



# Sclerotherapy in Hemorrhoids

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## Abstract

Injection sclerotherapy for all grades of interhemorrhoids in various situations and co-morbidities has become popular method of treatment. Several types of surgical operations both conventional and stapled hemorrhoidectomy has many and serious described side effects. On the contrary, proctoscopic injection sclerotherapy using some of the modern sclerosants and thin bore needle injections is an office-based ambulatory method of treatment of internal hemorrhoids; it is low in cost, devoid of any major complications besides it is quite successful as reported. Its safety and efficacy has been published in recent years. This manuscript is a result of thorough systemic review using PRISMA guidelines on various sclerosing agents, their merits and demerits, methods of administration, and outcome in internal hemorrhoids.

**Keywords** Hemorrhoids · Injection sclerotherapy · Endoscopic · Complication

## Introduction

Sclerotherapy was first used for hemorrhoids by Blanchorde in 1928, but was gradually replaced due to severe complications. Subsequently, sclerotherapy therapy gradually became mature in a clinic. Injection sclerotherapy can be operated under the condition of observing the panorama of hemorrhoids, which is conducive to reducing complications. Endoscopic injection sclerotherapy (EIS) is one of the most prominent, cost-effective, and commonly used treatments for internal hemorrhoids. Endoscopic retrograde sclerosis for internal hemorrhoids is technically well tolerated, with high patient satisfaction, low complication rate, and satisfactory long-term results. Endoscopically, patients with internal hemorrhoids can be diagnosed and treated simultaneously, reducing the cost to the patient and the demands on the medical staff [1]. Cap-assisted endoscopic sclerotherapy (CAES) is an endoscopic technique for the treatment of internal hemorrhoids that has emerged in recent years [2]. Different technical approaches were developed mainly to improve efficacy and safety. Hemorrhoids are a normal structure consisting of

blood vessels, connective tissue, smooth muscle, and overlying epithelial tissue. There are four lines on the surface of the anal canal, namely the anal margin line, the Hilton line, the dentate line, and the anorectal line. Under the endoscope, the endoscopist can identify the dentate line and the anorectal line, and the area between them, called the anal column area, in which the internal hemorrhoid area is also located. Pathological congestion of the vascular cushion is one of the most important pathogenic mechanisms of internal hemorrhoids. Internal hemorrhoids are located near the dentate line and are innervated by visceral nerves, so discomfort is evident [3]. Hemorrhoids are the most common anorectal disorder, with 98% of patients with anorectal disease having hemorrhoid symptoms [4]. In the USA, \$350 million to \$2.5 billion is spent annually on hemorrhoidal disease, and the diagnosis and treatment of hemorrhoids has become a multi-billion dollar industry [5, 6].

## Injection Sclerotherapy

### Indications and Contraindication

The indications of sclerotherapy for hemorrhoids included patients with symptomatic hemorrhoids, especially when bleeding is present, patients with a high risk of secondary hemorrhage, patients with AIDS, and contraindication are patients with thrombosed hemorrhoids; cardiac, hepatic,

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renal, or hematological diseases; and people with asthma, allergic predisposition, thrombophilia, or inflammatory bowel disease [7, 8].

### Sclerotherapy for Hemorrhoids

Different sclerosants have their own advantages and disadvantages and are not identical in treatment. Aluminum potassium sulfate and tannic acid (ALTA) is obviously more useful than phenol in almond oil (PAO) for injection sclerotherapy; ALTA was more effective than PAO in hemostatic [9]. In a study comparing 3% polidocanol and 5% phenol, polidocanol needs less treatment frequency and higher patient satisfaction [10]. Three percent polidocanol foam vs 3% polidocanol liquid, foam polidocanol is more effective and equally safe compared to liquid polidocanol [11]. PAO is effective for internal hemorrhoids up to grade III, while ALTA has shown efficacy in treating prolapsing internal hemorrhoids at grades II, III, and IV [12]. The major studies of injection sclerotherapy are summarized in Table 1.

