

Modern surgical management of haemorrhoids

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Abstract: Haemorrhoidal disease is one of the commonest anorectal disorders. Treatment options are dependent upon the severity of symptoms and the extent of haemorrhoidal prolapse with up to 10% of patients requiring surgical intervention. The traditional surgical treatment for haemorrhoids is excisional haemorrhoidectomy. The Milligan Morgan technique, first described in 1937, is the most popular technique and remains the gold standard for surgical intervention. However haemorrhoidectomy is recognised as a painful procedure with a risk of significant complications and remains unpopular with the general population. Using advances in medical equipment and an understanding of the pathophysiology of haemorrhoidal disease new approaches to the surgical treatment of haemorrhoids have now been developed. Stapled haemorrhoidopexy reduces haemorrhoidal tissue prolapse by excising a ring of the prolapsed anal mucosa above the dentate line, using a specific circular stapling device. Haemorrhoidal artery ligation (HAL) uses a Doppler transducer to identify haemorrhoidal arteries which can then be ligated, reducing haemorrhoidal venous plexus pressures and haemorrhoidal artery ligation with recto anal repair (HAL-RAR) combines HAL with a procedure to plicate and draw up prolapsing haemorrhoidal tissue. This article reviews the evidence for the different surgical techniques; focussing on treatment outcomes including rates of recurrent disease and post operative complications.

Key words: Internal haemorrhoids; Haemorrhoidectomy; Stapled haemorrhoidopexy; Doppler-guided hemorrhoidal artery ligation; Recto-anal repair.

INTRODUCTION

Haemorrhoidal tissue is a normal component of the anal canal and is composed predominantly of vascular tissue, supported by smooth muscle and connective tissue. Its function is to provide complete closure to the anus at rest and protection of the underlying muscle during defaecation.¹ Haemorrhoidal disease is one of the most common anorectal conditions² although the exact incidence is difficult to determine because many people are reluctant to seek medical advice due to various personal, cultural and socioeconomic reasons.³ Estimates of the proportion of the UK population affected range from 4.4% to 24.5%⁴ whilst more than 15 million people are believed to be affected annually within the United States.⁵

Internal haemorrhoids result from chronic engorgement of the three submucosal venous plexi of the anal canal and originate above the dentate line.⁶ With the weakening or fragmentation of the supportive connective tissue framework combined with the repeated passage of hard stool and straining producing a shearing force, these vascular cushions descend and prolapse.³ The degree of resultant prolapse is used to grade internal haemorrhoids using Goligher's classification system: Grade I: haemorrhoids non prolapsing; Grade II: haemorrhoids prolapse on straining but reduce spontaneously; Grade III: haemorrhoids require manual reduction; Grade IV haemorrhoids are non-reducible.⁷ Symptoms resulting from internal haemorrhoids are commonly bright red bleeding per rectum, mucosal prolapse or protrusion, and pruritus ani.⁶ Pain is not characteristic unless there has been thrombosis or strangulation of the haemorrhoid which possibly can lead to gangrene⁸ and it should be noted that severity of symptoms do not necessarily correlate with the degree of haemorrhoidal prolapse.⁹

Conservative treatment has traditionally been recommended for the treatment of Grade I and II haemorrhoids including; changing bowel habit through dietary and lifestyle changes, increased oral hydration and the use of stool softeners and laxatives. Increased dietary fibre has been demonstrated to be consistently beneficial in relieving overall symptoms and bleeding.¹⁰ Non surgical interventions include rubber band ligation, injection sclerotherapy, cryotherapy, laser therapy, diathermy coagulation and infrared coagulation.⁹ These can be performed in an outpatient setting and are considered to be primary options in the treatment of grade I-III haemorrhoids.¹¹ Meta analysis of outcomes from these interventions has demonstrated rubber band ligation to be the most effective in terms of response to treatment and reduced requirements for further intervention.¹¹

Surgical intervention is usually the treatment of choice for grade III-IV haemorrhoids, prolapsed grade II haemorrhoids that have failed to respond to non surgical treatments, and circumferential grade II haemorrhoids.⁴ This is estimated to be approximately 10 % of all patients¹² and in 2004-5 of approximately 23,000 haemorrhoidal procedures carried out in England, 8,000 were surgical excisional interventions.⁴

