

# Prolapsed hemorrhoids treatment options

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(Submitted: 11 March 2020 – Revised version received: 23 March 2020 – Accepted: 27 April 2020 – Published online: 26 June 2020)

## Abstract

**Objective** To evaluate the effect of topical application of mannitol solution in management of prolapsed hemorrhoids.

**Methods** This study is a prospective study, conducted on 50 patients with prolapsed pile, 46 of whom were males and 4 were females and were collected in the span of 2 years from Sulaymaniyah Teaching hospital and Shar hospital in Kurdistan Region of Iraq. Topical application of mannitol included a gauze soaked with mannitol solution and applied to the prolapsed hemorrhoids.

**Results** All patients presented with prolapsed hemorrhoids, 46 of them were males and 4 of them females. The "IBM SPSS Statistics version 25" was used for the analysis of data and both descriptive and inferential statistics were used. Furthermore, P-values of ( $\leq 0.05$ , and  $< 0.001$ ) were considered as statistically significant, and highly significant associations, respectively. In addition, Pearson Chi-Square Test was used to determine significant association between independent and dependent variable pairs.

**Conclusions** Prolapsed hemorrhoid can be managed conservatively by topical application of mannitol as it decreases edema, cause the hemorrhoidal tissue to retract to its position. It is simple, safe, and effective treatment for prolapsed hemorrhoids as an alternative for surgical treatment.

**Keywords** Prolapsed hemorrhoids, Mannitol, Cold sitz bath, Hemorrhoidectomy.

## Introduction

Hemorrhoids are symptomatic anal cushions and can develop inside the rectum (internal hemorrhoids) or under the skin around the anus (external hemorrhoids) or mixed. Anal cushions are clusters of vascular tissue, smooth muscle, and connective tissue lined by narrow epithelium. Several treatment options (Rubber band ligation, Doppler-guided hemorrhoid artery ligation, stapled hemorrhoidopexy) are available in order to avoid pain post-operatively.<sup>1</sup>

Hemorrhoid is defined as enlargement of anal blood vessels or pathological change in anal cushion.<sup>2</sup> Normal physiology of anal cushion involves defecation of stool and anal maintenance of continence. The pathological change involves rupture of supporting connective tissues within the cushion,<sup>3</sup> resulting in enlargement rectal blood vessel plexus, the pathological change causes pain, swelling, bleeding, and prolapse.<sup>3</sup>

Hemorrhoids are affecting one out four people in the general population and resulting in a common worldwide complain. Annually, about 20,000 pile procedure performed in the UK.<sup>2</sup>

## Pathophysiology of hemorrhoids

The precise pathophysiology of hemorrhoid is unknown, but it is clear hemorrhoids include symptomatic enlargement of anal blood vessels due to rupture of connective tissue in the anal cushion. Hemorrhoids represent a hyper-perfusion state of hemorrhoid vessel plexus and abnormal vascular tone with pile tissue.<sup>2</sup> However, hemorrhoidal tissue contains inflammatory cells and new angiogenesis. Prolapsed internal hemorrhoid may be related to rectal prolapse.<sup>4</sup>

## Risk factors for hemorrhoids

It includes constipation, pregnancy, aging, obesity, prolonged straining, low fiber food, food that are spicy, and alcohol intake.<sup>5</sup>

## Grading of hemorrhoids

Grade 1: Hemorrhoids that bleed but are not prolapsed.

Grade 2: Hemorrhoids that prolapse but spontaneously reduce.

Grade 3: Hemorrhoids that prolapse but need manual reduction.

Grade 4: Hemorrhoids that prolapse and cannot be reduced.

## Management of hemorrhoids

Treatment varies from conservative to surgery according to the hemorrhoidal grade.<sup>1</sup>

Grades 1 & 2 can be managed by lifestyle change and diet, medication, rubber band ligation, or sclerotherapy.

Grades 3 or 4 are refractory to conservative management, strangulated piles are managed by surgery.<sup>2</sup>

## Conservative management

Conservative management of hemorrhoids is composed of lifestyle change and diet modification. Eating food that is rich in fiber is preventive and important for treatment of hemorrhoids. There are several meta-analysis studies that prove eating food rich in fiber reduce symptoms and significantly decrease the risk of bleeding by about 50%. Fluid diet, exercise, and avoiding straining during defecation have also been shown to have benefit.<sup>6</sup>

## Drug treatment

There are several forms of creams and suppositories available for pile treatment, they are usually a mixture of steroids, anti-septics, and anesthetics.<sup>7</sup>