Sodergren's hemorrhoid symptom severity (SHSS) scores were compared between the endoscopic band ligation (EBL) and EIS groups at postoperative week 4, at weeks 8 and 12, and there were changes. These results suggest that EBL and EIS were equally effective in reducing the severity of grade I to grade III internal hemorrhoid symptoms. There was no significant difference in the incidence of complications between the EBL and EIS groups, but the pain of EBL was significantly more than that of EIS. Therefore, both EIS and EBL are recommended as safe and feasible first-line treatments for hemorrhoids [19]. Compared with EIS, EBL had a higher success rate and required fewer courses of treatment to relieve the symptoms of prolapse and complications and

previous research. When the main symptom is anal bleeding, an EIS can be recommended because of less pain [20]. EIS and EBL have similar clinical efficacy; the incidence of postoperative complications of the two methods is very low, and the incidence of complications of EIS is even lower than those of EBL. The pain and the cost of EIS are obviously lower than that of EBL. The combination of sclerotherapy with ligation or rectal mucosal fixation for the simultaneous treatment of symptomatic internal hemorrhoids is superior to monotherapy in terms of clinical efficacy, complications, long-term control, and cost. The combination of EBL with EIS indeed holds practical implications. Not only is noble therapy a "band and stent" approach, but the embolic agent below the band ligation serves to hold the band in place and reduce failure due to premature slippage [21, 22]. Although the effective rate of sclerotherapy for prolapse is lower than hemorrhoidectomy. However, patients were often reluctant to undergo hemorrhoidectomy due to the long postoperative hospital stay and were overly concerned about postoperative pain and other complications. Sclerotherapy does not cause any serious pain or complications. Sclerotherapy is less invasive and is an alternative to surgery [23]. The results showed that sclerotherapy was considered on par with surgery. During the COVID-19 epidemic, patients with grade III and IV hemorrhoids were treated with 3% polidocanol foam sclerotherapy and their symptoms were alleviated. All patients left in 10 min after EIS without any adverse events and resumed normal daily activities on the second postoperative day. Research has shown that 3% polidocanol foam sclerotherapy is a "bridging treatment" intended to alleviate the symptoms of serious hemorrhoids that could not be treated for surgery in time during the COVID-19 epidemic, while waiting for the next "bridging treatment" surgery [24].

**Table 1** Studies of injection sclerotherapy

Researcher, date	Subjects (N)	Disease	Sclerosant	Scope of injection	Conclusion
Kanellos et al. [13]	240	Grade I and II hemorrhoids	PAO	Anoscope	The recurrence rate is very high after 3 years
Hachiro et al. [14]	448	Grade III or IV hemorrhoids	ALTA	Proctoscope	Sclerotherapy is a simple and safe treatment with few complications
Miyamoto et al. [15]	604	Grade II to III hemorrhoids	ALTA	Anoscope	Sclerotherapy is an effective treatment
Moser et al. [11]	130	Grade I hemorrhoids	Polidocanol foam or liquid	Proctoscopy	Sclerotherapy is an innovative and effective treatment
Tomiki et al. [16]	83	Grade II to IV hemorrhoids	ALTA	Colonoscope	Endoscopic ALTA is a less invasive and effective treatment sclerotherapy
Lobascio et al. [17]	66	Grade II to III hemorrhoids	Polidocanol foam	Colonoscope	Sclerotherapy is a safe, cost-effective, and repeatable treatment
Figueiredo et al. [18]	243	Grade I, II, or III internal hemorrhoids	Polidocanol foam	Colonoscope	Sclerotherapy is an effective and safe therapy

**Table 2** Complications of injection sclerotherapy

Researcher, date	Complication	Occurrence time	Symptom	Outcome
Lattuneddu et al. [32]	Pulmonary allergic	7 days after 2 <sup>nd</sup> injection sclerotherapy	Cough and ingravescent dyspnea	Recovery
Suppiah et al. [33]	Hepatitis	6 days after injection sclerotherapy	Jaundice	Recovery
Rashid et al. [34]	Adult respiratory distress syndrome	Soon after injection sclerotherapy	Syncope	Recovery
Hachiro et al. [35]	Strangulated hemorrhoids	4 h after injection sclerotherapy	Difficulties in urinating, increasing of abdominal pressure	Recovery
Schulte et al. [36]	Rectal necrosis, septic infections	1 day after injection sclerotherapy	Diffuse pain in the lower abdomen	Recovery
Yang et al. [37]	Abdominal compartment syndrome	9 days after injection sclerotherapy	Abdominal distension	Recovery
Ray et al. [38]	Rectovaginal fistula	NA	NA	NA
Yoshikawa et al. [39]	Acute liver disorder	1 day after injection sclerotherapy	Fever, dark colored urine, itchy skin	Recovery