SURGICAL HAEMORRHOIDECTOMY

Surgical haemorrhoidectomy involving excision of the haemorrhoidal cushions is the traditional surgical approach used for treating haemorrhoids.¹³ It is a technique that has been demonstrated to have successful long-term results and has been previously stated as the only effective treatment for large external haemorrhoids.¹⁴ There are two popular, well established, methods of surgical excision: the "open" Milligan Morgan excision and the "closed" Ferguson method.² The Milligan Morgan technique was first described in 1937 and involves dissection of the haemorrhoid off the underlying anal sphincter complex and ligation of the vascular pedicle.¹⁵ The resulting mucosal defects are left open to granulate by secondary intention.³ The Ferguson operation, described in 1959, is essentially a modification of the Milligan Morgan procedure in which the mucosal defect edges and skin are closed with a continuous suture.¹⁶ The Milligan Morgan procedure is the most widely practiced technique and is considered the current 'gold standard' for surgical management¹⁷ although it should be noted the closed technique is more popular in the United States.³ Both operations have been demonstrated to be equally effective and safe, however, the closed technique has been demonstrated to result in faster wound healing¹⁸ and one randomised controlled trial demonstrated improved long term patient anal continence following closed surgery.¹⁹

Unfortunately there is significant morbidity associated with surgical haemorrhoidectomy. In particular it has a reputation for being an extremely painful procedure for a fairly benign condition.²⁰ Other significant short term complications include; urinary retention (20.1%), bleeding (secondary or reactionary) (2.4%- 6%), and subcutaneous abscesses (0.5%) whilst documented long term complications include anal fissure (1%-2.6%), anal stenosis (1%), incontinence (0.4%), fistula (0.5%) and recurrent haemorrhoidal symptoms (20%).⁹

Modifications to the original Milligan Morgan technique have been described including diathermy haemorrhoidectomy as opposed to scissor dissection²¹ and more recently the use

of ultrasonic scalpel, laser and bipolar electrothermal device in an attempt to reduce post operative pain and blood loss and to permit faster wound healing and a quicker return to normal activities.²² However a meta-analysis of the use of Ligasure (a bipolar electrothermal device) demonstrated a reduction in operative time and blood loss but no advantages in terms of pain or recovery of normal activity² and a literature review by Cheetham and Phillips concluded there was no evidence to support the practice of laser haemorrhoidectomy and whilst diathermy haemorrhoidectomy achieves good haemostasis it is not superior to conventional techniques.²³

Spasm of the internal anal sphincter appears to play a significant role in the origin of pain following haemorrhoidectomy.²⁴ To relieve this spasm techniques have included surgical sphincterotomy,²⁵ reversible chemical sphincterotomy using topical application of 0.2% glycerol-trinitrate (GTN) ointment or 2% Diltiazem cream and injection of botulinum toxin.²⁴ Lateral sphincterotomy can be performed through one of the haemorrhoidectomy wounds²⁶ but is associated with a risk of significant long-term sequelae including symptoms of incontinence of flatus and difficulty with perianal hygiene after defaecation in up to 20% of patients.¹⁴ Chemical sphincterotomy using topical creams has the advantage of causing only a temporary sphincter relaxant and is thus much safer for patient continence. However, despite inducing enhanced wound healing, application of GTN or diltiazem, results in only limited reduction of pain symptoms^{27, 28} and there have been problems with side effects, most notably headaches.²⁹ A single intra operative injection of Botulinum toxin into the internal anal sphincter has been demonstrated to reduce post operative anal canal resting pressures but resulted in similar levels of pain upon defaecation as compared to using GTN ointment.³⁰

Other techniques to reduce post operative pain following haemorrhoidectomy have included the use of laxatives pre and post operatively, perioperative use of local anaesthetics and analgesics³ and the prophylactic use of oral metronidazole following surgery to prevent secondary infection.¹⁴ Despite all of these practices, even when used in conjunction, there has still only been a limited reduction in post operative pain. There are also continuing concerns regarding the risk, if small, of significant complications for the treatment of a benign condition and recurrent disease remains a problem. In an attempt to elevate these issues alternative surgical techniques have been developed.

