Vesicovaginal and Rectovaginal Fistulae: Evaluation & Surgical Management

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I have no relevant financial relationships or affiliations with commercial interests to disclose.

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Learning Objectives

- Explain the etiology and epidemiology of vesicovaginal (VVF) and rectovaginal fistulae (RVF)
- Describe the tests used for VVF and RVF diagnosis
- Summarize the basic principles of VVF and RVF surgery
Etiology of Vesicovaginal Fistulae (VVF)

- Etiology in the United States
  - Iatrogenic 80-90% (hysterectomy, incont/prolapse procedures)
  - Radiation-induced
  - Trauma/advanced malignancy/congenital/retained pessary
- Etiology in LMICs
  - Obstructed labor (~95%)
    - Obstetric fistula patients are the “lucky” ones who survive
  - Iatrogenic – ie: cystotomy during Cesarean section, hysterectomy or repair of uterine rupture
  - Trauma-forceps laceration, rape/sexual abuse, Gishiri cutting (in specific populations)
  - Trauma/advanced malignancy/congenital/infectious
Etiology of Rectovaginal Fistulae (RVF)

- Etiology in the United States
  - Iatrogenic-pelvic surgery (hysterectomy, bowel resection, etc)
  - Inflammatory bowel disease, infection
  - Radiation-induced
  - Advanced malignancy
  - Obstetric trauma

- Etiology in LMICs
  - Obstructed labor
  - Iatrogenic-pelvic surgery
  - Advanced malignancy
Obstetric Fistulas

- Prolonged obstructed labor due to cephalo-pelvic disproportion
- Tissue trapped between baby’s head and pubic bone → pressure necrosis of the anterior vaginal wall, bladder, bladder neck, and proximal urethra, and anterior rectal wall
Obstetric Fistulae: Affected population

Women/girls from low income countries or from cultures where they are at risk of:

- Poor nutrition $\rightarrow$ stunted skeletal (pelvic) growth in the mother
- Marriage and conception at a very young age $\rightarrow$ childbearing via a relatively small, immature pelvis
- Low social/educational status/poverty
- Reliance on traditional medical treatment
- Poor infrastructure - roads, transport
- Lack of quality obstetric care (no OR, no doctor, no supplies) = **POOR ACCESS TO C-SECTION**

Prevalence of symptoms of vaginal fistula in 19 sub-Saharan Africa countries: a meta-analysis of national household survey data

Mathieu Maheu-Giroux, Véronique Filippi, Sékou Samadoulougou, Marcia C Castro, Nathalie Maulet, Nicolas Meda, Fati Kirakoya-Samadoulougou

Figure 1: Lifetime prevalence of vaginal fistula symptoms per 1000 women of reproductive age in sub-Saharan Africa (2005–12)
Crl=credible interval.
How common is VVF?

- Incidence of obstetric fistula in developing countries estimated at ~ 0.3% to 0.4% of deliveries.
- Worldwide, estimates vary from 50,000-500,000 new VVF/year.
- Total morbidity from obstructed labor has been estimated to be in excess of 5 million individuals annually.
- Estimates of the number of patients currently suffering from VVF vary from one to three million!

Surgery for Obstetric Fistulae

http://www.globalfistulamap.org
80% of OF sufferers live in Africa

Photo used with permission of Dr. Serenge Gueye
Long lines of patients
Obstructed Labor Injury Complex

Vesicovaginal fistula (VVF)
Urethrovaginal fistula
Ureterovaginal fistula/ureteral obstruction/renal failure
Rectovaginal fistula (RVF)
Incompetency of the anal sphincter
Rectal atresia
ISD/sphincteric destruction
Cervical incompetence/destruction
Vaginal stenosis
Osteitis pubis
Pelvic inflammatory disease
Secondary infertility
Genital skin lesions/encrustation
Neuropathy--foot drop
Bladder instability, neurogenic bladder**


**Addition by K Chrousier
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**Addition by K Chrouser
VVF Diagnosis/Evaluation

- Presenting sx → high volume, often “total” incontinence
- In the US:
  - Assess the bladder integrity
    - Physical exam– with dye test
    - Cystoscopy
    - +/- cystogram
  - Assess the ureters
    - +/- CT urogram
    - +/- Retrograde ureteropyelogram
  - Biopsy if suspicious for malignancy
- In LMICs
  - Physical exam +/- dye test, +/- ultrasound
Dye Testing

- Standard dye testing
  - Dilute methylene blue (or equivalent) through catheter into bladder
    - Immediate speculum exam
    - Vaginal packing with ambulation if no obvious leak

- Double dye testing
  - Oral phenazopyridine 1 hr prior to procedure
  - Standard dye testing with vaginal pack (above)

- Simultaneous Cystoscopy—see UOs (optional)
VVF Classification

- No universally accepted classification system
- Describe what matters
  - Size (length and width)
  - Location (incl distance from landmarks)
  - Vaginal depth and degree of scarring
  - Number of fistulae
  - Integrity of sphincter
  - Other characteristics (stones, RVF, status of cervix)
Vesicovaginal Fistula Assessment Flowchart