### Sclerotherapy for Special Populations

Hemorrhoids are an extremely rare condition in children, with approximately 1 to 2 cases of children with hemorrhoids being diagnosed annually. Fourteen pediatric patients with symptomatic hemorrhoids were treated with sclerotherapy. Patients with grade III hemorrhoids required a significantly larger amount of polidocanol than those with grade II. Sclerotherapy with polidocanol was a safe and effective treatment for children with symptomatic hemorrhoids, which was simple to operate with minimal anesthesia and was associated with very low morbidity [25]. HIV-positive patients should avoid rubber band ligation [26]. Sclerotherapy is more suitable for hemorrhagic hemorrhoids in patients with AIDS, with little pain or risk of complications postoperative. Patients with recurrence can solve the bleeding symptoms by repeated treatment. Due to the immune deficiency of these patients, preventive antibiotics should be given before intervention [27]. EIS is very effective in controlling internal hemorrhoid bleeding. Sclerotherapy is an effective and safe treatment for hemorrhagic hemorrhoids in patients with advanced cirrhosis of the liver. But postoperative recurrent symptoms are common in patients with portal hypertension cirrhosis [28]. Transient increases in aluminum concentrations occur after treatment with ALTA in patients with chronic renal failure on dialysis. Patients on dialysis at levels below 150 ug/L before and after 1 week were considered to have a low risk of developing aluminum encephalopathy, but the risk of aluminum encephalopathy could not be ruled out [29]. ALTA injection sclerotherapy is known as an effective and safe treatment option for patients with hemorrhagic hemorrhoids. ALTA injection sclerotherapy is strongly recommended for patients with hemorrhoids who have difficulty stopping antithrombotic therapy [30]. For patients with mixed hemorrhoids, ALTA injection combined with distal hemorrhoidectomy is an option for

the treatment of mixed hemorrhoids; the remission rate of prolapse symptom is 100% [31].

### Complication

EIS is a safe and effective endoscopic minimally invasive treatment for hemorrhoids with good efficacy and few complications. Postoperative complications of sclerotherapy are mostly related to the urinary system, and are almost curable. Infection is the most common complication, along with other rare complications. The major complications of injection sclerotherapy are summarized in Table 2.

With the advancement of operational techniques, the incidence of complications becomes lower and lower. Improper positioning of the injection sclerosant can lead to potential complications. CAES is an innovative endoscopic sclerotherapy with the advantage over conventional approaches that the addition of a cap at the front of the colonoscopy adequately exposes the surgical field and changes the short needle into a long needle injection. Traditional short needle injection through an anoscope may cause increased iatrogenic risks and complications due to misplaced injection; compared with the traditional injection of hardener by using a short needle through an anoscope [40]; CAES is injected using a long needle; the CAES was coined as an innovation technique for having advantages in accurately controlling the injection angle, direction, and depth under direct vision of flexible endoscope [41]. There are still some problems to be solved in the treatment of hemorrhoids. The current EIS of hemorrhoids may have the following limitations: lack of evidence-based medical evidence recommended by a high-quality grade, such as direct, large sample, long-term continuous follow-up of randomized controlled trials between different treatments for different grades of hemorrhoids; lack of scoring system based on patients' symptoms; lack of evaluation criteria for technical success training of

endoscopists. The exploration of the depth and direction of needle insertion is neglected in sclerotherapy. Physicians are required to evaluate patients' quality of life, and discuss with patients the appropriate treatment in order to select the most appropriate approach for symptom relief and hemorrhoidal cure. Low cost is not always the best, although it can be a factor in patient selection [42].

## Education of Patients After Sclerotherapy

Hemorrhoids are common and tend to recur. Patients with internal hemorrhoids can leave the hospital soon after outpatient treatment. EIS usually takes 1–2 weeks to be effective in treating hemorrhoids. During this period, doctors and nurses gave publicity and education to the patients after treatment, which was helpful for the success of treatment. They should educate patients to change their bad living habits, take high-fiber food and a large amount of water as much as possible, avoid constipation and diarrhea, take medicines to soften the stools after the procedure, and avoid sitting for a long time. Good publicity and education and management can not only improve the curative effect, but also reduce the recurrence of hemorrhoids.

## Conclusion

It is a very effective and safe treatment without the need for hospitalization, with low costs, a low incidence of postoperative complications, and very few serious complications. Pre-operative care by specialists with a detailed history of the patient and postoperative patient education are essential, including softening of the stools, pain relief if necessary, and education about early and late complications.

**Abbreviations** EIS: Endoscopic injection sclerotherapy; CAES: Cap-assisted endoscopic sclerotherapy; ALTA: Aluminum potassium sulfate and tannic acid; PAO: Phenol in almond oil; SHSS: Sodergren hemorrhoids symptom severity; EBL: Endoscopic bland ligation

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