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The Treatment of Hemorrhoids in Unusual Situations and Difficult Circumstances

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The management of hemorrhoids varies widely based on disease severity and the individualized risks and medical history of each patient. Certain patients are particularly challenging for the surgeon, including those with pregnancy, immunosuppression from HIV/AIDS, portal hypertension, and inflammatory bowel disease. In general, almost all patients can be initially offered a conservative treatment regimen, including lifestyle and dietary modifications, improved perianal hygiene, and symptom relief. The indications for office-based procedures such as rubber band ligation, injection sclerotherapy, or infrared coagulation vary widely in these special groups of patients. Most therapies have not been well studied in the literature. Similarly, very little data exists pertaining to the safety and efficacy of operative hemorrhoidectomy in complex patients with hemorrhoidal complaints. Larger studies will be required before any additional conclusions can be reached regarding the optimal management of complex hemorrhoids. In the meantime, adopting a conservative approach and avoiding unnecessarily aggressive procedures will best serve surgeons and their patients.
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Hemorrhoids are subepithelial fibrovascular cushions located in the left lateral, right anterior, and right posterior positions within the anal canal.[1-4] These are typically associated with arteriovenous connections between branches of the superior rectal artery and the superior, middle, and inferior rectal veins. In addition, hemorrhoids comprise smooth muscle that suspends and provides bulk to the cushions within the anal canal. The precise role played by hemorrhoids in health is only poorly understood. It is believed that these vascular anal cushions provide approximately 15 to 20% of the resting anal pressure, contributing significantly to fecal continence and evacuation.[1]

The term "hemorrhoids" refers to anal cushions that swell, bleed, thrombose, and/or prolapse, hence causing clinical symptoms. While the true prevalence of symptomatic hemorrhoids is difficult to evaluate, studies have reported rates ranging from 4.4 to 36.4%.[5,6] The diagnosis of hemorrhoidal disease must be based on a thorough history and physical examination, including anoscopic evaluation of the anal canal. Rectal bleeding should never be solely attributed to hemorrhoids without first completely evaluating the remainder of the colon. Traditionally, hemorrhoids can be classified as internal or external, based on their origin proximal or distal to the dentate line, respectively. External hemorrhoids are covered by anoderm, and as such, are exquisitely sensate, whereas their internal counterparts are covered by insensate anorectal mucosa.

The management of hemorrhoids varies widely based on disease severity and the individualized risks and medical history of each patient. For the majority, conservative measures such as dietary and lifestyle modifications are sufficient therapy for hemorrhoidal disease. A variety of topical over-the-counter medications also exists for symptomatic relief and personal hygiene, although no randomized trials support their use in routine practice. In Europe and Asia, oral preparations of micronized, purified flavonoids have been used to treat hemorrhoidal bleeding, a practice supported by randomized studies.[7-9] At the present time, flavonoids are not approved for use in the United States by the Food and Drug Administration.[10] When conservative therapies fail, or when patients present with severe disease, increasingly invasive therapies are indicated. Such approaches include rubber band ligation, injection sclerotherapy, infrared coagulation, surgical hemorrhoidectomy, and stapled hemorrhoidopexy. While it is well beyond the scope of this review to discuss individual treatment modalities in detail, it should be emphasized that the indications for each approach varies based on patient characteristics and medical history. Certain patients are

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particularly challenging for the surgeon, including those with pregnancy, immunosuppression, portal hypertension, and inflammatory bowel disease. This review addresses the management of hemorrhoids in each of these special groups of patients.

Pregnancy

It is generally acknowledged that benign anorectal complaints, particularly hemorrhoids, are more common in pregnant women than in the general population.[3] Most patients who experience hemorrhoidal symptoms do so in the second and third trimester of pregnancy. Although there are no high-quality epidemiological studies assessing the incidence of hemorrhoidal disease in this group of patients, one can surmise that it is high. Indeed, referral rates for symptomatic hemorrhoids in obstetric care likely grossly underestimate the true burden of disease given the popular belief that hemorrhoids are a normal and expected part of pregnancy. In a survey conducted in a postpartum obstetrics unit in the United Kingdom, Simmons found that 26 of 68 women (38%) had problems with hemorrhoids during pregnancy.[11] Up to one third of women reported experiencing this problem for the first time. More recently, Abramowitz and colleagues conducted proctologic examinations on 165 women within 3 months of delivery and in the immediate postpartum phase.[12] This study focused solely on anal fissures and thrombosed external hemorrhoids. Among third trimester mothers, the authors reported a total of 13 cases of thrombosed external hemorrhoids (7.9%), compared with 33 cases (20%) in the postpartum period, of which 72.7% were found in women with no antepartum evidence of hemorrhoidal disease. Importantly, over 90% of cases of postpartum thrombosed external hemorrhoids were identified during the first day after delivery.

