagnostic methods, type, size and location of fistula, type of repair, use of tissue interposition and suprapubic catheter, and surgical outcome.

Results
Six patients with UVF, 29 with VVF, and 2 with poucho-vaginal (Studer) fistulas were identified. One VVF was associated with a concomitant vesicocervical fistula. Average age at surgery was 50.5 years (range 27-84 years). Follow-up ranged from 3-222 weeks (median 6).

Of the 29 VVFs, the etiology of 24 (83%) was hysterectomy [17 abdominal (71%), 7 vaginal (29%)]. The remaining 5 fistulas were caused by radiation (1), birth trauma in a developing country (1), uterine rupture and caesarean section (1), and bowel surgery (2). 4 VVFs occurred after hysterectomy (3 abdominal, 1 vaginal) complicated by intraoperative cystotomy repaired by the operating gynecologist. The etiology of the 6 UVFs included TVT erosion, urethral diverticulum repair, Raz needle suspension, retained vaginal packing and intravesical suture, radiation, and childhood sexual assault.

All patients were evaluated with cystoscopy, with 33% of VVF patients undergoing IVP and 26% undergoing cystogram or voiding cystourethrogram. Fistula size was characterized in 34 patients and graded as small (<5mm) in 11 (32%), medium in 9 (26%) and large (>1 cm) in 14 (41%).

At the time of referral to urology 7 patients had undergone a total of 12 unsuccessful repairs. One of the UVF patients had had 2 previous failed repairs including use of Martius flap, and another had had 1 prior failed repair. Of the VVF patients, 5 (17%) had prior failed repairs: 3 patients with 1, 1 patient with 2, and 1 patient with 4 prior repairs. Of the failed procedures, 1 was transabdominal and the rest transvaginal; none were performed by a fellowship trained pelvic reconstructive surgeon. Operative records were available for 6 of the 12 failed repairs: Tissue interposition was only employed in 1 case.

Poucho-vaginal fistulas were managed with transvaginal closure in 1 and conversion to ileal conduit in the other. Among the VVF's, 19 (66%) were repaired transabdominally and 10 (34%) transvaginally. These repairs are compared in the table below. The majority of these fistulas (69%) were reportedly located high at the apex of the vaginal vault. All UVFs were repaired transvaginally using Martius flap interposition. The time to surgical repair ranged from 2 weeks to 30 years. No patients remain with fistula at the time of reporting.

Table 1: Comparison of Transabdominal and Transvaginal VVF Repairs

Parameter	Transabdominal (n=19)	Transvaginal (n=10)	p Value
Mean OR Time (min) (range)	166.8 (56-435)	114.8 (74-231)	0.09
EBL (ml)	320.0 (50-800)	155.0 (50-600)	0.07
Fistula tract excision	16 (84.2%)	0	
Tissue interposition	Omentum (11), peritoneum (1), fat (1)	Peritoneum (5), Martius flap (5)	
Suprapubic catheter	12 (71.4%)	1/10 (10%)	
LOS (days) (median)	9.6 (7)	2.9 (2)	0.005
Complications	8 (42%) SBO, UTI, Prolonged postoperative	1 (10%) Pelvic pain syndrome	

	pain, Incisional herania, Enterotomy, Ileus, Pain secondary to SPC (2)

EBL=Estimated Blood Loss; LOS=Length of Stay; SBO=Small Bowel Obstruction; UTI=Urinary Tract Infection; SPC=Suprapubic Catheter

Interpretation of results

The majority of LUT fistulas are iatrogenic; in particular, most VVF's are caused by hysterectomy. Intraoperative cystotomy should be repaired carefully in consultation with urology as necessary. Cystoscopy is mandatory in the investigation of these fistulas, with other imaging performed as necessary. Limited evaluation of prior failed procedures suggests lack of tissue interposition as a likely explanation in many cases. While transabdominal repairs are necessary in some instances (eg. need for associated procedures or exploration), transvaginal repairs should be offered whenever possible, and can be successful regardless of location or size of fistula or prior failed repairs. These repairs are associated with shorter hospital stay and lower morbidity. We have not routinely used suprapubic catheters in uncomplicated transvaginal repairs, sparing the associated potential morbidity without sacrificing success.

Concluding message

The majority of lower urinary tract fistulas can and should be managed via a transvaginal approach employing tissue interposition. Compared to a transabdominal approach, transvaginal repair of vesicovaginal fistulas is associated with reduced hospital stay and lower morbidity, and a trend toward lesser blood loss and operating time. Suprapubic catheters add morbidity, and are not necessary for successful outcome in uncomplicated repairs.

Specify source of funding or grant	**None**
Is this a clinical trial?	**No**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**Calgary Health Region Ethics Board**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**No**