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Introduction



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1398 Trevisa Barth. de P.R. vii. lix. (1495) 274 Fistula, the fester is a postume that. rootyth wythin.]

1563 T. Gale Antidot. ii. 25 This vnguent. doeth also profyte muche in Fistulays.

c1570 Sir H. Gilbert Q. Eliz. Acad. (1869) 5 Towching all kinds of Vlcers, Sores, Phistiloes, wowndes, &c.

1579 Langham Gard. Health (1633) 12. It is good for all wounds, fistilae, and sores of the mouth.

1671 Salmon Syn. Med. iii. xxii. 423 It cools Feavers and cures Ulcers, Fistulas, Cancers.

1732 Arbuthnot Rules of Diet 360. It happens sometimes to end in a Fistula.

1879 Green Read. Eng. Hist. xviii. 89 H, notwithstanding his fistula and his fever, was able to sit on horseback.

It is surprising that none of these quotes about the early use of the term fistula (Oxford English Dictionary CDROM, Oxford, 1995) come from John of Arderne (1307–1392), whose classic work on the treatment of anal fistula is still in print, and who pre-dates them all. For many colorectal surgeons, the Queen disease of the specialty is anal fistula and the gold standard treatment for it is fistulotomy. Like fissure and hemorrhoids, anal fistula should be one of life's little problems, one apparently of less consequence, rubbing its shoulders against the ankles of giants like colorectal cancer, ulcerative colitis or diverticulitis. So, why?

It is possible that no condition has been written about more by surgeons over the expanse of time and world geography than anorectal abscess and fistula. There is hardly a major author that has not written about it: Sushruta, who probably first described fistulotomy [1], Hippocrates, who used a cutting seton, Celsius, Galen [2], al Razi, describing curettage and cauterization [3], John of Arden—who wrote a whole book on the topic [4, 5] Boyer, Brodie, Bodenhamer, and frequently to the present day [6].

Many of their treatments are still in common use. This broad concern is a testament both to the prevalent nature of this disorder and the difficulty it presents to the surgeon in basic decision making. The reasons for these difficult decisions are obvious. On the one hand it is necessary to resolve sepsis and symptoms associated with fistula, principally pain, and yet the procedures that one employs must also preserve function in the anal canal, that is, prevent incontinence.

In addition, the history of surgery is very much influenced by anal fistula. Henry the fifth of England, the victor at Agincourt, died of sepsis from an anal fistula at age 34 (or 36) [2]. Louis the XIV, the Sun King was troubled by the pain and odor of his fistula beginning in 1684. His physicians had irrigated the track with various fluids known to cause good health elsewhere with no effect. Some time had been spent on the local residents with fistulas to see what was most efficacious, often sending them to other regions of France for specific waters, again with no effect. Finally a surgeon was consulted. M. Charles Antoine Felix was in fact not a known expert in the field and had not operated before on an anal fistula. So he begged the king to give him some time to learn the procedures and practice, which he did on various residents, again with fistulas, in prisons and poor houses around Paris. Once he felt sure of himself, he returned to Versailles and on November 18, 1686, the

King had his surgery, descriptions of which sound like fistulotomy and somewhat more, including curettage and caustic irrigations.

The king, fortunately for all, was cured and he rewarded M Felix with several benefits, including a house in Bougival, where Louis kept his mistresses, a fee that adjusted for inflation is almost beyond calculation, and the French academy of surgery was founded. Surgeons could at last wear white coats and attend medical school. In addition, on a trip to a convent on the outskirts of Paris in January 1687, the King received a poem from the abbess celebrating his miraculous recovery, which was set to music by the court composer, Jean Baptiste Lulli, and with some modification became the British national anthem [2, 7].

Complications of Fistulotomy

If one were to list the top ten complications of fistulotomy for anal fistula, the first seven would be incontinence. The problem is dealing with the numbers. This is best illustrated by the data from the practice parameters of the American Society of Colon and Rectal Surgeons. It is stated in the introduction that reported incontinence rates of postoperative incontinence vary from 0 to 70% after fistulotomy [8]. What? How can one possibly resolve that in discussing surgery with a patient?

