

The management of haemorrhoids

Haemorrhoidal disease is common, but there is still no consensus on optimal treatment. The most appropriate treatment is tailored to the individual patient. This article defines and classifies haemorrhoids, reviewing the efficacy of current treatments including the latest techniques.

The word 'piles' is derived from the Latin word *pila*, meaning ball. It has traditionally been the layman's term for haemorrhoids, the treatment of which dates back almost 4000 years. Although there are many well-recognized precipitating factors associated with haemorrhoids such as low fibre intake, prolonged straining and pregnancy, the precise aetiology remains unclear, which is certainly reflected in the number of treatment options available. This review defines haemorrhoidal disease both anatomically and clinically, and explains how such classifications can affect subsequent management strategies. The efficacy of the most popular modalities of treatment is reviewed, and a novel surgical technique is introduced.

Anatomy and pathophysiology

Figure 1 depicts the anatomical relationships of the components within the anal canal. The concept of anal cushions being the precursors of haemorrhoids was first introduced in 1975. Cushions were described in the classical 3, 7 and 11 o'clock positions (Thomson, 1975). They lie predominantly above the dentate line and are separated from the sphincter complex by the submucosal layer (a combination of blood vessels, muscular and connective tissue), related to which is the inferior haemorrhoidal plexus which can become engorged at the anal verge. This fact is important in distinguishing prolapsing internal haemorrhoids, which are lined by an insensate covering and whose neck arises above the dentate line, from external haemorrhoids that arise below this line. The importance of anal cushions lies in part in the maintenance of faecal continence; vascular filling is thought to be responsible for approximately 20% of resting anal pressure (Lestar et al, 1989), and the cushions are able to provide a conformable plug to maintain complete closure of the anal canal.

Theories of the aetiology of haemorrhoids are believed by some to be related to their vascularity and underlying supportive structure. Local changes in pressure are thought to cause venous dilatation in the anal cushions and the valveless venous system leads to their engorgement. Such a mechanism may account for the increased prevalence of haemorrhoids in pregnancy. The alternative connective tissue theory suggests that the underlying support provided by the collagenous fibres of the submucosa degenerates over time and ultimately leads to a caudal displacement of the anal cushions (Haas et al, 1984), perhaps explaining the phenomenon of haemorrhoidal prolapse.

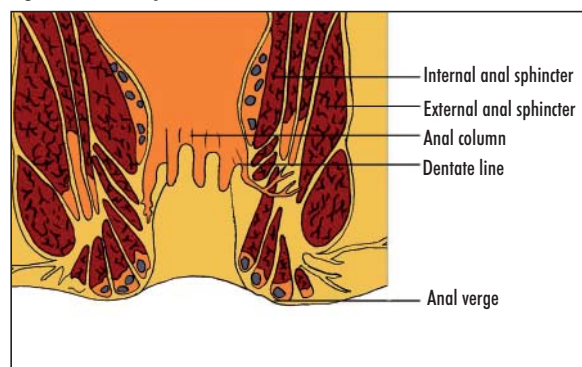
Classification

Improved understanding of local anatomy has led to helpful clinical classifications for haemorrhoids. The product of underlying pathophysiological and anatomical changes, they allow examination findings to be standardized, as a basis for the most appropriate form of treatment to be offered.

One such classification is the Goligher classification, which includes four clinical entities (Goligher et al, 1984). Grade I describes a normal external appearance, with haemorrhoids that bleed but do not prolapse, whereas in grade II the haemorrhoids prolapse but reduce spontaneously. Grade III and IV describe prolapsing haemorrhoids. Those that require manual digital reduction are termed grade III while those that remain prolapsed permanently are grade IV (Figure 2). With the increased availability of endoscopy, haemorrhoids can be visualized during colonoscopic or sigmoidoscopic examination with a retroflexed scope (Figure 3). Endoscopic classification systems also address and closely correlate to the patient's symptoms (Fukuda et al, 2005).

Although these classifications are limited by the assumption that bleeding and prolapse are the only symptoms caused by haemorrhoids, they still have an important place in the management of the condition when used in conjunction with the wider clinical picture.

Figure 1. Anatomy of the anal canal.