**Mannitol** is a six-carbon molecule, linear, simple sugar which is only mildly metabolized by the body and excreted rapidly from the body primarily by the kidney. Mannitol can also be an osmotic diuretic that is metabolically inert in humans and occur naturally as a sugar or sugar alcohol. Mannitol

decreases blood plasma osmolality resulting in enhanced water flow from tissues. It is nonirritant and anti-edematous solution that can decrease hemorrhoid volume. It is available in 5%, 10%, 15%, 20%, 25%, and 70% concentrations.<sup>9</sup>

## Outpatient management

### **Rubber band ligation (RBL)**

In England, rubber band ligation is the most commonly performed outpatient treatment for hemorrhoids through proctoscope. After 1–2 weeks from application, the hemorrhoid becomes ischemic due to reduced blood supply ending in fibrosis, especially in prolapsed hemorrhoids. Benefits are early return to work and an easy learning curve. The reports regarding recurrence after rubber band ligation varies from 11% to 50%.

Recurrent hemorrhoids can be treated by another trial of rubber band ligation or proceed to surgical treatment.<sup>10</sup>

### **Injection sclerotherapy**

Mitchell was the first surgeon to use carbolic acid for hemorrhoid injection.<sup>11</sup> There are multiple sclerosant available for injecting hemorrhoids, e.g. 5% phenol in almond oil is the most commonly used sclerosant, which has a lower rate of mucosal necrosis. Injection is easy and simple but not as effective as RBL. Injection sclerotherapy was used when there was failure of conservative management, also in patients with liver cirrhosis and compromised immunity. Bleeding and pain are common complications.

### **Infrared coagulation (IC)**

Applying infrared waves to pile pedicle causes its necrosis and sloughing. Outpatient infrared coagulation is effective in first- and second-degree hemorrhoids. Through a proctoscope, the infrared probe is applied to the hemorrhoid causing a ring burn of about 2 mm deep. The end result of infrared coagulation is similar to RBL and sclerotherapy, although it is less painful, however, it is more expensive.<sup>12</sup>

### **Cryosurgery**

This method is the best option for first, second and some of the third-degree hemorrhoids. Through a probe, nitrogen liquid is applied for about 3 min to the hemorrhoid causing cold tissue liquefaction. Anesthesia is not necessary in this procedure as it is pain free, however, edema and profuse discharge are possible complications. Callaghan et al in 1982 concluded in their research that cryosurgery in prolapsed hemorrhoids is as effective as open hemorrhoidectomy.<sup>13,14</sup>

### **Manual anal dilatation (Lords procedure)**

This procedure was first advocated by lord in 1969. It is mostly used in Grade 2 and 3 hemorrhoids; the anal canal is dilated by four fingers of each hand. In this procedure, General Anesthesia is needed, patient can be discharged in the same day. Nowadays, this procedure is avoided because of risk of stool incontinence.<sup>15,16</sup>

### **Laser hemorrhoidectomy**

LASER therapy is used in Grades 1, 2 and some Grade 3 hemorrhoids. Carbon dioxide or NdYAG LASER is used for vaporization or excision of the hemorrhoid, accuracy, and precision can be obtained through the use of smaller LASER beams. The

procedure is rapid and pain free. LASER therapy can be used alone or in combination with other procedures.<sup>17</sup>

### **The harmonic ultrasonic scalpel hemorrhoidectomy**

The harmonic scalpel simultaneously causes cutting as well as coagulation in hemorrhoidal tissue, resulting in minimal tissue damage and injury.

Temperature produced by harmonic scalpel is low when compared to cryosurgery and LASER therapy.

It is used for first- and second degree of hemorrhoids as outpatient management.<sup>18,19</sup>

## Surgery

### **Hemorrhoidectomy**

There are two types, open excision (Milligan-Morgan) and closed hemorrhoidectomy (Ferguson).

In open excision, skin that is covering the external hemorrhoid is excised with mucosa, then the hemorrhoidal pedicle is ligated, care must be taken to protect mucosal bridges.

In closed method, the vascular tissue of hemorrhoid is excised but care must be taken to protect anoderm.

### **Procedures for prolapsed hemorrhoid management**

Operation for prolapsed pile or stapled hemorrhoidopexy uses circular stapling device to remove mucosa above hemorrhoidal complex. This procedure reduces swelling and blood supply, shrinking the prolapsed pile into the anal canal.