The pathogenesis of hemorrhoids during pregnancy is similar to that of nonpregnant adults. However, several functional and physiological factors predispose pregnant women to hemorrhoidal disease. One such factor, constipation, is known to be both more common and more severe in this group of patients. It is estimated that 11 to 38% of pregnant women in the United States suffer from this problem.[13] Increased levels of progesterone and estrogen hormones, as well as depressed levels of motilin, have been associated with slowed gastrointestinal transit time at the smooth muscle level, and hence, constipation. This phenomenon is also aggravated by poor fluid intake, iron supplementation, decreased activity levels, psychological stress, as well as mechanical compression by the enlarging gravid uterus.[13] Other physiological changes of pregnancy influence the incidence of hemorrhoidal disease, including increased pelvic floor connective tissue laxity, as well as increased venous congestion. In pregnancy, increased venous congestion is thought to be associated with mechanical compression of the superior rectal veins, venous smooth muscle relaxation related to progesterone, and an overall increase in blood circulating volume of 25 to 40%.[13-15]

Symptomatic hemorrhoids in pregnancy typically present with intermittent bleeding, pain, anal irritation, and pruritus.[14] Although hemorrhoidal disease is the commonest anorectal pathology encountered in pregnant patients, other worrisome disorders such as inflammatory bowel disease and carcinoma of the colon, rectum, or anus must be excluded in patients presenting with rectal bleeding.[15] Colonoscopy and sigmoidoscopy are considered safe in pregnant patients but should be used selectively as these patients are usually younger and less likely to harbor more ominous pathology.[12,14,16]

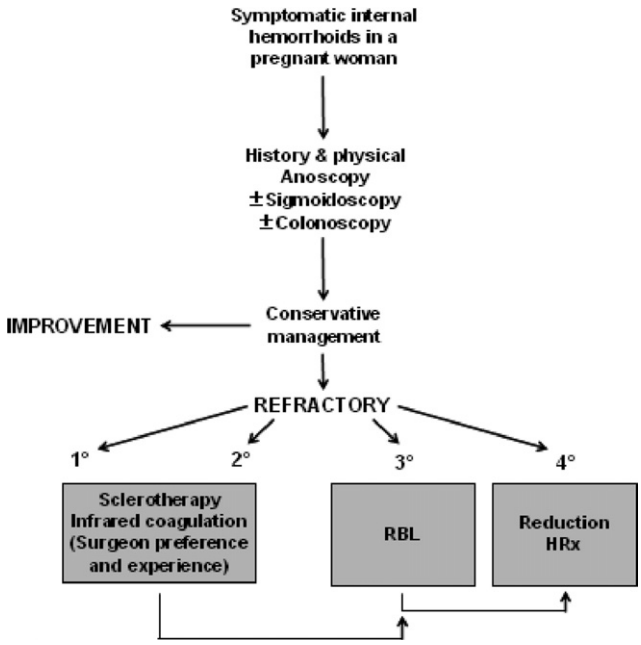

Figure 1 Management algorithm of symptomatic internal hemorrhoids in pregnant patients. HRx, Hemorrhoidectomy; RBL, rubber band ligation.

The management of symptomatic hemorrhoids in the pregnant patient must be individualized to the type of hemorrhoid and degree of severity of symptoms (Fig 1). As well, the gestational age is of relevance in planning surgical therapies. For all patients, initial management of symptomatic hemorrhoids includes lifestyle and dietary modifications. Specifically, the pregnant patient should be encouraged to drink copious quantities of fluids and to consume a high-fiber diet. Fiber supplementation, psyllium seeds, and stool softeners may also be recommended.[15] Patients taking iron supplements ought to be switched to slow-release formulations, in an effort to minimize constipation. For uncomplicated external hemorrhoids, frequent warm sitz baths are of benefit. Excellent perianal personal hygiene cannot be overemphasized. For minor symptomatic relief, over-the-counter topical anesthetic ointments as well as hydrocortisone-based creams may help alleviate pruritus and pain, although their use is not supported by randomized studies. It is best to avoid anesthetic ointments containing epinephrine or phenylephrine in pregnant patients.[13]

External hemorrhoids in pregnant patients are best managed conservatively using the measures outlined above, unless the patient develops acute thrombosis. The natural history of thrombosed external hemorrhoids is such that pain

usually diminishes spontaneously over several days without treatment.[1] For those patients experiencing some degree of improvement in their symptoms, conservative measures may be all that is needed. Occasionally some pregnant patients will develop refractory symptoms and excision of the thrombosed hemorrhoid under local anesthesia is indicated.[13,14] Patients must be adequately counseled and must understand that the degree of pain associated with surgical excision is sometimes greater than that of thrombosed hemorrhoids, particularly after 72 hours.[1] Incision of the thrombosed hemorrhoid and clot removal leads to rapid symptomatic improvement, although it is not optimal therapy as it can lead to subcutaneous hemorrhage and recurrent thrombosis.[1,13,15]

Uncomplicated internal hemorrhoids in pregnancy are generally managed satisfactorily with conservative measures alone. For complicated cases, or for those patients who fail to respond to simple therapies, office-based or operative procedures may become necessary. Injection sclerotherapy is one such option in the pregnant patient. This procedure is performed by injecting 5% phenol in almond oil, quinine, urea hydrochloride, or hypertonic saline into the submucosal base of the internal hemorrhoid.[1] This leads to the formation of fibrosis within the hemorrhoid as well as intravascular thrombosis, thus reducing the severity of prolapse. Injection sclerotherapy can be used in pregnant women with first- or second-degree hemorrhoids. Active inflammation, ulceration, evidence of infection, concomitant anal disease and fistulas, anal tumors, and anal fissures are contraindications to sclerotherapy.[1] As well, it should be noted that there is very little literature assessing the safety and efficacy of this procedure in pregnant patients. We are aware of one older published series in which the author reported an 86% success rate in relieving hemorrhoidal symptoms in 28 pregnant patients.[17] No complications were reported and six patients required additional treatment within a 30-month follow-up period.