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Haemorrhoidal grade	Clinical description	Example
Grade I	Normal appearance; bleeding but not prolapsing	
Grade II	Bleed and prolapse but reduce spontaneously	
Grade III	Bleed and prolapse but require manual reduction	
Grade IV	Bleed and permanently prolapsed	

Figure 2. Goligher classification of haemorrhoids. From Goligher et al (1984).

The clinical picture

Although haemorrhoids affect between 4 and 36% of the general population (Loder et al, 1994), this figure is indicative only of symptomatic haemorrhoids and may well be an under-estimate. Hospital-based proctoscopy studies have shown prevalence rates of up to 86%, with the majority of patients being asymptomatic (Haas et al, 1983). Symptoms are widely variable, but haemorrhoids are responsible for most cases of rectal bleeding. The most common symptoms after bleeding include pain, mucous discharge and pruritus, with or without associated haemorrhoidal prolapse (Dennison et al, 1989). The colour of the bleeding is attributed to the arterial oxygen tension caused by arteriovenous communications within the anal cushions (Thulesius and Gjores, 1973), while pruritus and associated discomfort is thought to be caused by prolapse of the rectal mucosa leading to deposition of mucus on the perianal skin. The type and severity of symptoms plus the examination findings allow the most appropriate treatment modality to be offered.

It is crucial not to attribute all cases of bright red rectal bleeding to haemorrhoids. Conditions ranging from anal

fissure to colorectal malignancy may all produce similar symptoms. Concurrent pathology must be excluded by investigation of the proximal colon, which in most cases is performed by sigmoidoscopy or colonoscopy.

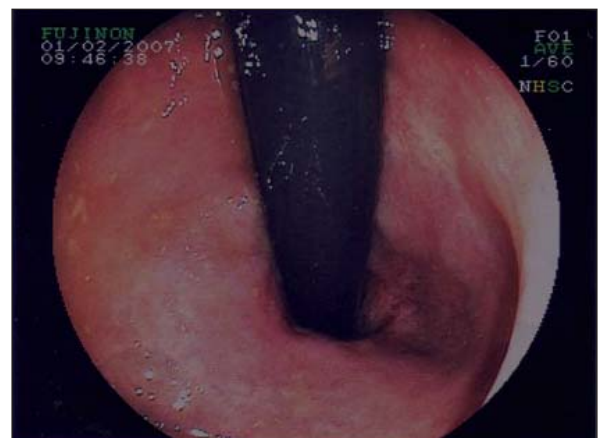
The treatment ladder

Classification systems, such as the one described above, allow standardization of the condition and can also monitor progression. Once a patient has been adequately investigated, the surgeon is in a position to offer the most appropriate treatment. As haemorrhoids are essentially a benign condition, treatment is directed at alleviating symptoms rather than necessarily at halting progression. Most surgeons have traditionally adopted a step-wise approach in treatment depending on the severity of symptoms and clinical grading of the haemorrhoids, with escalation if necessary (Figure 4). With the advent of newer more definitive techniques, however, the options for treatment have increased and a more individually-tailored management strategy can be used.

Conservative management

Conservative management is usually reserved for patients with minor symptoms and grade I or grade II haemorrhoids. Addressing some of the precipitating factors may well prevent the need for further intervention. This essentially involves lifestyle modification and dietary advice as well as medical treatment. Some have suggested that constipation may be a precipitating factor in the development and progression of haemorrhoids and the lower incidence of the condition in populations with high dietary fibre intake adds weight to this theory (Burkitt, 1972). This is never been proven definitively, however, and others have equally proposed that haemorrhoids may actually lead to constipation (Johanson and Sonneberg, 1990). Adequate fluid and fibre intake may reduce straining effort during defaecation, along with laxatives, and may also prevent recurrence of haemorrhoids. A meta-analysis of fibre supplementation showed

Figure 3. Retroflexed colonoscope showing internal view of haemorrhoids.



that the risk of bleeding was lower with an increased fibre intake, along with the rate of recurrence (Alonso-Coello et al, 2006). Furthermore, simple education on toilet habits such as avoiding straining or reading while on the toilet is useful (MacKay, 2001). Reading leads to excessive time being spent on the toilet and one may be tempted to strain unnecessarily. In many circumstances, these measures have been initiated before consultation with a surgeon.