STAPLED HAEMORRHOIDOPEXY

Stapled haemorrhoidopexy, also known as 'procedure for prolapse and haemorrhoids' (PPH), stapled anopexy, stapled prolapsectomy and stapled mucosectomy, was first described in 1998 by Longo as an alternative to conventional excisional haemorrhoidectomy.³¹ It is a technique that reduces the prolapse of the haemorrhoidal tissue by excising a ring of the prolapsed anal mucosa above the dentate line, using a specific circular stapling device that results in a mucosa to mucosa anastomosis. This both reduces the potential for available rectal mucosa to prolapse and interrupts the blood supply to the haemorrhoids.⁴ As a result of the excision occurring above the dentate line it is believed to avoid the painful wound in the somatically innervated ano-derm.³² Early small randomised controlled trials comparing stapled haemorrhoidopexy to traditional surgery reported it to be less painful, to have better patient acceptance with quicker post operative recovery times plus be more compliant for use in a day surgical setting making it more economical.¹⁷ These encouraging reports combined with continuing concerns regarding pain associated with excisional surgery ensured that stapled haemorrhoidopexy has rapidly become a popular alternative surgical therapy.

The initial enthusiasm for stapled haemorrhoidopexy was however tempered by reports of serious surgical complications including; pelvic sepsis, rectal obstruction, rectal perforation and staple line dehiscence.^{33, 34} New post operative symptoms including faecal urgency and anal pain were described following the procedure³³ and there were continuing questions concerning the long term effectiveness of the technique. Meta analysis of randomised trials performed comparing the two surgical techniques have subsequently demonstrated that whilst stapled haemorrhoidopexy is quicker to perform, less painful post operatively and with similar complication rates to conventional haemorrhoidectomy; patients are significantly more likely to have recurrent disease with increased problems of symptom recurrence and prolapse in long term follow up.^{17, 35} It was also stated that there was insufficient evidence to advocate performing the stapled procedure in a day case setting.³⁵ The studies concluded that conventional surgery offers a more effective cure for grade IV haemorrhoids and remains the 'gold standard' in the surgical treatment of haemorrhoids particularly if recurrence and prolapse are the most important clinical outcomes.^{17, 35} It should however be noted that the National Institute for Health and Clinical Excellence (NICE) which appraises new medical technologies for use in the NHS of England and Wales (in terms of proven clinical and cost-effectiveness) recommended in September 2007 the use of stapled haemorrhoidopexy for the treatment of prolapsed internal haemorrhoids as it concluded that the level of post operative pain and the length of the recovery period would be the deciding factors in the choice for procedure rather than any increased risk of prolapse or the need for re-intervention.⁴ This highlights the potential and need for alternative, painless surgical techniques that can also reduce symptomatic recurrence rates.

HAEMORRHOIDAL ARTERY LIGATION

Haemorrhoidal artery ligation (HAL) is a novel non-invasive surgical treatment for haemorrhoids that was developed by the Japanese surgeon Morinaga in 1995.³⁶ It is a technique that is based upon an understanding of the pathogenesis and arterial inflow to haemorrhoids and can potentially be performed under sedation and/or local anaesthesia. The procedure entails precise identification of the superior rectal arteries supplying haemorrhoids using a Doppler transducer located in the side wall of a special proctoscope. Using an applied frequency of 8.2 Mhz and an introduction angle of approximately 60° a screening depth of approximately 7 mm is provided.³⁷ This enables identification of the haemorrhoidal arteries which are then selectively suture ligated 2-3 cm above the dentate line through a lateral ligation window within the proctoscope (situated proximally to the transducer). Ligation of these arteries prevents inflowing blood to the haemorrhoidal venous plexi. This causes a reduction in plexi internal pressures and subsequently results in both a cessation of haemorrhoidal bleeding and shrinkage of haemorrhoidal tissues.³⁶ Various centres across Europe and America have adopted this technique with minor modifications and using different names (including: Doppler guided Haemorrhoidal artery ligation (DG-HAL) and Transanal haemorrhoidal dearterialisation (THD)); however the basic principle has remained the same.