Infrared coagulation is another office-based procedure that can be utilized to treat first- and second-degree hemorrhoids that fail conservative management. This method employs infrared light to coagulate the hemorrhoid, thus creating sclerosis and fibrosis.[1] It is generally very well tolerated and is associated with less postprocedural pain than rubber band ligation.[18] That being said, its use has not been studied in pregnant patients. Although some authors utilize infrared coagulation as first-line therapy in pregnant women who fail to respond to conservative measures, its safety and efficacy remains theoretical and is based entirely on data obtained in nonpregnant patients.[14]

Rubber band ligation involves placement of a band just proximal to the base of the internal hemorrhoidal pedicle. This procedure is typically advocated for first-, second-, and third-degree hemorrhoids. It can be associated with a certain degree of postprocedural pain, although this complication can be minimized by limiting the number of hemorrhoids banded in one sitting. Other complications of rubber band ligation include delayed hemorrhage, band slippage, pelvic sepsis, and in rare cases, Fournier's gangrene.[1] In one meta-analysis by MacRae and McLeod, the authors concluded that rubber band ligation was associated with fewer complications than hemorrhoidectomy, although the latter provided greater symptomatic relief.[19] In pregnancy, several authors advocate the use of rubber band ligation as a simple office-based procedure to treat hemorrhoids that are refractory to conservative therapies.[13-15] Once again, no studies exist to support this practice, but this procedure appears to be a reasonable bridge between initial simple supportive measures and surgical hemorrhoidectomy. The relative value of infrared coagulation and rubber-band ligation in pregnant patients is difficult to assess, although one could argue that the small risk of pelvic sepsis and necrotizing infections associated with rubber band placement favors infrared coagulation as first-line therapy in pregnant patients. In light of the lack of published data, the optimal procedure for pregnant women who do not respond to conservative measures should be based on the degree of experience and comfort of the treating surgeon.

In pregnant women for whom hemorrhoidal disease is associated with severe prolapse and incarceration, intractable bleeding or pain, and/or failure of office-based procedures, surgical hemorrhoidectomy may become indicated.[2,3,13-15] For hemorrhoidectomy performed in the second or third trimester, the patient should be positioned in the left anterolateral position using local anesthesia with intravenous neuroleptic sedation. Some data exist in the literature supporting this approach in very select patients. Indeed, Saleeby and colleagues have reported their experience with 12,455 pregnant women who delivered at their medical center.[20] Of those, 25 (0.2%) underwent surgical hemorrhoidectomy for acute hemorrhoidal crises. All but three of these patients were in their third trimester of pregnancy, and all procedures were performed under local anesthesia with sedation. All but one patient experienced symptomatic relief within 24 hours. There were no maternal or fetal complications from the procedures, except for one patient who required rectal packing for a postoperative hemorrhage at 6 hours. At a mean follow-up of 30 months, 24% of women required further treatment for symptomatic hemorrhoidal disease.

For patients experiencing acute hemorrhoidal crises during delivery, hemorrhoidectomy in the immediate postpartum period is advocated.[3] Ruiz-Moreno demonstrated the safety and efficacy of hemorrhoidectomy in 90 women with acute hemorrhoids on postpartum days 0 to 4.[21] Indeed, there we no reported complications and none of the patients who subsequently went on to other pregnancies reported experiencing other anorectal problems. Schottler and coworkers also studied a cohort of 98 women undergoing hemorrhoidectomy in the immediate postnatal period, of which only 3.1% experienced minor postoperative complications.[22] Finally, it is worth noting that Stage IV hemorrhoids in the immediate postpartum period can be injected with a mixture of 1% xylocaine and hyaluronic acid to assist in manual reduction back into the anal canal.

HIV/AIDS Infection

The management of hemorrhoidal symptoms in immunocompromised patients is complex and challenging. Tradi-

tionally, surgeons have avoided operating or offering aggressive therapies for hemorrhoids to patients with depressed immune function for fear of severe septic complications and poor wound healing.[4] Individuals with human immunodeficiency virus (HIV) infection or the acquired immunodeficiency syndrome (AIDS), as well as certain malignant conditions such as leukemia or lymphoma, are groups of patients that have been best studied in the literature. Transplant recipients on systemic immunosuppression, chronic steroids usage, diabetes, as well as critically ill patients also have relative degrees of immune suppression, although the management of hemorrhoidal complaints in these patients has not been studied extensively.

HIV seropositivity and AIDS represent a considerable burden of disease worldwide. In North America alone, it is estimated that approximately one million people are living with HIV.[23] Within this cohort of patients, disorders of the rectum and anus are common, particularly in males practicing anoreceptive intercourse. The prevalence of anorectal pathology among HIV-positive homosexual males has been previously estimated to be 5.9 to 34%.[24,25] In contrast, the prevalence of anorectal diseases is known to be as low as 3% among HIV-positive patients infected following intravenous drug abuse.[26] Interestingly, anorectal pathology has been reported to be the most common reason for surgical intervention among HIV-positive patients.[24] More recently, Gonzalez-Ruiz and colleagues have attempted to determine whether the prevalence of anorectal disorders in HIV-positive patients has changed since the widespread introduction of highly active antiretroviral therapy (HAART).[27] The authors of this study compared two groups of patients referred to their HIV clinic for anorectal problems before and after the routine use of HAART (117 "early" versus 107 "late" patients). In comparing these two cohorts of patients, the authors found no difference in the prevalence and distribution of anorectal disorders following the introduction of HAART. While surprising, these data may be attributable to the high proportion of men having sex with men within their two cohorts, considering that these patients are the most likely to develop HIV-associated anorectal disease.

