

Evolution in the surgical management of hemorrhoidal disease



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Hemorrhoidal disease is a very common condition requiring surgical management in approximately 10% of cases. Despite its long history and high prevalence, we are still trying to identify the best treatment. Earlier surgical approaches were soon abandoned and now only detain an historic significance. For long, proctologists have given their preference to hemorrhoidectomy that was gradually perfected through the years. The true innovation came in 1937, with the famous Milligan-Morgan hemorrhoidectomy, still one of the leading interventions for treatment of hemorrhoids. Less fortune encountered alternative techniques, such as the Whitehead hemorrhoidectomy, and closed and semi-closed techniques. Later on, the advent of a new concept of the pathogenesis of hemorrhoidal disease has brought to the development of stapled prolapsectomy techniques. This approach has encountered both supporters and detractors between the experts in this field and has received a strong impulse by the emerging trend towards "day-surgery". Today the search for the best surgical technique for hemorrhoidal disease is far from being over and witnesses the introduction of new techniques for hemorrhoidal dissection. The choice of the best strategy remains in the hands of the clinician in the modern conception of tailored surgery.

KEY WORD: Hemorrhoidal disease, Hemorrhoidectomy, Milligan-Morgan hemorrhoidectomy

Introduction

In the XVIII century, Giovanbattista Morgani stated that hemorrhoidal disease was the price that human race had to pay for the acquisition of the erect position. In fact, this condition is very common; with an estimated overall prevalence of 39% in the adult population¹. The disease affects both genders between 45 and 65 years of age, is often symptomatic with multiple manifestations² and has a high impact on quality of life. It can be managed with a multitude of surgical and non-surgical treatments. Despite its long history and high prevalence, we are still

trying to identify the best treatment for this condition today, 3500 years after the first therapeutic approaches detailed in the famous Eber and Smith papyrus³. According to literature, approximately 10%⁴ of patients with hemorrhoidal disease will eventually require surgery. Given the vast diffusion of this condition, this percentage equals a very high number of patients and procedures, making this topic very relevant to the surgeon. Our intention in this review is to trace the evolution of the surgical management of hemorrhoidal disease, since the birth of proctology, in the XIX century, to the present days, evaluating the development and gradual diversification of the different techniques.

Early Approaches

As in other Pathological conditions, the existence of many different therapeutic approaches reveals a lack of certitude about the real etiology and pathogenic mechanism underlying this condition. Many of the described techniques are nowadays obsolete and only detain an his-

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toric significance. Some owe their fame to a prestigious inventor. It is the case for the *Pecten* technique, described by Miles in 1919⁵. The author postulated the existence of a fibrous ring (*pecten*), developing in the anal channel between the mucosa and the internal sphincter, which could represent both the causative mechanism and the effect of the hemorrhoidal veins congestion. The technique was based on the excision of this fibrous structure (*pectentectomy*) in order to solve the stenosis. The existence of the *pecten*, however, was never demonstrated, not even at histological examination, and the technique was soon abandoned. The concept of a functional, rather than organic, stenosis became predominant in later years. In 1953, Eisenhammer underlined the pathogenic role of a chronic sphincter contraction and therefore suggested a possible role of sphincterotomy for the cure of hemorrhoidal disease⁶. The idea of a possible sphincter hyper tone in hemorrhoids persisted through the years and found confirmation in by modern manometric studies, where an augmented tone was identified in more than half of the patients, especially in young males⁷. This the concept at the base of the technique proposed by Lord in 1969, where an energetic anal divulsion aims to the resolution of the hypertone and to the regain of venous drainage⁸. Lord's maneuver, however, is aggravated by an unacceptable rate of post-operative incontinence (30% overall with a 10% of severe cases)⁹. For this reason, both this technique and sphincterotomy (although gravely by fewer and less serious complications) have now been abandoned, even as complementary approaches. No more fortune encountered the idea of a venous ligation of the hemorrhoidal plexus. The idea is old to the point that the first to attempt it was Celsus (25 b.C.-14 a.C.)³. The same principle was reenacted in '900 by Mitchell, who also performed a running suture of piles after their ligation¹⁰. In later years, Farag further developed the concept, stating that piles drain through perforating venous vessels and should therefore be obliterated through transfixion¹¹. This kind of treatments based on vessels ligation never thoroughly took hold and would nowadays have been abandoned if it had not been reinterpreted in a new way. In 1995 Morniga et al¹² proposed the transfixion of the terminal branches of the hemorrhoidal arteries, which are identified through an anoscope of their invention, provided with an acoustic Doppler velocimeter and a light source. This would allow cutting off the vascular provision to venous cushions. There is still much debate around this technique. For one thing, its field of application is not well defined. It seems to be effective on second-degree hemorrhoids, but there are other methods for that purpose (sclerosis, elastic ligation, photocoagulation) that can also be applied in an out-patient setting and are just as simple but less expensive. Moreover, Doppler analysis proved Miles hypothesis of the tripartition of the hemorrhoidal artery (in

