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Excision Hemorrhoidectomy: New Methods to Improve the Outcomes of an Old Technique

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Abstract

Context: Hemorrhoidal disease is the most common anorectal disorder that requires surgical intervention. Hemorrhoids require treatment when they result in symptoms such as bleeding or prolapse. Surgical intervention is indicated for significant prolapse, and a number of accepted and viable methods are available for treating prolapsing hemorrhoids that do not reduce spontaneously (Grade III and IV). Excision hemorrhoidectomy remains the gold standard treatment for Grade III and IV hemorrhoids despite great interest in alternative procedures such as stapled hemorrhoidopexy and Doppler-guided hemorrhoidal artery ligation with mucopexy. A large body of evidence demonstrates that excision hemorrhoidectomy is an effective, safe, and affordable procedure. Nevertheless, the main drawback of excision hemorrhoidectomy remains its notorious association with significant postoperative pain.

Evidence Acquisition: A comprehensive literature search was conducted through MEDLINE and the Cochrane database of systematic reviews. Only prospective case-controlled studies, review articles, and meta-analyses were considered.

Results: Many strategies have been put forward in the literature to address the issue of pain after excision hemorrhoidectomy. These strategies can be broadly categorized into surgical techniques (e.g., LigaSure hemorrhoidectomy) and pharmacological adjuncts (e.g., intradermal methylene blue and chemical sphincterotomy with glyceryl trinitrate ointment). In recent years, meta-analyses and randomized controlled trials have been performed to evaluate their effects.

Conclusions: This article evaluates the evidence behind these strategies and outlines the new methods available to improve the outcomes of an old technique.

Keywords: Excision Hemorrhoidectomy, Post-Hemorrhoidectomy Pain, Improving Outcomes, LigaSure Hemorrhoidectomy, Glyceryl Trinitrate Ointment, Intradermal Methylene Blue

1. Context

"Piles" are hemorrhoids that become pathological and are the most common anorectal disorder that requires surgical intervention. In a study on the prevalence of hemorrhoidal disease, hemorrhoids were found to be symptomatic in 17.4% of individuals, and among them 19.4% were classified as grade III or IV disease (1).

A range of surgical operations has been described for the treatment of hemorrhoids, and the debate on the best surgical method for the treatment of hemorrhoids continues. A tailored approach would be the authors' recommendation for deciding on the optimal approach, with consideration given to the grade of disease, number and size of hemorrhoids, and whether the hemorrhoids are circumferential (2). Although rubber band ligation or Doppler-guided hemorrhoidal artery ligation may be suitable for grade I or II hemorrhoids, the surgical treatment of grade III or IV hemorrhoids requires a different approach to resolve the issue of problematic prolapse. Excision or "conventional" hemorrhoidectomy remains the gold standard treatment of grade III or IV hemorrhoids. However, alternative surgical methods have gained much interest in the surgical community in recent years.

Stapled hemorrhoidopexy was first introduced by Longo (3) in 1998, and it has gained wide acceptance in the surgical community. The reason for its wide acceptance is the absence of a wound below the dentate line with reduced postoperative pain and a faster recovery. Stapled hemorrhoidopexy is also advantageous in the treatment of circumferential hemorrhoids (2), which may not be adequately treated with excision hemorrhoidectomy because adequate mucosal bridges have to be preserved. However, stapled hemorrhoidopexy was shown in a meta-analysis (4) of randomized clinical trials to have an increased rate of recurrent hemorrhoids in long-term follow up (odds ratio 3.85, 95% confidence interval 1.47 - 10.07), with a recurrence rate of around 8.5%. Mattana et al. (5) also reported that 32% of patients who had undergone stapled hemorrhoidectomy developed tenesmus compared with 0% for

the excision group (P< 0.001). Stapled hemorrhoidectomy can be considered a safe and viable alternative to excision hemorrhoidectomy, but it presents a trade-off in terms of risks and benefits.