A somewhat narrower, but still very broad range of possibilities had been published for sphincterotomy for anal fissure. In the chapter in this book on surgery for anal fissure, this disparity in numbers was resolved by reference to randomized trials of partial lateral internal sphincterotomy. The published range of incontinence risk declines from 0% to over 40% to a fairly secure level of just less than 5% [FISSURE CHAPTER]. The larger numbers were mostly due to measuring continence much too soon after the surgery, when pain and an open wound results in discharge that is easily mistaken for incontinence. Full recovery of function as with any surgical wound takes time. More importantly, randomized trials do not just, minimize selection bias, in allocating patients to treatment groups, but ethics committees in hospitals and universities require a protocol for the performance of the trial before patients are recruited, unlike retrospective chart reviews. In the protocol there must be awareness of patient welfare including prospective recording of side effects of the intervention. In a retrospective mail or phone survey, only those who had a tough time may respond.

So, there are several sources. There are five randomized trials comparing fistulectomy to fistulotomy. Three of the five reported no anal incontinence in either treatment group [9–11]. One reported minor incontinence in two of 32 patients having fistulotomy (which means in most publications incontinence to flatus only or some wound discharge) and five cases in 44 patients having fistulectomy [12]. The other reported one case of minor incontinence in 26 patients in the fistulotomy group and 3 cases in 21 patients in the fistulectomy group [13].

There are five randomized trials of incision and drainage alone versus a “cutting procedure” meaning either fistulotomy, or cutting seton (essentially a slow fistulotomy—see below) for higher fistulas. In a systematic review and meta-analysis of these trials, of 204 patients having the cutting procedure, 23 developed incontinence to flatus or fecal soiling only (common with fresh rectal wounds), and 7 of 201 having I&D only also developed similar minor incontinence. The odds ratio for incontinence is 2.46, obviously favoring I&D, but with a 95% confidence interval of 0.75–8.06, not statistically significant [14].

There are four trials that have compared fistulotomy alone to fistulotomy with marsupialization of the open wound—a technique to narrow the spread of the wound and perhaps speed healing. This is to be differentiated from primary repair of the divided sphincter muscle in fistulotomy (discussed below). Here incised skin only is anchored to the base of the open wound. Two trials reported no incontinence in either treatment group [9, 15]. One reported improved continence results with marsupialization, with only one of 52 patients developing incontinence post fistulotomy with marsupialization and six of 52 developing incontinence with fistulotomy alone [16]. One study reported worse minor incontinence in 9% of each group [17].

There are five trials comparing surgery to fibrin glue injection into the fistula track. They are quite a mixed bag and only two of them yield data to this discussion, one comparing glue to fistulotomy and one to cutting seton [18, 19]. In those having the cutting procedure 15 of 48 developed incontinence and 17 of 58 in the glue group developed incontinence (How could this be?). The odds ratio for incontinence for both studies was 1.00 with 95% confidence intervals of 0.43–2.34 [20].

There are two randomized trials of fistulotomy compared to a cutting seton infused with Indian spices called an Ayurvedic seton. One case of incontinence to solid feces was reported in the fistulotomy group in one study along with two cases of minor incontinence in 24 patients and one case of minor incontinence in the seton group in 26 patients [21]. In the second study two cases of minor incontinence in 46 seton patients and one case of minor incontinence in the 54 patients of the fistulotomy group were reported [22].

There are just a few more randomized trials with at least one fistulotomy arm. Of those that had incontinence data, one used a radiofrequency scalpel compared to traditional instruments and no incontinence was found in either group [23]. One included in the fistulotomy group immediate repair of the divided muscle and found four new cases of minor incontinence in 28 patients [24].

All in all, this is an unusual group of publications. A surprising number reported no incontinence after fistulotomy, or even fistulectomy. None reported an incidence of new onset incontinence anywhere approaching what has been reported in retrospective observational studies. Only one mentioned a single patient with incontinence to solid stool. There are more publications of case series and nonrandomized trials providing data on incontinence with fistulotomy than can be counted and the numbers they provide are dizzying. None provide more valid data than those discussed above. The retrospective case series are prone to selection bias. The few prospective reports have too high a rate of attrition [25].

Setons—A Method to Prevent Incontinence with Fistulotomy?