2 right branches and 1 left) to be true in less than 50% of cases¹³. This would mean that there would be the need for more than 3 transfixions (up to 6 or 8), making this technique not much different from the mucosal elastic ligations proposed in the 80s by Barron.

Hemorrhoidectomy Techniques

Traditionally, proctologist always preferred radical hemorrhoidal excision (hemorrhoidectomy). Back in 400 b.C., Hippocrates, the genial father of modern medicine, already recommended hemorrhoidal cauterization with an hot poke³. In the 1800, Cusack in Ireland and von Langenbeck in Germany proposed thermal cautery¹⁴. Later on, during the second half of the century, especially devised instruments (including Farquharson's device) made their appearance and found vast applications. Despite what one could think, these techniques were not especially painful, but presented high risks of secondary bleeding¹⁵. For this reason, most surgeons used to prefer the simple transfixion and ligation of the exteriorized pedicles with the combined resection of the skin-mucosal component underneath, an effective but extremely painful practice. Back in 1836, Fredrick Salomon, the founder of St Marks hospital, introduced a technical innovation with the aim to reduce post-operative pain¹⁶. His key concept was to perform long dissections (stripping), brought up to the skin-mucosal junction, way above the dentate line, to perform the ligations on non-sensitive mucosa. The new method soon proved to be much less painful, although associated with a higher risk of stenosis. The first case series of hemorrhoidectomies performed at St. Marks Hospital with this new technique was published in 1901¹⁷. In the late 1800s, Whitehead¹⁸ proposed his new method of circular dissection with skin-mucosal suture. Although this might be in part attributable to incorrect execution, this technique is certainly aggravated by a higher risk of stenosis and by issues of mucosal ectropion. Thus the technique encountered a scarce diffusion and gradual dismissal. To avoid the excessive freshening of the mucosa that is characteristic of Salomon technique, Miles¹⁵, in 1919, suggested a lower V-shaped incision of the perineal skin. In 1937, Lockhart-Mummery proposed to suture the extremities of the venous pedicles to the margins of the skin wounds¹⁹. The true innovation, however, came in 1937: Milligan et al.²⁰ published on Lancet their new technique for hemorrhoidectomy as developed at St. Mark's hospital, the so-called *Milligan-Morgan hemorrhoidectomy*. They practiced a V shaped incision as described by Miles, dissected the pedicles leaving wide skin bridges in between and performed the mucosal transfixion and ligation more caudally than in the original Salomon technique. *Milligan-Morgan intervention*

represents an “open hemorrhoidectomy” with skin wounds left open to heal by secondary intention. Because of its simplicity and effectiveness, this surgical technique was defined a “five minute job” and soon spread well beyond the British borders. Many variants have been proposed over the years, from the minor modifications introduced by the same St. Marks Hospital (where they prefer to refer to the technique as “St. Mark’s Hospital method”) to Arnoux and Parinaud’s variant¹⁶, ideated overseas, in St Bellan Hospital (Paris). The authors proposed to solve the issue of circumferential hemorrhoids with a posterior anal plastic. Anyhow, the diffusion of the original technique was such that *Milligan-Morgan intervention* is still the more diffused hemorrhoidectomy to this day. The main issue with this approach is post-operative pain, which usually lasts for 3-4 weeks, until the complete healing of surgical wounds. Patients fear the ill-famed post-operative course of these interventions, aggravated by pain and by once common practices like the positioning of anal tampons and the induction of constipation in patients. The severity of post-operative pain is variable and mostly depends on the patients’ tolerance. Hence, the continuous research of technical and pharmacological solutions to make post-operative course easier. In 1956, always at St. Mark’s, Sir Alan Parks proposed a semi-closed hemorrhoidectomy²¹ with sub-mucosal dissection. This approach aimed to reduce pain and the risk of cicatricial stenosis. However, even in skilled hands, the intervention takes longer, is more complex, and may present with a higher risk of recurrence²². In fact, despite few exceptions, this approach has never known a vast diffusion after Parks’ death and was gradually dismissed, even at St. Mark’s. In 1959, at Grand Rapids (Michigan), Ferguson and Heaton²³ practiced a closed hemorrhoidectomy for the first time, subverting one of proctology long standing dogmas and finally suturing surgical wounds. The aim was to diminish the incidence of post-operative pain and bleeding. In many technical aspects, the technique deviated from European habits like in the choice of the prone position and in the use of Hill divaricators. The possibility to discharge the patients without open wounds, however, assured the technique a vast success and a vast diffusion, going from Ferguson clinic to all over the USA and even to this side of the Atlantic. This approach is the one that better answers the need for a fast discharge that is especially important in private sanitary systems, like the USA. It must be remarked, however, that neither closed nor semi-closed techniques ever reached their primary goal. No prospective controlled study, in fact, ever proved a significant reduction of post-operative pain when compared to the “traditional” *Milligan-Morgan hemorrhoidectomy*^{22, 24-25}. Moreover, after a few days the surgical sutures tend to tear out, turning closed hemorrhoidectomies back into open ones.

