MEditorial, May 2013

"Hole in the Wall"

"Something there is that doesn't love a wall, that wants it down…

He says again, good fences make good neighbors".

From Robert Frost's poem, *Mending Wall.*

The body has natural walls that separate neighboring organ systems, so that urine stays in the urinary tract, digested food and fecal matter stay in the gastrointestinal tract, etc. Birds and other lower vertebrates have a cloaca, a common storage organ for both urinary and gastrointestinal elimination products.

An abnormal opening between two organ systems is called a fistula. Rarely are people born with fistulas, e.g., trachea-esophageal fistula. I remember a medical school classmate whose 1st son was born with this condition. The Chief Pediatric Surgeon at the hospital, notified at LAX, heroically cancelled a trip he was about to take. He surgically repaired this hole (allowing liquids to enter the lungs), preventing further aspiration pneumonia and potential death of the newborn.

Most fistulas we see are acquired (as opposed to congenital); and occur spontaneously, due to chronic inflammation in a structure--and breakdown of the wall between it and another organ. The contents of one can then freely enter the other, without barrier. The flow is usually from the higher pressure system to the lower pressure system. A fistula

from the colon/ rectum to the bladder/ urethra usually results in fecal matter entering the urinary tract and not the opposite. Pressure waves developed by the colon are considerably higher than those typically seen in the urinary tract.

A second source of fistulas is “iatrogenic” or created--most often inadvertently--by surgery; and rarely by radiation. The usual context is two nearby structures, one of which is intentionally entered as part of an operation, and the other of which is accidentally lacerated. If the accidental laceration is not obvious/goes unnoticed, a fistula will occur. If the problem is recognized and repaired immediately, the chance for a “hole in the wall” is far less. The vagina is routinely and necessarily entered, so as to completely remove the uterus; the top of the vagina is then closed. The nearby bladder (which can be stuck to the cervix and upper vagina in the case of a diseased pelvis), if nicked, can leak urine once the postoperative urinary catheter is removed. This results in an immediate or delayed “vesico-vaginal” fistula. The woman will notice nearly constant urinary incontinence without having to urinate.

A third cause of fistula is trauma, usually penetrating (as opposed to blunt) trauma with a knife--or a gunshot wound--where two nearby organs such as bladder and rectum are both penetrated. This situation would likely be addressed with emergency surgery… but especially due to the blast effect (gunshot) or bacterial contamination (either), chances for healing without a fistula are low, unless there is diversion of urine and/or gastrointestinal contents.

I will follow with some real examples I have personally witnessed.

RADIATION: Elderly man has external beam radiation therapy for prostate cancer. He unfortunately exhibits painful urinating and rectal

ulceration toward the end of the treatment. A breakdown in the barrier between rectum and urethra leads to fecal leakage into the lower urinary tract and severe infection. The stool is then surgically diverted via an ileostomy (small intestine taken out laparoscopically to the skin). The hole still exists, but now, urine leaks into the rectum (the lower pressure system of the two, since fecal material is not being propelled through it), causing urgent elimination of urine via the rectum. Attempt to surgically repair this fistula was unsuccessful, possibly due to poor blood supply to and inflammation of the irradiated tissues--and failure of the surgeon to bring in nearby available healthy tissues to buttress and create a layer between the two "closure" suture lines.

RADIATION: An older woman had "radiation damage" to the ureters (natural conduits between kidneys and bladder), and needed internal plastic "JJ" stents placed and changed every 6 months. Four years into having this done, during cystoscopic exchange of one stent, a major hemorrhage was noted. A fistula had developed between a nearby small branch pelvic artery and the ureter. Radiation thinned the walls of the ureter and blood vessel, making these adhere to each other. Constant internal pressure by the stent eventually led to erosion of the flimsy "wall" between the two structures. Emergency surgery to tie off the damaged blood vessel saved her life.

SURGERY: During a radical prostatectomy for a nodular tumor, the tissue planes in the deep pelvis between the back of prostate and front of rectum are less clear than usual. The rectum is lacerated. Since the patient did not do, as directed, his preoperative "bowel prep" there was gross fecal contamination of the wound. This necessitated a diverting colostomy. After resolution of pelvic inflammation, the patient was left with a hole between rectum and bladder neck (site

where the bladder was reattached/sutured to the urethra after prostate was removed). Ultimately, urine needed to be diverted to skin to resolve this problem.

SURGERY: During the course of a difficult pelvic surgery for endometriosis, the gynecologist inadvertently, not recognizing its thin structure, lacerates the left ureter. That night, there is left flank (kidney) pain due to temporary spasm of the ureter—followed by resolution of the pain but then urine leaking out via vagina while at the same time, patient can urinate "normally" (since the right ureter's urine can still reach the uninjured bladder). A diverting tube (percutaneous nephrostomy) was placed into this left ureter's attached kidney and leakage was minimal until it was considered safe to re-operate and reattach the normal ureter above the site of injury, back to the bladder.

DISEASE: Many adults have diverticulosis, a colon condition with small sacs that can trap undigested food products and feces—these outpouchings can get inflamed, causing diverticulitis. A middle aged woman, who has had a hysterectomy, developed diverticulitis treated two years ago with antibiotics. There have been few bladder infections over the past 6 months. She now comes in with two weeks of mild bladder infection symptoms and notices dark particles in the urine and a burst of gas at the end of her urinary stream. The doctor diagnoses, again, infection in the urine. Based on the history, A CT is ordered and shows the presence of gas (from the colon) inside the bladder; severe inflammation of diverticulae in the sigmoid colon; and adherence of the colon to the upper/back wall of the bladder. The urologist looks in the bladder and sees some greenish-brown flecks in the bladder and a rather large patch of inflammation on the left posterior bladder wall. The colovesicle fistula requires surgery to remove the diseased piece of

colon and maintain continuity of the colon, usually nowadays without a colostomy. The tiny hole where the fistula burrowed into the bladder closes by itself without the urologist even having to suture the bladder. Note if the woman had NOT had a hysterectomy, the chance of a diverticulitis-related fistula from would be far less, since the anatomical location of the uterus would be a natural barrier to prevent “contact” between the two nearby organ systems. Men have more colo-vesicle fistulas than women without hysterectomy.

Some fistulas are avoidable, some are not-- but all are significant health threats and involve complex decision making for the urologist and general surgeon alike. The chance, for example, of having a fistula after gynecological surgery in the US is estimated to be less than 1 in 200-500 (0.2 to 0.5%). Those holes not associated with irradiated or severely infected tissue are more amenable to definitive surgery to restore structure and function of the involved organ systems to normalcy.

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