In two series of HIV-positive patients presenting to colorectal surgery clinics with anorectal complaints, the most commonly encountered symptoms included pain (55-57%), the presence of a mass (19-28%), bleeding (12-16%), mucoid or purulent discharge (11%), and severe pruritus (6%).[28,29] Up to 24% of patients had at least two symptoms. Overwhelmingly, the most commonly diagnosed pathology is anal condyloma, found in 38 to 43% of HIV-positive patients with anorectal complaints.[24,28,29] Other common disorders included anorectal ulcers, fistulas, fissures, and abscesses. Across series, 2 to 14% of patients were found to have anal neoplastic disease, including Kaposi's sarcoma, non-Hodgkin's lymphoma, and squamous cell carcinoma.[24,28-30] The colorectal surgeon evaluating HIV-positive patients with new anal symptoms must maintain a high degree of suspicion for malignant disease, as many of these can present subtly, often resembling other benign pathologies.[31,32] Certain authors advocate taking biopsies from all HIV-positive patients with anorectal symptoms, including mucosal sampling.[30] Finally, hemorrhoidal disease was reported in 6 to 17% of patients presenting for surgical evaluation of anorectal symptoms.[24,28,29,33] The clinician should be aware that the prevalence of hemorrhoids among HIV-positive patients is likely not increased compared with that of the general population, and that the appearance of acute hemorrhoidal crises is in fact often related to anorectal herpes simplex virus infection.[34]

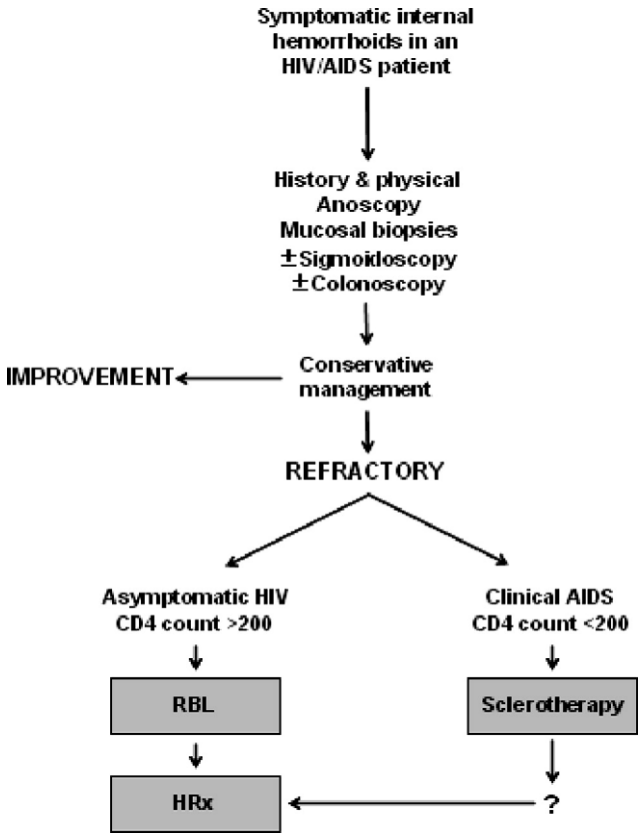

Figure 2 Management algorithm of symptomatic internal hemorrhoids in HIV/AIDS patients. AIDS, acquired immunodeficiency syndrome; CD4, CD4 helper-T cell count; HIV, human immunodeficiency virus; HRx, hemorrhoidectomy; RBL, rubber band ligation.

The initial management of hemorrhoidal disease in individuals with HIV/AIDS is identical to that of otherwise healthy patients. Conservative measures are indicated in this group of patients and should be aggressively utilized, whether or not the surgeon is planning to offer other operative treatment modalities. The decision to offer rubber band ligation, injection sclerotherapy, infrared coagulation, or surgical hemorrhoidectomy to HIV-positive patients with hemorrhoids must be considered carefully (Fig 2). Indeed, a number of reports exist in the literature describing extremely poor outcomes within this group of patients, including severe pelvic and systemic septic complications.[25,35-37] Above and beyond infectious complications, concerns over poor wound healing can be found in the literature.[25,30,33]