The Introduction of Stapled Techniques

In the last few years, the need to contain sanitary expenses has imposed new rules for the regulation of hospital admissions, especially in public sanitary systems. Short stay and “day surgery” options are considered the best choice for common minor conditions like proctologic diseases²⁶. This kind of organization is appreciated by patients that benefit from the reduction of waiting lists and from the psychological and logistic benefits of an early discharge, and goes to even greater advantage of hospitals. In fact, this approach allows for a greater turnover, giving the possibility to perform a greater number of minor interventions and at the same time and leaving more room and resources to devote to major pathology. The growing diffusion of “day-surgery” has brought the attention to surgical techniques that allow for a faster and safer discharge and that don’t need general anesthesia. In proctology, there is a growing tendency to prefer spinal anesthesia, especially if caudal or selective. Local anesthesia or loco-regional anesthesia (with perineal posterior block)²⁷ is also possible and reduces complications (such as urinary retention) to the minimum while allowing for immediate post-surgical mobilization. In 1998 Longo²⁸ published a new surgical technique that he had actually been employing over the previous 5 years. The theoretical start-point of the new technique was that hemorrhoidal disease might arise, not much from vascular structures, but from a disease of the supporting tissues (Parks ligaments, Treitz muscle) with a progressive prolapse of the mucosa and venous cushions. Hence the idea of a stapled prolassectomy with a 360° anopexy or “lifting” of the anal mucosa and without hemorrhoidal transfixion. This way, the hemorrhoids are repositioned back into their proper anatomical position. This new pathogenic concept is now applied to full thickness rectal prolapse as well and recently found application in new stapled techniques for the treatment of this condition²⁹. Given the vast epidemiologic relevance of this hemorrhoidal disease, the new technique caused an enormous interest and a lively scientific discussion. In clinical practice, the new method found a favorable reception becoming, in some countries, the gold standard for the treatment of hemorrhoidal disease. The advance of the learning curve and the introduction of specific operator kits made the intervention easier and standardized, minimizing the initial difficulties. The introduction of “double stapler techniques” allowed expanding the indications to include even severe prolapses. In 2000, Fazio³⁰ analyzed the pros and cons of the methodic as described in literature. In his conclusions, he prizes the “early promise of stapling technique” although underlining the need for a long-term follow-up on ample case series. On short-term analysis, most trials that compare Longo technique to hemorrhoidectomy³¹⁻³³ show a reduction in post-operative pain intensity and duration with a reduction in the use of pain

medications, a shorter hospital stay and earlier resumption of normal activities. Not all authors agree, however. Some authors³⁴ associated the methodic to persistent post-operative pain and fecal urgency. More recently, a multicenter randomized control trial³⁵ suggested that, although more painful in the short term, traditional excisional surgery may be more clinically effective and less costly when compared to haemorrhoidopexy. In this study, the authors found a comparable time for the return to normal activities and better results with excision in terms of quality of life, HSS, continence, tenesmus and need for further surgery. The excellent functional results of prolassectomy probably deserve more attention than they usually receive³⁶. After the first month, patients treated with Longo technique show a better anal continence than after excisional surgery. This might depend on the fact that the Thompson venous cushions are spared (hemorrhoidal veins are repositioned and not excised), the sensitive anal mucosa preserved and by the absence of scars. Data about complication rates are very reassuring³⁷⁻³⁹. The initial fears about the risks of stenosis and, especially, of post-operative bleeding have been much re-dimensioned after an accurate and systematic revision of the anastomotic rim has become a habit. Other complications such as the development of pelvic sepsis or rectum-vaginal fistulae are just anecdotal and possibly dependent on technical errors^{40,41}. To balance out the risk complications there is the advantage of a very marked effectiveness in the treatment of constipation, also in patients with obstructed defecation⁴² where surgical treatment can also be implemented with the addition of alimentary complements⁴³.

