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Urologic Evaluation After Closure of Vesicovaginal Fistulas

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Abstract: Eighteen patients at University College Hospital in Ibadan, Nigeria, underwent urologic evaluation after repair of obstetrics-related vesicovaginal fistulas. This included a questionnaire, assessment of vaginal scarring, urodynamics and urethroscopy. Eight patients demonstrated stress urinary incontinence, with 4 revealing type III incontinence with either low maximum urethral closure pressure or open vesical neck on urethroscopy. This study documents some of the persistent problems that occur even after successful closure of vesicovaginal fistulas. Continued evaluation should lead to better surgical and medical techniques to diminish the incidence of continued bladder dysfunction after closure of fistulas.

Keywords: Hypermobility; Maternal morbidity/mortality; Obstetric fistula; Stress urinary incontinence; Vesicovaginal fistula

Introduction

Obstetrics-related vesicovaginal fistulas (VVF) still commonly occur in the Third World. Each year approximately 15 000 new VVFs result from neglected labor in Nigeria alone, with estimates of more than 10 000 awaiting closure [1]. Large fistulas seen in Egyptian mummies reveal that this is not a new problem [2,3]. VVF surgery also links us with one of the fathers of modern gynecology, James Marion Sims, whose innovations led to some of the first consistently successful repairs. Improved surgical techniques have led to improved closure rates since Dr Sims' era (Lawson, 73%, 1953–1969, West Africa [4]; Ashworth, 74%, 1973 Ghana [5]). Currently, successful closure rates, especially at primary reparative surgery, approach 90% (Sister Ann Ward, Anua, Nigeria [6]; Waaldjik, Katsina, Nigeria [7]), yet there are still many problems. These include significant stress urinary incontinence (SUI) [8], vaginal stenosis with dyspareunia [9], persistent amenorrhea, small bladder syndrome with detrusor instability [10], and devising ways to successfully repair massive fistulas with urethral loss [11]. This pilot project attempts to identify these problems in patients who have had vesicovaginal fistulas successfully closed, and represents the first effort in West Africa to formally evaluate stress incontinence after fistula repair.

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Materials and Methods

Eighteen patients were evaluated after vesicovaginal fistula repair at University College Hospital (UCH) in Ibadan, Nigeria, between November 1990 and March 1991. All fistulas were the result of obstetric trauma, and all were repaired transvaginally. Parity, menstrual and sexual history, location and size of fistula, number of repairs and use of any grafts were answered on a brief questionnaire (Tables 1 and 2). Vaginal depth and visualization of the cervix were noted to assess the significance of vaginal scarring and stenosis. Self-reported and demonstrable stress urinary incontinence was evaluated by history and urodynamics, including bladder capacity, maximum urethral closure pressure (MUCP), anatomic and physiologic urethral length, urethroscopy and water cystometrogram (CMG).

Table 1.

	Description of fistula	No. of patients
Type	Juxtacervical	2
	Midvaginal	5
	Juxtaurethral	3
	Massive*	5
	Vesicocervical	2
	Vesicouterine	1
Size	≤1 cm	2
	2–5 cm	9
	>5 cm	7
No. of repairs	1	8
	2	6
	≥3	4
	Use of graft	1

*One patient who also had a rectovaginal fistula

Table 2. Successfully repaired fistula

	Continent $N = 8$		Incontinent $n = 8$	
Bladder capacity				
First urge	35–220 ml	148 ml	9–325 cm	164 ml
Max capacity	125–370 ml	253 ml	140–485 ml	253 ml
Maximum urethral closure pressure (cmH_20)	30–91 ml	56 cm	12–50 cm	32 cm
Urethral length				
Anatomic	2.5–4.25 cm	3.3 cm	2.0–3.5 cm	2.7 cm
Physiologic	1.2–3.0 cm	2.3 cm	1.0–3.0 cm	1.8 cm
Vaginal depth	6.0–9.0 cm	7.5 cm	2.0–9.0 cm	6.3 cm

Anatomic length was obtained using a Foley catheter and measuring from the vesical neck to the urethral meatus. Physiologic length was determined by the distance where the urethral pressure was noted to be significantly greater than the bladder pressure at rest. Many of these repairs had been done in the preceding 6 months, but the interval since repair varied from 3 months to 15 years.

Surgitek provided the Endotek OM-3 digital urodata monitor and Miller donated the 8 Fr dual-sensor microtip transducer for the urodynamics portion of the study. Prior to evaluation of the post fistula-repair patients, 6 volunteers served as controls, primarily to test the accuracy of the equipment by comparison with known normals for bladder capacity, urethral length and urethral closure pressures [12,13]. They also supplemented the urodynamics training of the staff at UCH during the initial establishment of the laboratory.