Wound healing following surgery in HIV/AIDS patients has been studied extensively in a number of anorectal conditions and has been extrapolated to procedures for hemorrhoidal disease. Wexner and colleagues have reported one of

the earliest series of HIV/AIDS patients undergoing anorectal surgical procedures.[25] Among 51 patients who underwent 73 anorectal procedures, the authors reported an 88% rate of poor wound healing at 30 days after surgery, in addition to a 16% rate of major morbidity. Since its publication in 1986, this series has often been quoted in support of a very cautious approach to anorectal disorders in HIV-positive patients. More recently, Lord reviewed the records of 101 HIV-positive patients who underwent 161 anorectal operations.[30] Within this group, 72% of patients were described as having AIDS, with a median CD4 count for the series of 101 cells/μL. Overall, only 40% of wound healing was completed at 3 months postoperatively. Low CD4 counts—particularly counts $<$50 cells/μL—were significantly associated with poor wound healing, whereas stage of HIV illness, albumin level, and patient age were not. In contrast, other series of anorectal surgery in HIV/AIDS patients have reported somewhat more encouraging results. Indeed, Consten and coworkers reported inadequate wound healing in 17% of HIV-positive patients, with poorer outcomes being associated with low CD4 counts and with specific types of pathologies (perianal abscesses, fistulas, anorectal ulcers, and malignancies).[33] Similarly, Nadal and colleagues compared 31 HIV-positive patients with 29 HIV-negative patients undergoing anal fistulotomy.[38] The authors of this study reported comparable wound healing outcomes between the two groups, except among patients with AIDS and CD4 counts $<$200 cells/μL who faired significantly worse with a 70% nonhealing rate. Across most studies, the 30-day perioperative mortality rate associated with anorectal surgery in HIV-positive patients is low at 0 to 2%.[28,33,39]

There is a paucity of high-quality literature evaluating the safety of office-based and operative procedures in HIV/AIDS patients with hemorrhoidal complaints. However, in light of case reports from the 1980s describing disastrous outcomes in HIV-positive patients, it is generally believed by many surgeons that rubber band ligation is contraindicated in this group of patients. That being said, the increasingly widespread use of HAART since the mid-1990s has changed the nature of HIV infection from rapidly and uniformly fatal to chronic. As such, some authors have suggested that anorectal procedures, particularly office-based hemorrhoidal therapies, be offered to patients with stable HIV infection and adequate CD4 counts.[28,40] Moore and Fleshner have described their experience with 11 HIV-positive patients who underwent single-hemorrhoid rubber band ligation between 1993 and 2000.[41] All patients had asymptomatic HIV disease with relatively high median CD4 counts of 450 cells/μL. Patients with AIDS were specifically excluded from this study. Interestingly, no deaths or complications were reported in any of the study patients, in addition to complete symptomatic resolution in 73% of patients. The data reported in this small series seem to support the view that rubber band ligation may be safe and effective in highly selected patients with asymptomatic HIV and moderately high CD4 counts. In contrast, Scaglia and colleagues have studied 22 patients with second- to fourth-degree hemorrhoids treated with injection sclerotherapy.[42] Most patients in this series had clinical AIDS, with median CD4 counts of 40 cells/μL and overall poor general health condition. Nevertheless, the authors were able to control the patients' symptoms in 86% of cases after a single injection, while three patients required additional treatments. Importantly, no deaths or complications were reported. Based on this series, injection sclerotherapy may be an attractive alternative for patients with advanced HIV or AIDS who fail conservative management.

The use of surgical hemorrhoidectomy in HIV/AIDS patients must be considered carefully. To our knowledge, only two studies exist in the literature detailing outcomes in these patients. Hewitt and colleagues compared the charts of 27 HIV-positive and 30 HIV-negative patients who had undergone open hemorrhoidectomy following failure of conservative management and office-based procedures.[43] In this study, the cohort of HIV-positive patients had a moderately high mean CD4 count of 301 $\pm$ 48 cells/μL, but up to 81% of these patients met laboratory or clinical criteria for AIDS. Despite this relatively advanced disease stage, the authors found no significant differences in overall complication rates between HIV-positive and HIV-negative patients (19% versus 33%, P = NS), in addition to comparable mean wound healing times between the two groups (6.8 $\pm$ 0.5 versus. 6.6 $\pm$ 0.5 weeks, P = 0.8). Interestingly, wound healing times were not adversely affected in patients with CD4 counts $<$200 cells/μL. No perioperative deaths were reported. The authors of this report concluded that HIV status should not affect whether a patient with symptomatic hemorrhoids is offered a surgical hemorrhoidectomy. In contrast, Morandi and coworkers compared prospectively collected data from 48 HIV-positive patients who underwent closed hemorrhoidectomy with 20 age- and gender-matched controls from their general database.[44] Within the cohort of HIV-positive patients, up to one-third had AIDS, with significantly lower mean CD4 counts than their asymptomatic HIV-positive counterparts (98.4 versus 351 cells/μL, $P < 0.01$), as well as high HIV RNA loads (mean 71,929 copies/mL). Overall, there were no deaths in this report, but the rate of postoperative local and general complications differed significantly between AIDS, HIV-positive, and control patients (87.5, 22, and 5%, respectively). As well, healing time was significantly adversely affected by HIV and AIDS status, with only 66% of asymptomatic HIV-positive patients and 0% of AIDS patients having healed their wounds completely by 14 weeks postoperatively. In contrast, all control patients had healed their wounds completely by the same time. The presence of wound infection as well as poor Karnofsky performance status—a validated assessment tool in HIV patients—were both associated with poor wound healing. Thus, this controlled case series appears to contradict the data reported by Hewitt and colleagues in that patients with AIDS undergoing closed hemorrhoidectomy had a significantly worse outcome than did healthy controls or patients with asymptomatic HIV infection.[43,44] In light of the fact that all currently available reports in the literature are small case series describing the experience of individual surgeons or colorectal surgery clinics, care must be exercised in performing hemorrhoidecto-

mies in patients with HIV. In those patients who fail conservative measures, surgical options may be offered to patients with asymptomatic HIV infection, including rubber band ligation. On the other hand, patients affected by advanced AIDS are most likely to benefit from injection sclerotherapy. Further randomized studies are necessary before more definitive conclusions can be reached.