Assess Vaginal Fibrosis

- Accommodate 2 Fingers
  - Yes → Catheterise the Urethra
  - No → Refer

- Obstructed
  - Yes → Able to Gently Dilate with Sound
  - No → Refer

Distance from Meatus to Bladder Fundus ≤ 7 cm

- Yes → Refer
- No → Assess for a Fistula

Assess for a Fistula

- Is there an RVF
  - Yes → See RVF Tab & Algorithm
  - No → Can You See a VVF

Can You See a VVF

- Yes → Dye Test Shows VVF
  - Yes → Assess/Treat for Other Causes of Incontinence
  - No → Refer if Needed
  - No → Assess Fistula Location

Assess Fistula Location

- At Bladder Neck or ≤ 3 cm from Meatus
  - Yes → Refer
  - No → Circumferential Urethral Defect

Circumferential Urethral Defect

- Yes → Juxtacervical (< 1 cm from cervix)
  - Yes → Assess Fistula Fibrosis
  - No → Refer
  - No → Refer

Juxtacervical (< 1 cm from cervix)

- Yes → Assess Fistula Fibrosis
- No → Refer

Assess/Treat for Other Causes of Incontinence
Simple Fistulae

Photos courtesy of Dr. Serenge Gueye
Complex fistulae

Circumferential fistula

Tiny capacity bladder

Photos: SG
Complex fistulae (2)

Circumferential proximal bladder neck fistula

Bladder prolapse through VVF

Photos: SG
Circumferential mid-urethral injury
Distal urethral injury

Photo: SG
Severe scarring

VVF with vaginal scarring

VVF + RVF + vaginal destruction

Photos: SG
In the US, many of our fistulas are small...
Conservative VVF management

- Catheter placement
  - Potentially diagnostic
  - Potentially therapeutic (in fresh fistulae)
    - 4-6 weeks

- For tiny established VVFIs consider:
  - Monopolar fulguration of fistula tract
  - Laser “welding”
    - Neodymium yttrium aluminium garnet (YAG) laser
    - or holmium YAG laser
  - +/- Fibrin glue injection
Surgical VVF repair

Things to keep in mind:
- Fistula size
- Degree of scarring
- Location
- Time since injury
- Previous attempts at repair
- Other issue (UVF, RVF, prior FGM)
- Additional surgery (ureteral re-implant, vag reconstruction)

Then decide:
- Approach (vaginal vs. abdominal vs. robotic/laparoscopic)
- Need for flap (Martius, Singapore, peritoneal, gracilis, omentum)
- Drainage (foley +/- SP tube, ureteral stents)
Surgical Techniques VVF

- Transvaginal approach
  - Starting at fistula edge, develop plane between vaginal mucosa and bladder (+/- inverted “T”)
  - +/- Excise fistula
  - Close bladder (confirm water-tight)
  - Interposition graft (optional)
  - Close vagina

- Transabdominal approach (open/lap/robotic)
  - Transabdominal extravesical--develop plane between bladder and vagina starting superiorly and then transect fistula, close bladder and vagina with an omental flap between
  - Transabdominal transvesical (O’Conor) -bivalve bladder incorporating fistula, develop plane between bladder and vagina omental flap and close bladder and vagina with an omental flap between
Laparoscopic extravesical VVF repair
Robotic-assisted extravesical repair of small apical VVF

Watts et al, 2016 Robot-assisted extravesical vesicovaginal fistula repair utilizing laparoscopically mobilized omental flap interposition. Int Urogynecol J
Laparoscopic transvesical VVF repair
Transvaginal repair of a very small VVF
Transvaginal repair of a large VVF
Timing of Repair

- Classic teaching for VVF—wait 3 months
- Early repair (4-6 weeks) has been advocated for:
  - Medicolegal considerations
  - Mitigation of emotional distress
- Early repair requires that:
  - Infection has been treatment
  - Inflammation has subsided
  - Wait an absolute minimum of 3 weeks

Ideal Surgical Repair (VVF)

- Accurate pre-op diagnosis
- Timing (minimal inflammation)
- Exposure (choice of approach)
- Adequate tissue mobilization
- Tension free, watertight bladder closure
- Post-op catheter drainage
- Avoid bladder spasms post operatively
**VVF TIPS**

- **Re: diagnosis** - Low volume leakage with activity after hysterectomy can be a tiny VVF—don’t make assumptions.

- **Re: pre op counselling**—Carefully consider the cause and prognosis when making your operative plan.