Medical treatment options are essentially used for alleviating discomfort associated with haemorrhoids. They are for symptomatic relief and do not affect the underlying pathology. *Table 1* highlights the different treatment modalities for haemorrhoidal disease.

Outpatient procedures

As new surgical techniques are developed, outpatient procedures are showing a slight decline in popularity. They are, however, considered to be the primary option for grades I and II in particular as they are quick, simple, inexpensive and do not require anaesthesia. The most common of these procedures are rubber band ligation and injection sclerotherapy, although cryotherapy and photocoagulation are other potential options.

Rubber band ligation

Rubber band ligation has been modified over the years from Blaisdell's original description (Blaisdell, 1958), which advocated the application of a single band alone. Currently, surgeons may apply up to three bands at a time and can repeat this every 6 weeks or so. The technique involves the direct visualization of the haemorrhoidal pedicle through a proctoscope, with application of a band around it using either forceps or a suction device. Banding results in ischaemic necrosis of the haemorrhoidal tissue, which subsequently auto-amputates. It is important to warn patients that they may experience some bleeding after 10–14 days when the banded tissue sloughs off. Success rates of between 69% and 94% have been shown (Bat et al, 1993) with low complication rates, although potentially life-threatening complications have been reported in a few cases. With higher success rates than other outpatient procedures, it is still deemed less efficient than haemorrhoidectomy in the long term. However, it is associated with less pain and fewer complications than haemorrhoidectomy (Shanmugam et al, 2005). Evidence suggests that most patients actually complain of moderate or worse discomfort after banding (Watson et al, 2006).

Sclerotherapy

Injection sclerotherapy is a widely available technique, the most common sclerosant being 5% phenol in almond oil, and it is particularly useful for bleeding piles. The sclerosant induces an inflammatory reaction causing changes both in the haemorrhoidal mass and affecting

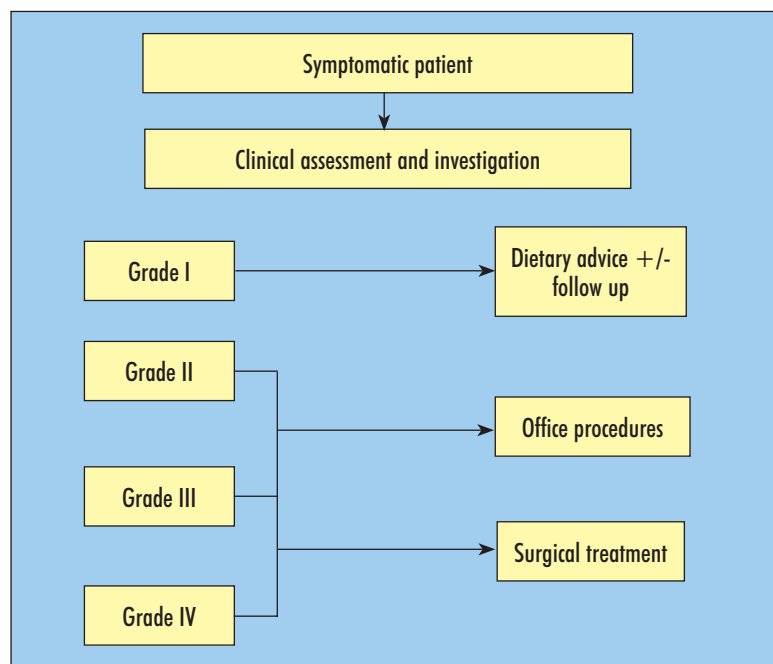


Figure 4. Step-wise management strategy.

the underlying architecture. Haemorrhoids are again identified by proctoscopy and then injected well above the dentate line. As long as the injections are appropriately directed no pain is experienced by the patient. Although sclerotherapy is a seemingly easy, reproducible procedure, there are as many reported problems with it as there are advantages. These include high failure rates and misplaced injections which have led to many surgeons abandoning this procedure altogether.