Portal Hypertension

The distinction between hemorrhoids and anorectal varices in patients with portal hypertension causes much confusion among clinicians. As is well understood, the superior rectal vein drains the upper rectum into the portal circulation via the inferior mesenteric vein (IMV), whereas the middle and inferior rectal veins drain the middle rectum and upper anal canal, respectively, into the systemic venous circulation by way of the internal iliac vein. As such, anorectal varices—quite similarly to esophageal varices—constitute a known collateral decompression pathway for the portal circulation under conditions of hypertension.[45] On the other hand, hemorrhoids constitute vascular cushions that line the anal canal and are anatomically distinct from anorectal varices.[46] The two pathologies can coexist in the same patients. Despite belief to the contrary, there is no good evidence in the literature suggesting an increase in the prevalence of hemorrhoidal disease in patients with portal hypertension and cirrhosis.[3,4,45]

Several endoscopic studies conducted in patients with portal hypertension and cirrhosis have attempted to further define the relationship between anorectal varices, hemorrhoids, and portal hypertension. Overall, the prevalence of anorectal varices among patients with portal hypertension has been estimated to be 40 to 89%.[45,47-50] Hosking and colleagues examined 100 consecutive patients with newly diagnosed cirrhosis, or with initial bleed or rebleed from gastrointestinal sources related to portal hypertension.[45] The authors reported that 44% of patients had anorectal varices, the proportion of which rose from 19% in cirrhotic patients without portal hypertension, to 59% among those with esophageal varices and a more significant degree of portal hypertension. In contrast, hemorrhoids were not found to be associated with portal hypertension, and as such, were felt to be distinct from anorectal varices in these patients. These data are supported by another study by Wang and coworkers who prospectively compared 103 cirrhotic patients with an equal number of healthy controls.[47] This group identified a 43% rate of anorectal varices in cirrhotic patients, compared with 2% in healthy controls ($P < 0.001$). Interestingly, there did not appear to be a relationship between anorectal varices in these patients and the hepatic venous pressure gradient. Importantly, the authors found no significant differences between the two groups in the prevalence of hemorrhoids (79% versus 83%, $P > 0.05$). Finally, another prospective study by Misra and colleagues reported rates of anorectal varices of 40 and 0%, and rates of hemorrhoids of 36 and 40% among patients with and without cirrhosis, respectively.[49] These studies and others confirm that no relationship exists between anorectal varices and hemorrhoids in patients with portal hypertension and cirrhosis.

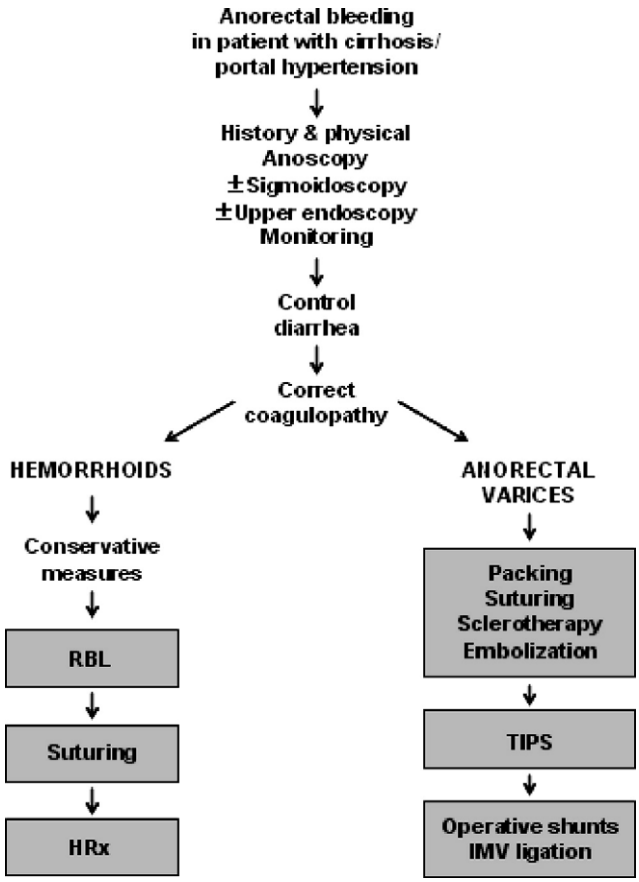

Figure 3 Management algorithm for bleeding hemorrhoids or anorectal varices in patients with portal hypertension/cirrhosis. HRx, hemorrhoidectomy; IMV, inferior mesenteric vein; RBL, rubber band ligation; TIPS, transjugular intrahepatic portosystemic shunt.