- **Re: intraop considerations**
  - Hydrodissection (with epi) helpful.
  - The bladder closure matters more than the vaginal closure.
  - The importance of exposure and countertraction cannot be overemphasized (patient positioning, metal sounds, small catheters, probes, etc).
Post-operative leak- DDX

- Failed Repair
- Stress incontinence (sphincter damage)
- Urge incontinence (bladder instability)
- Poor bladder compliance
- Low bladder capacity

10% of Obstetric VVF patients have RVF too

Photos courtesy of Dr. Serenge Gueye
RVF Diagnosis/Evaluation

- Presenting sxs → stool and/or flatus per vagina, foul odor, pain

- Assessment
  - Physical exam—probe via tract +/- dye test or air test
    - Often classify as low/mid/high
  - Manometry and endoanal u/s--assess sphincter
  - +/- Cross sectional imaging (CT, etc)
  - +/- Biopsy if suspicious for malignancy
  - +/- Barium enema
  - +/- Anoscopy/sigmoidoscopy
RVF Classification

- **Location**
  - Anovaginal (below dentate line)
  - Low rectovaginal (within or distal to sphincter complex, above dentate line)
  - High rectovaginal (prox to sphincter complex)

- **Simple** (<2.5 cm, distally located, caused by trauma or a cryptograndular infection) vs Complex (crohns dz, radiation, cancer, recurrent fistula)
Rectovaginal Fistula Assessment Flowchart

1. Perform DRE
2. Accommodate index finger
   - Yes: Assess location of RVF
   - No: Refer
3. High vaginal
   - Yes: Adherent to sacral promontory
     - Yes: Refer
     - No: Mid/low vaginal
4. Mid/low vaginal
   - Yes: Refer
   - No: Size > 5 cm
5. Size > 5 cm
   - Yes: Perform RVF repair
   - No: Assess anal sphincter
6. Assess anal sphincter
   - Yes: Repair RVF and sphincter
   - No: Sphincter injured
   - No: Refer

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Conservative RVF Management

- Optimize stool consistency (avoid diarrhea)
- Treat inflammatory bowel disease
- Treat infection/drain abscess
- WAIT: Many small RVFs will close without surgery
- Fibrin glue
- “Plugs” (synthetic or porcine SIS)
Surgical RVF Repair

- CRS Techniques:
  - Transanal (endorectal) advancement flap (no crossed suture lines)
  - Transvaginal advancement flap
  - Transvaginal inversion (rare)
  - Transperineal excision and closure (difficult)
  - Transabdominal ligation - bowel resection with coloanal reconstruction

- OF surgeons often use a transvaginal approach with excision of the tract and layered closure (similar to VVF repair)
- +/- sphincteroplasty
- +/- tissue flaps, muscle flaps, bioprosthetic grafts (support repair, fill dead space, bring in blood supply)
- +/- temporary fecal diversion (rare)
Endorectal Advancement Flap
Transvaginal Excision and layered closure
Transvaginal Excision and layered closure (2)
Transvaginal Excision and layered closure (3)
Timing of RVF Repair

- Once infection and inflammation have subsided
- Usually ~6-12 weeks
Principles of Surgical Repair (RVF)

- Accurate pre-op diagnosis
- Appropriate timing (minimize inflammation)
- Bowel Prep
- Exposure (choice of approach/position)
- Adequate tissue mobilization
- Tension free, watertight closure (often multiple layers)
- Sphincteroplasty if needed
- Avoid both post op diarrhea and constipation
Prevention of Iatrogenic VVF/RVF

- Obstetricians
  - Identify and repair perineal tears after vaginal delivery
- Surgeons (gynecology, general, CRS)
  - Intraoperative recognition of bladder/ureteral/rectal injury
  - Intraoperative urologic consultation and repair
Prevention of Obstetric Fistula

- Mitigate potential contributing factors
  - Early age at first marriage
  - Poor education of women
  - Nutritional deficiencies—sometimes gender-dependent
  - Poor infrastructure—roads, transport
  - Lack of access to care—C-section availability
- Local stakeholders key
- Cultural sensitivity critical
Surgical Training Strategies

- Speciality hospitals - such as Addis Ababa Fistula Hospital, Ethiopia
  - Hands-on training of African fistula surgeons
  - 2500 free surgeries/year
  - Est 1974. Hamlinfistula.org

- Regional centers of excellence in urology
  - Cooperative venture between the AUA, SIU, and IVUmed
  - Focus on training: “Teach one, reach many”

- Interactive video fistula trainer (no internet required)
  - Collaborative effort (NGOs, FIGO)
  - Interactive Learning, cognitive surgical simulation
  - Decreases the learning curve
Rational for development of the Interactive Obstetric Fistula Video Trainer

To increase access to quality fistula repair by increasing the availability of trained surgeons.

Interactive computer-based surgical education designed to augment traditional “hands-on” VVF training programs.
Video Trainer: Development Phase

Fistula repairs by experts (in three countries) were video recorded using high-definition equipment.
## Video Trainer: Procedure Analysis
### Identifying and Describing Steps & Sub-steps

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<th>Procedure Steps</th>
<th>Interactive</th>
<th>Ditactic</th>
<th>VIDEO</th>
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<td>5.2</td>
<td>Place anchor sutures lateral to bladder</td>
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<td>Close bladder defect using absorbable</td>
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<td>Revise initial incision if needed to reduce</td>
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<td>Suture over the defect with a second suture</td>
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RVF Animations go step by step through the procedure
Surgical descriptions and instructions recorded for inclusion in the trainer
### Summary

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Video Trainer: Implementation

- Distribution began in late 2015
  - USB stick– no internet required
- Integration into existing fistula training programs in Africa
- Validation/pilot study planned for early 2016 (on hold for lack of funding)
Dedicated to all the brave African women who suffer from VVFs.

You are not forgotten.
Any Questions?