Doppler-guided hemorrhoidal artery ligation was first described by Morinaga et al. (6) in 1995, and it has been suggested recently to be a viable alternative for the treatment of grade III and IV hemorrhoids when combined with mucopexy. However, the use of mucopexy to solve hemorrhoidal prolapse negates the benefit with regard to postoperative pain, which is the main selling point of Morinaga's method. A randomized controlled study by De Nardi et al. (7) found that both excision hemorrhoidectomy and Doppler-guided hemorrhoidal artery ligation with mucopexy had similar postoperative pain and long-term cure rate. The excision hemorrhoidectomy group had reduced costs and shorter operation times, whereas the latter group had quicker return to work. Currently, only a few randomized control studies have examined Doppler-guided hemorrhoidal artery ligation with mucopexy, and further evaluation is required before the method becomes common clinical practice.

Despite the options available, excision hemorrhoidectomy has not been eclipsed in popularity as it remains the most effective and affordable treatment available. Nevertheless, the issue of postoperative pain remains a big problem and is implicated in delayed discharge, acute urinary retention, delayed return to work, and reduced patient satisfaction after hemorrhoidectomy. Postoperative pain after excision hemorrhoidectomy can be severe due to the presence of an open wound below the dentate line, which is innervated by somatic pain receptors. The mechanism of the pain begins with an acute local inflammatory response due to tissue trauma. Subsequently, the pain is believed to be mediated by anal sphincter spasm, delayed wound healing, and secondary infection of the exposed wound. Many evidence-based approaches have been put forward to target these mechanisms, with the ultimate goal of improving postoperative outcomes after excision hemorrhoidectomy.

2. Evidence Acquisition

A comprehensive literature search was conducted through MEDLINE and the Cochrane database of systematic reviews in September 2015 using both medical subject headings and keyword searches. The terms used in keyword searches include the following: excision / open / conventional / Ferguson / LigaSure hemorrhoidectomy. Only prospective case-controlled studies, review articles, and meta-analyses were considered.

3. Results

3.1. Optimal Surgical Technique

3.1.1. Open vs. Closed

The two main techniques adopted for performing excision hemorrhoidectomy are the open method, in which the wounds are left open, described by Milligan et al. (8) in 1937 and the closed method described by Ferguson and Heaton and Ferguson (9) in 1971. Ho et al. (10) performed a meta-analysis of six randomized controlled trials on open versus closed hemorrhoidectomy and found no significant different between both techniques in terms of postoperative pain, length of stay or postoperative complications. Both methods were equally effective and safe, but the open method was found to require less operative time, and the closed method was found to reduce wound healing time.

3.1.2. Scissors vs. Diathermy vs. LigaSure

In 1992, Seow-Choen et al. (11) first compared excision hemorrhoidectomy using scissors versus diathermy for dissection through a randomized controlled trial on 49 patients. Dissection with diathermy instead of scissors was shown to result in less bleeding, reduced operation time, and reduced requirement of oral analgesics postoperatively. The authors attributed the improvement in postoperative pain to the burning of sensory nerves during diathermy dissection, a situation similar to anesthesia in third-degree burns.

In turn, diathermy dissection has been compared with dissection with modern energy devices. The LigaSure tissue-sealing device seals blood vessels through a combination of pressure and radiofrequency ablation and minimizes the spread of thermal energy, thus reducing collateral tissue damage and necrosis. Reducing collateral tissue injury should consequently reduce postoperative pain and decrease wound healing time. In 2008, we published a randomized control trial (12) on 44 patients comparing dissection with diathermy and LigaSure. Hemorrhoidectomy performed with LigaSure reduced intraoperative bleeding and operation time. Although the trial did not show a reduction in postoperative pain, patients who underwent LigaSure hemorrhoidectomy were over three times more likely to have complete wound epithelization at three weeks after surgery. LigaSure hemorrhoidectomy was further evaluated in a meta-analysis of 11 randomized controlled trials involving 1,046 patients by Mastakov et al. (13), and it also showed faster wound healing and reduced blood loss and operation time. Additionally, a significant reduction in postoperative pain scores and an earlier return to work were observed.