The management of hemorrhoidal symptoms in patients with liver disease and portal hypertension is not unlike that of healthy patients (Fig 3). As described earlier, conservative measures are recommended for all patients with portal hypertension and hemorrhoidal disease. In this group, special attention must be paid to symptoms of rectal bleeding.[3] Indeed, many patients with portal hypertension who are concurrently treated for encephalopathy using nonabsorbable osmotic agents have varying degrees of diarrhea, and as such, exacerbation of hemorrhoidal bleeding. Repeated bouts of diarrhea can break down the anal mucosa overlying a hemorrhoidal cushion and thus lead to potentially significant hemorrhage. As such, relative control of the patient's bowel habits is an integral part of hemorrhoidal management in patients with liver disease. In addition, many patients with portal hypertension and cirrhosis have varying degrees of coagulopathy, thus worsening the hemorrhagic picture. The surgeon treating hemorrhoids in patients with liver disease must be very mindful of the patient's coagulopathy and take appropriate steps to correct it, particularly when bleeding fails to respond to conservative measures. No procedures for hemorrhoidal disease should ever be undertaken in patients

with liver disease without first correcting their coagulopathy. Finally, for patients who fail to respond to conservative measures, including control of the diarrhea and coagulopathy, very few additional therapeutic options have been described in the literature. One group recently reported performing rubber band ligation in 16 patients with portal hypertension and cirrhosis, within a greater cohort of 500 healthy patients.[51] All procedures in this series were performed on an outpatient basis without anesthesia except for 6 of the 16 patients with liver cirrhosis who were hospitalized preventively. The authors reported no data specific to those cirrhotic patients, except to say that there were no postoperative complications. Nivatvongs also described an alternative method to control significant hemorrhoidal bleeding in patients with portal hypertension.[3,52] Indeed, he has reported identifying the bleeding hemorrhoid under direct anoscopic examination and administering a local anesthetic with epinephrine. The area of hemorrhage can then be controlled using a deep figure-of-eight synthetic absorbable suture through the mucosa, submucosa, and internal sphincter. Rebleeding is possible after a few days and may warrant further suturing. For severe cases refractory to these practices, hemorrhoidectomy may have to be performed, although no recent literature exists to support it.

In light of the high prevalence of anorectal varices in patients with portal hypertension, the surgeon must exercise extreme care in determining that the patient's symptoms are in fact related to hemorrhoids, particularly as it pertains to bleeding. Certain authors have argued that cases of massive hemorrhage originally attributed to hemorrhoids were in fact likely related to anorectal varices.[53] In addition, upper gastrointestinal causes of bleeding must always be excluded in patients with portal hypertension who present with hemorrhage, as esophageal varices remain much more common than their anorectal counterpart. Careful anoscopic examination is warranted in patients with portal hypertension and anorectal bleeding. Under direct visualization, anorectal varices differ from hemorrhoids in that they appear as bluish or gray tortuous, saccular submucosal veins. These are always found within the squamous epithelium portion of the anal canal and frequently extend into the columnar mucosa more proximally across the dentate line. Occasionally, anorectal varices can be seen extending superiorly into the distal rectum on proctoscopy, whereas hemorrhoids do not occur in the rectum.

Bleeding from anorectal varices is rare. Across multiple series, massive bleeding has been reported in very few patients, although its true incidence may be underestimated. In their series of 100 patients, Hosking and coworkers described two patients with portal hypertension and bleeding anorectal varices (2/100, 2%),[45] whereas Chawla and Dilawari found only one such case within their cohort of 72 patients (1/72, 1.4%).[48] In another series, Johanson and colleagues reported five cases among 1100 studied patients (0.45%).[54] While rare, hemorrhage from anorectal varices associated with portal hypertension may be massive and life-threatening. Once recognized by the surgeon, bleeding anorectal varices should not be treated like simple hemorrhoids. That being said, there are no good studies or guidelines addressing this difficult clinical problem. Conservative measures should initially be instituted, including adequate monitoring, endoscopic sclerotherapy, anorectal packing, and potentially under-running the varices with sutures.[55] Hosking and Johnson have reported their experience with 13 consecutive patients.[53] This group advocates operating on all patients with bleeding anorectal varices, whether or not the bleeding ceases spontaneously, given that in their experience most patients will have recurrence of bleeding within 6 months. Hosking and Johnson recommend oversewing the bleeding varices under direct visualization using a locking continuous absorbable suture, starting as proximal as possible and running to just outside the anus. This technique appears effective in this group's hands, although it is associated with significant pain postoperatively and may not be readily available everywhere.

Transjugular intrahepatic portosystemic shunting (TIPS) has recently been employed to treat bleeding anorectal or stomal varices in patients with portal hypertension.[56-60] This technique is known to be efficacious in cirrhotic patients with gastroesophageal varices,[61,62] and to be available in most interventional radiology departments. Katz and colleagues first reported the use of TIPS in managing a patient with bleeding anorectal varices.[56] In that case, TIPS successfully stopped the bleeding, as evidenced clinically and by endoscopic visualization of the decompressed variceal veins. Shibata and coworkers reported their own experience with TIPS in treating bleeding ectopic varices in patients with portal hypertension.[59] In this study, 12 patients with anorectal and stomal varices ($n = 7$ and $n = 5$, respectively) were described as having significant hemorrhage, with a mean transfusion requirement of 6.7 units of packed red blood cells. In all 12 patients, the bleeding completely resolved following TIPS insertion, with mean portosystemic pressure gradients decreasing from 17.4 ± 3.1 to 5.8 ± 1.8 mm Hg ($P < 0.05$). Three patients had worsening encephalopathy following the procedure, and four patients re-bled within 1 to 11 months, only two of which were bleeding from the original variceal site. Only one patient experienced TIPS-related complications, including shunt thrombosis and intraabdominal bleeding. In light of these successful results and the experience obtained with TIPS placement for gastroesophageal varices, certain authors have argued that this procedure is ideally suited for patients with refractory hemorrhage for anorectal varices, particularly when liver transplantation is being considered.[63] Finally, a variety of case reports have been published describing operative procedures for patients with severe hemorrhage from anorectal varices who fail conservative management using packing, variceal ligation, sclerotherapy, selective embolization, or TIPS. Many of these operative options are last resort procedures for patients with uncontrollable hemorrhage and most likely require the expertise of a vascular surgeon. Rahmani and coworkers described a patient who underwent a distal inferior mesenteric vein to renal vein shunt procedure.[64] This was well tolerated and controlled the bleeding in this patient. On the other hand, Yeh and McGuire have described a case in which they were un-