Morinaga et al's initial study reported promising results using the HAL on 116 patients. One month post the procedure symptoms of bleeding had stopped in 96% of the patients, 95% had pain relief and 78% had improvement in prolapse symptoms.³⁶ These results have been replicated by several other single centre studies of larger sample sizes.³⁷⁻³⁹ These studies also demonstrated that the technique is well

tolerated, is a relatively painless procedure and is able to be performed with reduced anaesthetic intervention using sedation and/or local anaesthesia. To date there is only one published randomised trial comparing conventional haemorrhoidectomy to haemorrhoidal artery ligation.⁴⁰ It reported both techniques to be equally effective in terms of the treatment of symptoms and recurrence rates one year follow up, but found HAL to be initially less painful and result in reduced length of hospital admission. It must however be noted that this study is small with only thirty patients in each group and the results of larger randomised trials are awaited.

Morinaga documented concerns regarding potential injury to the urethra, vagina and prostate when performing the arterial ligation however his initial group had no major complications³⁶ and the risk of major complication has found to be only minimal in all studies to date. Scheyer et al reported in their study of three hundred and eight patients that one patient developed proctitis and one other a submucosal fistula.³⁷ Other complications they recorded included; bleeding, thrombosis, defaecation pain, anal fissures, urinary retention, urinary infections and stool retention³⁷ but at reduced rates when compared to studies for conventional haemorrhoidectomy.⁹ Similar complication rates were found in Dal Mante et al's study.³⁸

The majority of patients treated by the HAL technique in studies to date have suffered with grade II or III haemorrhoids with only small numbers of grade IV patients. Whilst the technique clearly appears effective in treating symptoms of bleeding (which makes physiological sense given that the haemorrhoidal arterial branches are ligated) it potentially is not so beneficial for prolapsing symptoms. Scheyer et al reported post operative complications rates of residual protrusion at almost 60% in Grade IV patients compared to only 6.7% in Grade II patients and questioned whether the technique is indicated for Grade IV haemorrhoids.³⁷ The problem appears to be that the symptomatic redundant haemorrhoidal tissue often does not completely shrink back.

HAEMORRHOIDAL ARTERY LIGATION AND RECTO ANAL REPAIR (HAL-RAR)

In order to resolve the problem of symptomatic redundant haemorrhoidal tissue remaining following HAL; the technique was modified at the end of 2005 to additionally include a Recto Anal Repair (HAL-RAR). The HAL-RAR procedure involves haemorrhoidal artery ligation followed by plication of the redundant haemorrhoidal tissue, drawing it back up into the anus where the tissue scars over and integrates back into the anal tissue. Thus there is both a disruption of arterial blood into the venous plexi and a reduction of the prolapsing tissue. The RAR portion of the procedure enables symptoms resulting from prolapse such as mucus, puritus and occasional seepage of stool to be resolved making it potentially more beneficial for those patients with Grade III or IV disease. The inclusion of the RAR does however appear to make the procedure more painful than a HAL alone but it is still able to be performed under conscious sedation and has been documented to provide significant symptomatic relief.⁴¹ To date there are no published studies to demonstrate long term outcomes and complication rates from HAL-RAR procedure.

CONCLUSION

Although haemorrhoidectomy is currently the 'gold standard' surgical treatment for haemorrhoids, because of its proven effectiveness, there is a rapid expansion in the use of modern, new techniques. Post operative pain following

haemorrhoidectomy appears to be the most important motivating factor in the drive to acquire better treatment options. stapled haemorrhoidopexy has been found to significantly reduce post operative pain and appears to be well tolerated by patients. It has been demonstrated to be an effective haemorrhoidal treatment however there are still concerns if recurrence and prolapse are the most important clinical outcomes and there remains a small risk of serious post operative complications. Overall HAL has so far proven to be a painless, safe and efficacious method to treat haemorrhoids particularly if bleeding is the main complaint. The techniques effectiveness in treating prolapse symptoms is not clear. Combining HAL with a recto anal repair (HAL-RAR) potentially resolves this issue and still enables the procedure to be relatively pain free although at present there is no supporting published data. To provide the most effective surgical treatment it is necessary to choose the appropriate technique tailored to the individual patients' clinical symptoms.

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