Results

Three separate groups evolved from the 18 study patients. Two patients demonstrated continuous leakage and a work-up for failed repair or the presence of another fistula began. Eight of the remaining 16 successfully repaired fistula patients were continent, and 8 demonstrated stress urinary incontinence. Six of these 8 reported incontinence with cough and sneeze. Incontinence was also reported with lifting (3), sexual intercourse (3), walking (3), running water (1), and nocturnal leakage (1). One patient showed detrusor instability historically and by cystometrogram.

Table 2 lists the range and mean bladder capacities, maximum urethral closure pressure, and urethral lengths in the 16 patients with successfully closed fistulas, both continent and incontinent. Comparison to known normals, continent and incontinent patients revealed minimal differences in bladder capacity between these groups. However, apparently significant differences exist between maximum urethral closure pressure, urethral length and the presence of vaginal scarring [12,13]. Statistical significance and comparison to a small set or controls were not sought because of the small number of patients involved in this pilot study.

In 8 patients who were still leaking after successful VVF closure, three categories of incontinence evolved; profiles are included in Table 3. The first group reported SUI by history alone, but evaluation showed normal urodynamics, urethroscopy and no demonstrable SUI. These patients had clinical findings consistent with undocumented detrusor instability. The second group had demonstrable SUI, but normal urodynamics and urethroscopy. One patient had genuine SUI, the other had mixed urinary incontinence with both genuine SUI and demonstrable detrusor instability on CMG. The last group demonstrated SUI, low maximum urethral closure pressure and/or abnormal urethroscopy. These patients demonstrated intrinsic defects or the classic type III SUI, with an open vesical neck or bladder-neck incompetence.

Ten of the 18 patients studied were sexually active, with 6 reporting sexual dysfunction ranging from loss of sensation to dyspareunia due to vaginal scarring. Nine patients complained of amenorrhea.

The 6 controls had represented to the Gynecology Clinic for pelvic pain, infertility or amenorrhea. Interestingly, one of the controls was found by history and evaluation to have significant detrusor instability, with incontinence and enuresis. The values for her urodynamics were similar to the others, but were excluded from the study. Their mean bladder capacity, with first urge sensation at 205 ml and maximum capacity, was 420 ml; the mean MUCP of 96 and mean anatomic and physiologic urethral lengths of 3.7 and 2.6 compare favorably to normal values [12,13].

Table 3. Urodynamic parameters in 8 patients with incontinence

Group	Fistula type	Repairs	SUI	Capacity**	MUCP	Length*	Urethroscopy
A	Midvaginal	4	No	200/270	48	3/3	Normal
	Massive	2	No	100/140	45	2.5/2.5	Normal
B	Massive	2	Yes	175/250	50	3/2	Normal
	Juxtaurethral	1	Yes	325/485	44	2/1	Normal
C	Midvaginal	1	Yes	170/240	20	3/2	Open vesical neck
	Massive	2	Yes	90/140	15	2/2	NA
	Massive	4	Yes	160/275	12	2.25/1	Unobtainable due to scarring
	Juxtaurethral	1	Yes	90/220	20	3.5/0	Open vesical neck

*Length implies the anatomic urethral length (first number) and the functional urethral length (second number)
**Capacity implies the mean capacity (first number) obtained over several bladder filling efforts, and the maximal range (second number)

Discussion

There are numerous classifications of vesicovaginal fistulas. The most common is that of Moir and Mahfouz, which describes the type of VVF by anatomic position: this implies the type of obstructed labor that occurred [2,9,14,15]. Each fistula type has its own set of known complications that may persist after successful repair [9]. This is shown in Table 4. However, no studies to date have objectively looked at the prevalence or extent of these complications. This study looked especially at vaginal integrity, menstrual and sexual function, and the presence and type of stress urinary incontinence following fistula repair.

Previous estimates of SUI after fistula repair are 10%–12% [5,7,16]. Gray [9] describes the different types of fistula and the often higher incidence of SUI following repair. Documentation of the specific type of SUI, or whether there is truly SUI, is limited. This pilot project was designed to begin the process of evaluating 'dry' patients who still lack normal bladder function.

Table 4. Types of obstetric fistula

Fistula type	Site of labor obstruction	Post-repair complications
Suburethral* with urethral involvement	Pelvic outlet	Stress incontinence Small bladder syndrome Vaginal atresia
Midvaginal massive 25 cm	Mid-pelvis	Ureteral injury Hemorrhage Vaginal atresia
Juxtacervical** damage to anterior cervix	Pelvic inlet	Hemorrhage Vaginal atresia
Massive ⩾5 cm	Mid-pelvis and outlet	Combination of above
Others vesicocervical vesicouterine ureterovaginal combined vesicovaginal and rectovaginal	Post-cesarean section	

*Fistula at the urethral vesical junction just beneath and behind the pubic bone
**Fistula immediately adjacent to, or extending on to, the anterior wall of the cervix

As opposed to developed countries, where preoperative evaluation is the norm, these study patients were evaluated postoperatively. Preoperative evaluation is unsuccessful and frustrating in completely incontinent patients, except possibly for measuring urethral length and estimating the integrity of periurethral tissues. Many patients have also had multiple surgeries prior to successful repair, and the etiology of continued leakage is not always straightforward to establish by history and physical examination alone.