There are certain contraindications to banding and injecting piles such as patients being on formal anticoagulant medication and those who have coagulopathies, but there are no guidelines discouraging the use of a combination of procedures under these circumstances. One large study has shown that by using a combination of sclerotherapy, rubber band ligation and infrared coagulation over an average period of 2 months, satisfaction rates of around 90% were achieved with less than 10% of patients requiring surgical intervention (Accarpio et al, 2002).

Table 1. Haemorrhoid treatment modalities

Outpatient procedures	Rubber band ligation
	Injection sclerotherapy
	Cryotherapy
	Photocoagulation
Surgical procedures	Open haemorrhoidectomy
	Closed haemorrhoidectomy
	Stapled anopexy
	Haemorrhoidal artery ligation

Cryotherapy appears to have fallen out of favour. With the use of a specialized probe, the haemorrhoidal mass is ablated, and this procedure can be repeated over time. Potential problems include ulceration and discharge as a consequence of impaired healing following application of the cryo-probe (Oh, 1981).

Photocoagulation requires the use of specific infrared optical equipment. The procedure is similar to sclerotherapy in that direct visualization of the haemorrhoid with a proctoscope is required. Once the coagulator device is primed, the base of the haemorrhoidal tissue is targeted and necrosis ensues. The subsequent healing of the mucosa leads to shrinkage of the piles and ulcer formation. Photocoagulation has been most commonly used for internal haemorrhoids, and it has been shown to be a superior technique to sclerotherapy with fewer complications (Walker et al, 1990).

Surgical options

Excision haemorrhoidectomy

Haemorrhoidectomy has remained the mainstay of all surgical procedures for symptomatic haemorrhoids of high grade or those that fail outpatient procedures. Although the exact details of the operation and its variants are beyond the scope of this review, haemorrhoidectomy has been shown to be the most effective treatment for haemorrhoids (MacRae et al, 2002). Originally described by Whitehead in the late part of the 19th century, its modification, the Milligan–Morgan operation (Milligan et al, 1937), was later reserved for prolapsing haemorrhoids of grade III and IV. The technique involves excision of the internal and external components of each haemorrhoid, leaving the skin open in a three-leaf clover pattern and allowing healing to occur by secondary intention (*Figure 5*).

Over the years newer and more efficient surgical procedures have been developed. The operation can be performed with either an open technique (as described above) or a closed technique in which the haemorrhoid component is excised and the wounds are sutured primarily (Ferguson et al, 1971). The theory behind the

Figure 5. End result of Milligan–Morgan haemorrhoidectomy, showing the clover leaf appearance.



closed or Ferguson haemorrhoidectomy was that this would lead to better healing, less scarring and pain. This technique has been shown to have better patient satisfaction and fewer long-term problems than the traditional open haemorrhoidectomy and, in particular, better anal continence (Milito et al, 2002). Diathermy haemorrhoidectomy and LigaSure (Valleylab, Boulder, Colorado, USA) haemorrhoidectomy are varieties of the operation that have the common theme of excising haemorrhoidal tissue, the latter using a specialized surgical instrument to minimize tissue trauma and confer faster wound healing. LigaSure haemorrhoidectomy has currently been shown to be more efficacious than conventional haemorrhoidectomy (Rowell et al, 2000).

Complication rates have traditionally been higher in operative than outpatient procedures, postoperative pain being the most common (although this is not necessarily the case with newer techniques) (Chand et al, 2007). A number of trials have attributed pain as the main factor preventing patients from an early return to normal life, and have suggested time-frames of between 2 and 4 weeks before patients return to work (Boccasanta et al, 2001; Hetzer et al, 2002; Johannsson et al, 2006). Other complications include urinary retention, sepsis, incontinence and anal stenosis (Devien and Pujol, 1989; Senagore et al, 1993).

Stapled anopexy

This operation has emerged as the optimal procedure for prolapsed haemorrhoids (grades III and IV) with encouraging results regarding postoperative recovery and a comparable complication rate to that of traditional haemorrhoidectomy (Sutherland et al, 2002). First introduced by Longo in 1998, stapled anopexy uses a stapling device that has been modified from the circular stapling instrument used for low rectal anastomoses (Longo, 1998). It involves circumferential excision of redundant mucosa, with reduction and fixation of prolapsed haemorrhoidal tissue. Not only does this procedure allow suspension of the prolapsing haemorrhoidal tissue back within the anal canal, it also interrupts the arterial inflow that traverses the excised segment. It does not, however, deal with skin tags when compared with excisional haemorrhoidectomy. This is an important point as in the authors' experience many patients regard their skin tags as actual haemorrhoids and feel they have not been adequately treated if their skin tags are still visible.