able to carry out an open portacaval H shunt and instead decided to ligate the inferior mesenteric vein below the pancreas.[65] This maneuver led to the complete cessation of bleeding and disappearance of the varices. It should be noted that there is a potential risk of worsening the patient's portal hypertension with this procedure, which should be limited to patients who fail shunting. Thus, in order of importance, the treatment of bleeding anorectal varices should include conservative measures such packing and endoscopic sclerotherapy, under-running of the varices under direct visualization using sutures, TIPS procedure, and operative vascular procedures such as portosystemic shunts, ligation of the IMV or IMV to renal vein shunt (Fig 3).

Inflammatory Bowel Disease

The prevalence of hemorrhoids in patients with inflammatory bowel disease (IBD) is equivalent to that of the general population. In patients suffering from Crohn's disease, approximately one-third will exhibit perianal or anorectal symptoms, a well-described extra-intestinal manifestation of this disorder.[66] Many patients will have external skin tags related to their perianal Crohn's disease which are often mislabeled as hemorrhoids. On the other hand, patients with ulcerative colitis (UC) do not typically display any perianal symptoms. Within these two heterogeneous groups of patients, hemorrhoidal disease is mostly uncommon, but symptomatic flare-ups can be exacerbated by diarrhea and anorectal inflammation. The diagnosis and management of hemorrhoidal symptoms in patients with IBD require judicious assessment by an experienced colorectal surgeon. Given the relatively frequent use of corticosteroids and/or immune suppressing medications in IBD, care must be exercised in managing patients with these disorders.

There is currently a paucity of data in the literature addressing the management of hemorrhoids in patients with UC and/or Crohn's disease. To our knowledge, only two such studies exist. In the first one, Jeffery and colleagues reviewed retrospectively the records of patients with UC (n = 42) and Crohn's disease (n = 20) treated for hemorrhoidal complaints at St. Mark's Hospital in London from 1935 to 1975.[67] These patients were retrieved from a greater pool of 50,000 individuals treated for hemorrhoids during the same period. Within the cohort of patients with UC, 58 courses of conservative and operative treatment resulted in only four reported complications, whereas patients with Crohn's disease experienced 11 complications of a total of 26 courses of treatment. The rate of severe complications was much higher in Crohn's disease with 30% (n = 6) of patients requiring proctectomy for intractable anal fistulas, compared with only 2.4% (n = 1) within the UC group. The authors of this study concluded that active treatment of hemorrhoidal complaints in patients with Crohn's disease ought to be contraindicated, whereas therapy in UC patients was deemed safe. More recently, Wolkomir and Luchtefeld reviewed their own experience with hemorrhoidectomy among 17 patients with Crohn's disease and hemorrhoidal symptoms refractory to conservative management.[68] The mean total described follow-up was 11 years and 5 months. The authors of the this study reported that 88% (n = 15) of wounds healed satisfactorily within 2 months of surgery, with one of these patients requiring proctectomy for an unrelated anal fissure 15 years after his procedure. Of note, none of the 17 patients described in this report had active Crohn's disease, which likely explains the superiority of the outcomes reported by this group compared with Jeffery and colleagues.

In summary, the management of symptomatic hemorrhoids in patients with IBD requires persistence with conservative measures. Based on the very limited body of data available in the literature, it appears safe to treat hemorrhoids in patients with UC using office-based procedures such as banding or hemorrhoidectomy for those who fail simple measures. In Crohn's disease, operative procedures should be avoided, given the risk of poor healing and fistula formation. When unavoidable, hemorrhoidectomy should be performed in select patients with quiescent disease and with antibiotics prophylaxis.[2,69]

Summary

The management of hemorrhoids in pregnancy, immunocompromised states such as HIV/AIDS, portal hypertension, and IBD is challenging. Such patients are best treated by a surgeon with expertise in managing complex hemorrhoidal disease. In general, almost all patients can be initially offered a conservative treatment regimen, including lifestyle and dietary modifications, improved perianal hygiene, and symptom relief. The indications for office-based procedures such as rubber band ligation, injection sclerotherapy, or infrared coagulation vary widely in these special groups of patients. Most therapies have not been well studied in the literature. Similarly, very little data exist pertaining to the safety and efficacy of operative hemorrhoidectomy in complex patients with hemorrhoidal complaints. Larger studies will be required before any additional conclusions can be reached regarding the optimal management of complex hemorrhoids. In the meantime, adopting a conservative approach and avoiding unnecessarily aggressive procedures will best serve surgeons and their patients.

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