Latest Advancements

The search for the best surgical technique for the treatment of hemorrhoidal disease is far from being over. Milligan-Morgan intervention maintains its role and some have thought to pair it with new dissection techniques. Laser hemorrhoidectomy techniques (CO₂ or YAG) were developed in the late 70s but encountered an early failure. The elevated costs were not equally balanced by the expected faster and less painful recovery so that the technique to be soon abandoned³³⁻⁴⁴. Further dissection techniques have been proposed later on. Pedicle dissection through monopolar and bipolar electric coagulation found a vast diffusion in hemorrhoidectomy⁴⁶. The old paradigm according which eschars trigger pain receptors at sphincter level seems to lack foundation. Clinical studies evidence the good results, low costs and low complications rates of this method, which is well suited to the "day surgery" context^{47,48}. Nevertheless, many surgeons still restrain from it, fearing the possible adverse effects of carbonization on tissues, and, more importantly, fearing the early or delayed hemorrhages which might follow the eschar sep-

aration. Harmonic scalpels employ high frequency ultrasound energy (5500 Hz), to cut and to cauterize⁴⁸. The potential advantages of their use in hemorrhoidectomy include a low degree of thermal tissue damage (less than 1,5 mm of depths), much inferior than with monopolar or bipolar devices. This would allow for minor post-operative pain and for a faster recovery, at the expense of a greater technical complexity (the dissection of piles from the internal sphincter is harder) and of much higher costs. Lately, electro-surgical devices, which employ pulsated energy through radio-frequency, have generated a particular interest⁴⁹. They exploit a combination of pressure and of a 600 MHz frequency. The result is the molecular fusion on collagen and elastin with the sealing of vessels with a diameter of less than 7 mm, and of tissue layers of less than 7 mm thick. Peripheral thermal dispersion range is less than 2 mm. This kind of devices reach a lower temperature than others (estimated around 70°C, well below carbonization level) while allowing for the sealing of larger vessels than both electric and ultrasound coagulation. This reduces the risk of intra-operative bleeding and may help overcome the most feared complication of all: early and delayed post-operative hemorrhage. With the employ of these devices it would be possible to attain one of the hardest goals in proctologic surgery: a safe, same-day discharge a few hours after procedures which could be done in local, loco-regional or saddle anesthesia. Electric-frequency hemorrhoidectomy may also allow for a faster recovery since surgical wounds appear to produce less exudate from the start.

Haemorrhoidopexy techniques may play a role in first degree prolapse⁵⁰

Conclusions

Hemorrhoidal disease is an old and common condition but its etiology, pathogenesis and the choice of the best surgical treatment are still open for the debate. Many different surgical approaches have been proposed over time. At present, in the contraposition between supporters of hemorrhoidectomy techniques and stapled-prolassectomy techniques, there is no clear winner. We believe, that, like in any other medical field, it is useless to stand on dogmatic positions.

Riassunto

La malattia emorroidaria è una condizione molto comune che richiede una gestione chirurgica in circa il 10% dei casi. Nonostante la sua lunga storia e l'alta prevalenza, stiamo ancora cercando di identificare il trattamento migliore. Gli approcci chirurgici precedenti furono presto abbandonati e ora detengono solo un significato storico. Per molto tempo, i proctologi hanno pre-

ferito l'emorroidectomia, gradualmente perfezionata nel corso degli anni. La vera innovazione arrivò nel 1937, con la famosa emorroidectomia secondo Milligan-Morgan, ancora oggi uno dei principali interventi per il trattamento delle emorroidi. Meno fortuna hanno incontrato tecniche alternative, come l'emorroidectomia di Whitehead e le tecniche chiuse e semichiuse. Più tardi, l'avvento di un nuovo concetto di patogenesi della malattia emorroidaria ha portato allo sviluppo di tecniche di prolassectomia con stapler. Questo approccio ha incontrato sia sostenitori che detrattori tra gli esperti in questo campo e ha ricevuto un forte impulso dalla tendenza emergente verso la "day surgery". Oggi la ricerca della migliore tecnica chirurgica per la malattia emorroidaria è lungi dall'essere finita. La scelta della strategia migliore rimane nelle mani del clinico e nella moderna concezione della tailored surgery.

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