Bleeding, pain, and urinary retention may develop after procedure. More serious complications like rectal perforation and retroperitoneal sepsis may develop when pain, urgency, and tenesmus occur, often respond to nifedipine.<sup>20</sup>

### **Hemorrhoidal artery ligation**

This procedure entails the application of proctoscope with a Doppler probe, this device can accurately identify hemorrhoidal vessel that supply the anal cushion. Ligation of hemorrhoidal blood vessels decreases swelling of the prolapsed pile.<sup>21</sup>

## Methods

This study is a prospective study, approved by ethical committee of College of Medicine of University of Sulaymaniyah. Fifty (50) patients with prolapsed pile collected, 46 were males and 4 were females. All data were collected in span of nearly 2 years from October 1, 2017 to October 1, 2019 from Sulaymaniyah Teaching Hospital and Shar hospital. The patient's ages ranged between 18 and 68 years, were treated by conservative management and surgery. Complete history was taken from all patients with clinical examination and investigations.

### **Inclusion criteria**

This study included only Grade 3 and Grade 4 hemorrhoids.

### **Exclusion criteria**

Grade 1 and Grade 2 hemorrhoids. The conservative management of prolapsed pile that was used in this study included

application of mannitol 10% and 20%, cold sitz bath and topical ointment. The topical application of mannitol included a gauze soaked with mannitol solution applied to prolapsed hemorrhoids and held in place by plaster, three times daily from 30 min to 1 hr. Most of the patients respond in second and third days of treatment. Follow-up conducted weekly for every case.

## Results

All patients presented with prolapsed hemorrhoids, 46 of them were males and 4 of them females. The "IBM SPSS Statistics version 25" was used for the analysis of data and both descriptive and inferential statistics were used. Furthermore, *P*-values of  $\leq 0.05$ , and  $< 0.001$  were considered as statistically significant, and highly significant associations, respectively. In addition, Pearson Chi-Square test was used to determine significant association between independent and dependent variable pairs.

Most of the patients were heavy workers (46%), students made up 18%, employee were 22%, retired 8%, and free workers (6%).

Table 1. Shows statistically insignificant association between gender and treatment groups.

Gender	Treatment groups		Total (%)	P-value*
	Conservative (%)	Surgery (%)		
Female	2 (4)	2 (4)	4 (8)	0.801
Male	20 (40)	26 (52)	46 (92)	
Total	22 (44)	28 (56)	50 (100)	

\*Measured by Pearson Chi-Square test.

The most common clinical presentations were constipation (72%), anal pain (68%), bleeding (50%), itching (14%), discharge (4%), and only prolapse (6%).

From 50 patients, 32 of them treated conservatively by Mannitol (28 of them, 3 of them by cold sitz bath and 1 of them by topical ointment). They respond well to conservative management.

From 50 patients, 18 (36%) of them proceeded to surgery without conservative management.

Ten (10) patients (20%) who were treated by mannitol failed and proceeded to surgery. Eighteen (18) patients (36%) responded well to mannitol treatment. Three (3) patients (6%) had good response to cold sitz bath, and 1 (2%) patient responded to topical ointment. Twenty-eight (28) patients were treated by surgery (56%), 18 (36%) of them directly

Table 2. Shows statistically insignificant association between occupation and treatment groups.

Occupation	Treatment groups		Total (%)	P-value*
	Conservative (%)	Surgery (%)		
Employer	6 (12)	5 (10)	11 (22)	0.56
Free worker	2 (4)	1 (2)	3 (6)	
Heavy worker	8 (16)	15 (30)	23 (46)	
Retired	1 (2)	3 (6)	4 (8)	
Student	5 (10)	4 (8)	9 (18)	
Total	22 (44)	28 (56)	50 (100)	

\*Measured by Pearson Chi-Square test.

Table 3. Shows statistically insignificant association between symptoms and treatment groups.

Symptoms	Treatment groups		Total (%)	P-value*
	Conservative (%)	Surgery (%)		
Prolapse	3 (6)	0 (0)	3 (6)	0.16
Pain, bleeding and constipation	3 (6)	4 (8)	7 (14)	
Constipation	2 (4)	5 (10)	7 (14)	
Pain	4 (8)	1 (2)	5 (10)	
Bleeding and constipation	2 (4)	3 (6)	5 (10)	
Pain, bleeding, constipation and itching	2 (4)	2 (4)	4 (8)	
Pain and constipation	2 (4)	7 (14)	9 (18)	
Pain, bleeding and itching	0 (0)	2 (4)	2 (4)	
Bleeding	1 (2)	1 (2)	2 (4)	
Pain and bleeding	3 (6)	0 (0)	3 (6)	
Bleeding, constipation and itching	0 (0)	1 (2)	1 (2)	
Pain, bleeding, discharge and itching	0 (0)	1 (2)	1 (2)	
Pain, constipation and itching	0 (0)	1 (2)	1 (2)	
Total	22 (44)	28 (56)	50 (100)	

\*Measured by Pearson Chi-Square test.