3.2. Pharmacological Adjuncts

3.2.1. Stool Softeners

Stool softeners such as lactulose are almost universally prescribed to reduce postoperative pain during defecation after hemorrhoidectomy. London et al. (14) showed in a randomized controlled trial that preoperative lactulose that begins four days before surgery results in significantly less pain in defecation in the first four postoperative days compared with postoperative lactulose.

3.2.2. Metronidazole

Secondary infection of the perianal wound after excision hemorrhoidectomy is considered one of the causes of postoperative pain, and thus postoperative metronidazole has been evaluated as a means to reduce bacterial load and postoperative pain. Oral metronidazole was shown to reduce postoperative pain on the fifth to seventh day after hemorrhoidectomy in a randomized controlled trial by Carapeti et al. (15) in 1998. However, this result was not replicated in a randomized controlled trial by Balfour et al. (16) in 2002. Topical metronidazole (10%) was evaluated in a randomized controlled trial by Ala et al. (17) in 2007 and was found to significantly reduce postoperative pain for up to 14 days after hemorrhoidectomy.

3.2.3. Intradermal Methylene Blue

The intradermal injection of methylene blue has been established as a treatment modality for intractable pruritus ani. Eusebio et al. (18) demonstrated through electron microscopy that the cutaneous nerve endings in the dermis had been destroyed and absent after methylene blue was injected into the dermis of perianal skin. We noted a similar phenomenon when methylene blue was used to delineate the tract in perianal fistula surgery and reported a series (19) of patients who underwent lateral anal sphincterotomy with intradermal methylene blue and experienced minimal postoperative pain. We conducted a randomized controlled trial (20) to evaluate the benefit of intradermal methylene blue in 67 patients who underwent excision hemorrhoidectomy and found that intradermal methylene blue significantly reduced postoperative pain and the incidence of acute urinary retention in the first three days after hemorrhoidectomy.

3.3. Glyceryl Trinitrate (GTN) Ointment

Anal spasm is considered an important mechanism for pain after hemorrhoidectomy, especially during defecation. Previous attempts at addressing anal spasm through a mechanical approach (e.g., lateral internal sphincterotomy or anal dilatation) have failed to produce a significant advantage with regard to postoperative pain (21, 22) but instead have resulted in the problem of incontinence in a number of patients. The evaluation of pharmacological approaches, such as GTN ointment, trimebutine suppositories, botulinum toxin, and calcium channel blockers, has been more promising. We evaluated GTN 0.2% ointment in a randomized controlled trial (23) of 82 patients in 2006 and found that GTN ointment administration after excision hemorrhoidectomy resulted in earlier wound healing but failed to demonstrate an improvement in postoperative pain. Only 1 out of 40 patients who used GTN had to discontinue the treatment due to the development of headaches. A meta-analysis (24) of five randomized controlled trials covering 333 patients for the use of GTN ointment after hemorrhoidectomy showed that patients who used GTN ointment after hemorrhoidectomy were 3.5 times more likely to achieve complete wound epithelization at three weeks after surgery. The study also showed a significant reduction of postoperative pain at three and seven days after surgery.

4. Conclusions

Excision hemorrhoidectomy is notoriously associated with significant postoperative pain but remains the gold standard treatment for grade III and IV hemorrhoids because it is efficacious and affordable. A review of the literature reveals a number of innovative modifications that can be introduced to enhance this old technique by reducing postoperative pain and accelerating wound recovery.

Footnote

Authors' Contribution: All authors equally contributed to this paper in the conception and design of the study; literature review and analysis; drafting, critical revision, and editing; and final approval of the final version.

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