One of the largest single centre studies involving more than 3500 patients has shown stapled anopexy to be a safe and effective procedure with relatively few complications (Ng et al, 2006). The first major randomized controlled studies that compared this technique with traditional excision haemorrhoidectomy demonstrated decreased operative time, as well as decreased pain, and a subsequent quicker return to daily activities

(Ho et al, 2000; Mehigan et al, 2000; Rowsell et al, 2000). Most surgeons would perform this procedure under general anaesthetic, but trials of the use of local anaesthetic and mild sedation have been encouraging (Esser et al, 2004). It must be remembered that the operation is appropriate for grade IV and some grade III conditions but not for less severe haemorrhoids. Despite promising results from a number of trials, some important complications have been recorded including rectal perforation (Ripetti et al, 2002), and both retroperitoneal and pelvic sepsis (Maw et al, 2002). Furthermore, histological analysis of the surgical specimens of excised redundant mucosa have revealed fibres from the internal anal sphincter as well as the more proximal rectal wall (George et al, 2002). This could have potentially disastrous functional consequences.

Doppler-guided haemorrhoidal artery ligation

The newest treatment modality, and one that is gaining considerable popularity, is Doppler-guided haemorrhoidal artery ligation. Although essentially a surgical procedure, it is far less traumatic than traditional surgical options and does not involve the excision of haemorrhoidal tissue and its associated complications. This technique was first described more than a decade ago and involves the use of a specialized proctoscope coupled with a Doppler probe (Morinaga et al, 1995). It can be performed with or without general anaesthesia depending on the patient and clinical circumstances. It has been performed on all grades of haemorrhoids, but is thought to be most useful for grades II and III. The procedure works on the principle that arterial flow through local arteriovenous anastomoses maintains the haemorrhoidal mass. Ligating these vessels ultimately leads to haemorrhoidal shrinkage, with consequent reduction and cessation of bleeding.

Using the proctoscope to identify terminal branches of the superior rectal artery and haemorrhoidal artery, the surgeon subsequently ligates the vessels by placing haemostatic sutures (Figure 6). The patients are cautioned that bleeding will resolve over a period of up to 6 weeks. Early results have been promising, with satisfaction rates superseding all other modalities, complications reported as extremely low and success rates of almost 95% (Felice et al, 2005; Greenberg et al, 2006). However, it is important to note that this procedure is still in its infancy, and there are no longer-term studies available at present.

An even newer technique, which aims to act on grade IV haemorrhoids with rectal mucosa prolapse, is the Doppler-guided haemorrhoidal artery ligation recto-anal repair. It uses the same method as Doppler-guided haemorrhoidal artery ligation but additionally applies a vertical running suture, which retracts the prolapsed mucosa. Although there are no large series published on this treatment, it could potentially be a future rival to stapled anopexy.

The future

The resurgence of interest in the treatment of haemorrhoids has led to the introduction of more efficient variants of traditional techniques and novel surgical procedures aimed at increasing efficacy, reducing complications, promoting better healing and higher patient satisfaction. With greater understanding of the anatomy and pathophysiology of the condition, it may be possible to limit treatment to a few interventions relating directly to an appropriate classification system. It is highly improbable that there will be one all-encompassing optimal treatment modality for haemorrhoids, as the condition represents a spectrum of severity with different presentations. The important message is that whichever treatment is used, it must be safe and efficient. **BJHM**

Conflict of interest: none

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Figure 6. The Doppler-guided haemorrhoidal artery ligation technique.



KEY POINTS

- Haemorrhoidal disease is a common anorectal condition.
- Helpful clinical classification enables the most appropriate treatment modality to be offered.
- Treatment options range from simple dietary advice to haemorrhoidectomy.
- New techniques are being developed to minimize surgical complications while providing effective outcomes.
- There is no single universally-accepted management strategy for haemorrhoids.
- Prevention is still better than cure.

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