Table 4. Associations of individual symptom with treatment groups.

Symptoms		Treatment groups		Total (%)	P-value*
		Conservative (%)	Surgery (%)		
Pain	No	8 (16)	10 (20)	18 (36)	0.962
	Yes	14 (28)	18 (36)	32 (64)	
Bleeding	No	11 (22)	14 (28)	25 (50)	1.0
	Yes	11 (22)	14 (28)	25 (50)	
Constipation	No	11 (22)	5 (10)	16 (32)	0.016**
	Yes	11 (22)	23 (46)	34 (68)	
Prolapse	No	19 (38)	28 (56)	47 (94)	0.044**
	Yes	3 (6)	0 (0)	3 (6)	
Itching	No	20 (40)	21 (42)	41 (82)	0.146
	Yes	2 (4)	7 (14)	9 (18)	
Discharge	No	22 (44)	27 (54)	49 (98)	0.371
	Yes	0 (0)	1 (2)	1 (2)	
Total		22 (44)	28 (56)	50 (100)	

\*Measured by Pearson Chi-Square test.

\*\*Statistically significant association.

did surgery while 10 (20%) of them from failed mannitol treatment.

## Discussion

There was very little research about mannitol application in prolapsed hemorrhoids.

Non-irritant anti-edematous solutions like mannitol, sucrose, glucose or sugar alcohol-based solutions (glycerol or glycerin) reduce pile volume and edema.<sup>22</sup>

Hemorrhoids result from enlargement in rectal blood vessels, these edematous vessels cause compression of vessels with subsequent decrease of blood flow, resulting in further enlargement of the vessel plexus.<sup>22</sup>

When enlargement of vessels plexus occurs and the vascular damage is not corrected, the concentration of proinflammatory cytokines increases and are higher in comparison to anti-inflammatory cytokines, resulting in disrupted healing.<sup>22</sup>

To manage this pathology, we should treat two problems, one of them is edema and the second one is to reduce the concentration of proinflammatory cytokines.

There were two problems we faced in this study. First, there is no specific drug to reduce edema of hemorrhoid that acts through increasing venous return and diminishing blood entry to swollen hemorrhoids.

There is no specific drug to stimulate venous return of hemorrhoidal tissue, only anti-edematous solutions are available like hypertonic saline which decrease edema.

Hypertonic solution are 18 times osmotically stronger than sea water, causing outflow of hypotonic liquid from hemorrhoidal tissue.<sup>23</sup>

Topical applications like hypertonic solution attract hypotonic liquid, causing hemorrhoidal tissue to dehydrate,

decreasing pain and irritation with subsequent decrease of pro inflammatory cytokines concentration.

Reducing edema of hemorrhoidal tissue is the basic principle for treatment of external and internal hemorrhoids, removing or reducing the concentration of proinflammatory cytokines who are the cause of edema.

Pro- and anti-inflammatory cytokines are present in different inflammatory conditions in human body according to the chronicity of inflammation.<sup>24</sup>

A case report of perineal incarcerated rectal prolapse were hypertonic solutions of sugar, consisting of 50% dextrose or 70% mannitol were applied directly to the rectal mucosa. These have also been used to reduce edema and facilitate manual reduction of prolapse conditions.<sup>25</sup>

We collected 50 cases of prolapsed hemorrhoids in span of 2 years, 4 females and 46 males from Sulaymaniyah teaching hospital and Shar Hospital. Age of the patients ranged from 18 to 68 years.

In this study, the most common clinical presentations of prolapsed piles were constipation (72%), pain (68%), bleeding (50%), and itching (14%).

One study reported the most common symptoms as bleeding per rectum and pain (endoscopic band ligation of symptomatic internal piles in cirrhotic patients as alternative for surgical treatment).<sup>26</sup>

The patients who were most commonly affected were heavy workers (46%), students (18%), and employee (22%).

## Conclusion

Prolapsed hemorrhoid can be managed conservatively by topical application of mannitol as it decreases edema, cause the hemorrhoidal tissue to retract to its position. It is simple, safe,

and effective treatment for prolapsed hemorrhoids as an alternative for surgical treatment.

## Recommendations

**First:** We need large volume of patients to be included in the study.

**Second:** We need more researches about the effect of hypertonic solution in prolapsed hemorrhoids. Really there was few research about it.

**Third:** We need more time in order to follow-up patients.

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