This study found a higher than expected number of patients with SUI (8 of 18). Follow-up is sporadic, and only those patients accessible in the surrounding regions by the hospital social workers or those recently repaired were available for evaluation, which may not account for the higher incidence of SUI. Also, a higher incidence of intrinsic defects (type III SUI) was found. This is potentially explained by the wide mobilization of the bladder necessary to successfully close large fistulas, which often requires extensive or complete disruption of the endopelvic fascia, leaving no sphincteric mechanism. However, several juxtaurethral fistulas were completely continent after repair, or revealed SUI with normal urethral intrinsic function. Minimal scarring of the urethra was present at the time of initial repair in these instances. Use of a tissue graft may be helpful, but this procedure was only used on 1 patient in this group.

Interestingly, no patients were seen with extremely low bladder capacity, as previously described [6]. Even in this small number of patients, those with a bladder capacity of less than 200 ml had detrusor instability, except for 1 patient who had an open vesical neck as well as a small bladder. Potentially these patients may also have SUI and intrinsic defects, but with adequate closure of the vesical neck, e.g. with placement of a pubovaginal sling, the detrusor instability may worsen. Bladder augmentation procedures described elsewhere may be helpful for those with continued small bladder capacity [2].

Future studies will hopefully include evaluation of all those fistulas repaired at UCH in Ibadan at their postoperative visits. The desire is to learn what type and size of fistula is at risk for developing intrinsic defects postoperatively, and which procedure is consistently effective at correcting this incontinence. With further data, the correct adjunctive procedure, such as the pubovaginal sling, retropubic urethrepexy or other procedures to support the urethral vesical neck, may be predicted preoperatively and thus incorporated into the original surgery for the closure of the fistula.

References

1. Waaldijk K. Incidence/prevalence of VVF in Nigeria. Letter, 1990
2. Zacharin R. Obstetric fistula. New York: Springer-Verlag, 1988
3. Mahfouz N. Urinary and rectovaginal in women. *J Obstet Gynaecol Br Emp* 1929;36:581–589
4. Lawson J. Vesicovaginal fistula: a tropical disease. *Trans Roy Soc Trop Med Hyg* 1989;83:454–456
5. Ashworth F. Urinary vaginal fistulae: a series of 152 patients treated in a small hospital in Ghana. *West African Med J* 1973;22:39–43
6. Ward A. Genito-urinary fistulae. Unpublished data, 1988.
7. Waaldijk K. The surgical management of bladder fistula in 775 women in Northern Nigeria. Nijmegen: Benda B.V., 1989
8. Hassim A, Lucas C. Reduction in the incidence of stress incontinence complicating fistula repair. *Br J Surg* 1974;61:461–465
9. Gray P. Obstetric vesicovaginal fistulas. *Am J Obstet Gynecol* 1970;107:898–901
10. Dick J, Strover R. Vaginoplasty following vesicovaginal fistula repair: a preliminary report. *S A Med J* 1971;45:617–620
11. Elkins T, Drescher C, Martey J, Fort D. Vesicovaginal fistula revisited. *Obstet Gynecol* 1988;72:307–312
12. Abrams P, Feneley R, Torrens M. Urodynamics. New York: Springer Verlag, 1983
13. Raz S. Urodynamics. In: Buchsbaum H, Schmidt J, ed. Gynecologic and obstetric urology. Philadelphia: W.B. Saunders, 1982
14. Moir J. Personal experiences in the treatment of vesicovaginal fistulas. *Am J Obstet Gynecol* 1956;71:476–491
15. Mahfouz N. Urinary fistulae in women. *J Obstet Gynaecol Br Cwlth* 1957;64:23–24
16. Bird G. Obstetric vesicovaginal and allied fistulae. *J Obstet Gynaecol Br Cwlth* 1967;74:749–752

EDITORIAL COMMENT: This paper has information which is extremely important to those individuals in Third World countries who must deal with fistulas that develop secondary to obstructed labor. Where massive fistulas are present urodynamic evaluation would seem to be almost impossible, and it is probable that most of the evaluations will have to be done once the fistulas are closed. It is interesting that successful closure of massive fistulas was accomplished with regularity even though adjunctive procedures, such as the Martius graft were apparently not used. If patients who are at risk for the development of stress urinary incontinence can be identified preoperatively, then it would be preferable to deal with that problem at the time of the closure procedure. In addition, this small but pioneering study provides valuable insight into the biology of post fistula-repair incontinence. It makes the important point that patients with a closed fistula continue to have incontinence in certain circumstances, and the precise etiology of the urine loss must be determined. The occurrence of type III or low urethral pressure type of incontinence (indicating urethral sphincteric damage rather than a purely anatomic problem) in these patients further directs our attention to the need to detect this specific type of incontinence, since treatment for these patients is different from those who have incontinence caused by poor urethral support.