A cutting seton is essentially a slow fistulotomy, a procedure to lay open the fistula gradually without excising it. By cutting the muscle slowly, it is hoped that the scarring as it forms would fix the two sides of the divided external (and internal) sphincter in close proximity before they fall widely apart. Several problems exist when comparing cutting seton to surgical fistulotomy. First there are no direct randomized trials to provide data to support this hope. Second, I have never met any two surgeons who use a seton in exactly the same way. There is the fast seton, dividing the muscle in 2 weeks, and the slow seton extending that period to over a year, and everything in between. Each surgeon is very adherent to a specific seton material with tremendous variation from horse hair to silk to silastic to threads impregnated with Indian spices. How it is tightened is also very individual. There are studies comparing division of the internal sphincter prior to placement of the seton to no sphincter division. One systematic review showed a higher incidence of incontinence associated with such division (25.2 from 5.6% undivided) [26]. The included studies were predominantly nonrandomized trials, whereas one subsequent randomized trial showed no difference in continence between the two groups [27]. Looking at the huge number of published case series on this topic there does not seem to be much difference in incontinence risk between fistulotomy, cutting seton, or even staged fistulotomy with an intervening seton [28].

One intriguing procedure that has yet to be adequately evaluated is the loose seton. This is a loose seton that is left in until it essentially falls out, so very like the slow cutting seton [29, 30]. Again there are no randomized trials and each publication presents a very different technique.

High Versus Low Fistulotomy

This is an area of publication wherein the border between high and low is hard to define. How can one develop a scoring method for high and low fistula within ones own practice that is precise, repeatable and valid, much less across practices? It is intuitive that cutting a greater length of sphincters would increase the risk of postoperative incontinence and that has generally been found to be true [31]. How is incontinence to be avoided in high fistula surgery? Seton was one attempt in use for over 2000 years. Caustics and curettage were common in the ancient world as well, and now [2]. There are a number of reports in contemporary literature of immediate sphincter repair after fistulotomy or fistulectomy which often offer fair results but not better than those described above for fistulotomy alone [32–34]. The newer technologies such as LIFT, VAAFT, MAFT, PERFACT, FIPS, flaps, glue, or plugs are all interventions present in many randomized trials but almost never in comparison to fistulotomy, because of concern over the ethics of allocation of participants to the fistulotomy group. Yet fistulotomy is the gold standard therapy

with the best chance of curing a disease that is at least unpleasant, and, in the case of Henry V, fatal. There are those that, against the flow, have advocated fistulotomy for high fistula [35]. I must admit that I have been impressed with the results when my patients that have failed my flaps and glue, went on to fistulotomy for high fistula.

The elephant in the room is that in all this literature there is no discussion of the treatment of incontinence after fistulotomy. This incontinence is, in almost all cases, related to an otherwise uninjured sphincter, neurologically speaking. So unlike sphincter injury during childbirth (wherein the most serious injury occurs in the third trimester [36]), the results of a delayed sphincter repair should be excellent. What I am suggesting to solve this ancient problem is a two stage fistulotomy, not in the traditional sense, but a complete fistulotomy in the first stage and, for what may be a small minority of those patients, a delayed sphincter repair after complete healing. I must admit I have never done this, as I have never done an internal sphincter repair after lateral internal sphincterotomy for fissure, since I have not yet encountered such a patient.

Enough said about incontinence.

Other Complications of Fistulotomy

Finding the Internal Opening

Successful fistulotomy is dependent on accurate location of the internal opening. It usually follows Goodsall's Rule (which really states that most fistulas originate in the posterior midline), but often does not. It is a mistake to do a fistulotomy until this opening is found and this can be very difficult. Peroxide and or methylene blue injection in the fistula track, and repeated surgical exploration are all useful techniques [37]. In recent years magnetic resonance imaging has attained the status of the gold standard in this regard, both to assist in finding the opening, and to locate occult septic foci that need drainage [38–41]. Its use is routine in some centers and more selected in others. Of course it is a guide and not replacement of surgical exploration.

Cancer

It may seem far fetched but there are data that show an increased risk of cancer in neglected anorectal disease [42, 43]. The reason to mention this in the context of fistulotomy is a publication reporting anorectal cancers found in abscesses and fistulas, in which three cases were unsuspected even at the time of fistulotomy and came as a surprise when the pathology report was received 3 days later [44]. It was my habit at that time in my career to biopsy all fistulas and the appearance of these three fistulas was entirely normal.

Crohn's Disease

Nobody has done fistulotomies in patients with Crohn's disease though there are not a lot of data to suggest why they should not, and in fact that timidity seems to be waning [30, 45, 46]. With a very edematous inflamed anal region a seton drainage certainly seems a wiser course, though that often does not do much good.

The Non-healing Wound

Any anal wound may be slow to heal. Several things need to be ruled out, including Crohn's, cancer, duplication cysts, viral infections, and tuberculosis [47–49]. Skin grafts have been proposed but I have never seen it done [50].

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