

# Minimally Invasive Technologies in the Surgical Treatment of Chronic Haemorrhoids

*Rahmatov B. Kh., Xujabayev S. T.*  
*Samarkand State Medical University*

**Abstract:** Currently, there is a wide range of treatments for haemorrhoids, including operative, conservative and minimally invasive methods. Conservative therapy is used for acute haemorrhoids, the initial stage of chronic disease and to prevent exacerbations. Many researchers emphasise how important it is to exclude everything that contributes to the development of the disease.

**Keywords:** minimally invasive technology, surgical treatment, chronic haemorrhoids.

**Introduction.** The medical treatment of haemorrhoids usually involves the use of topical drugs with anti-inflammatory properties such as corticosteroids, analgesics, astringents and antiseptics. Although modern medications and conservative treatments that are most commonly used for acute haemorrhoids, their effectiveness is often time limited and does not prevent recurrence [5,11,14]. A recurrence that requires repeated conservative treatment can be caused by such things as new episodes of constipation, poor diet and exercise. In such cases, combination therapy including conservative and minimally invasive treatments or a combination of conservative and operative treatments is recommended. This is especially true for patients with advanced stages of haemorrhoids [3,9,15].

The emergence of new technologies in surgery may improve the results of haemorrhoid treatment. Nevertheless, the question of the most effective method of surgical intervention is still unresolved, as data on different methods often contradict each other. Thus, all patients with haemorrhoids should be considered individually when deciding on the method of surgery and its extent [7,12].

The main and only radical treatment for stage III-IV chronic haemorrhoids is surgical treatment, which consists of removing the three main haemorrhoidal nodes. There are many different methods of haemorrhoidectomy, which shows that people are constantly looking for the best method of surgery. However, there is no universal method that will work for everyone. There needs to be a clear indication for surgical treatment, given that the condition is often recurrent and that there are many complications following surgery [5,18].

The evolution of modern technology has led to the active introduction and development of new minimally invasive techniques for the treatment of chronic haemorrhoids in recent decades. The many advantages of these techniques include their simplicity, lower costs, less invasiveness, no need for hospitalisation, shorter treatment and rehabilitation period, and fewer complications. Most researchers state that these methods are best suited for the initial stages of hemorrhoids and bleeding. In complex cases of chronic haemorrhoids, these methods are ineffective, which may lead to recurrence of the disease, according to some studies, such as the work of V.S. Groschilin and colleagues (2017)[1,6,21].

Current literature indicates that ultrasonic scalpel is effective in the treatment of patients with haemorrhoids. This method uses high frequency oscillations of a titanium blade, which results in coagulation of blood vessels, denaturation of proteins and tissue dissection. While it has advantages such as minimal impact on deep tissue, it also has disadvantages. Early postoperative complications can occur in 4.8% of cases. In addition, its use is costly and the long-term results of its use have not been fully explored [2,13,20].

Electrocoagulation of haemorrhoids is another minimally invasive method for the treatment of haemorrhoids. This method involves coagulation of the leg of the haemorrhoidal node using low voltage and low amperage. Bipolar electrocoagulation allows treatment of larger vessels, but

monopolar electrocoagulation allows coagulation of smaller vessels. The electrocoagulation method has disadvantages in addition to its advantages, which include its low invasiveness and relatively low complication rate. These include the need for a lengthy procedure, the risk of pain during and after treatment, and the possibility of developing haemorrhoidal thrombosis. Some researchers have also associated this procedure with the possibility of divergence of wounds left after surgery [3,14,16].

Valleylab's proposed vascular electrolysis generator 'LigaSure' has attracted the attention of the scientific community in recent years. This device is equipped with a smart technology that enables tissue haemostasis with vessels up to 7 mm in diameter. It works based on the ability of collagen and elastin to melt, which provides a strong coagulation comparable to tissue stitching. The procedure using LigaSure takes between 15 and 25 minutes and is accompanied by reduced blood loss, avoidance of sutures and a lower incidence of early postoperative complications. LigaSure technology can be used to treat various stages of chronic haemorrhoids. There are many studies confirming the interest of scientists in this new method of haemorrhoidectomy [4,11].

High reliability, insignificant heat spread, resistance to 'sealing' of vessel walls and ability to adhere are the main advantages of the 'LigaSure' method. In histological examination of adhesion sites, collagen 'clips' are strong up to 900 mmHg, and heat spread is about 1 mm. Patients with chronic hemorrhoids report faster healing compared to traditional ligation methods, and the area of inflammation is reduced.

Many studies compare the results of haemorrhoidectomy with LigaSure and traditional surgical methods (Milligan-Morgan). The analysis considers various parameters such as disease stage, duration of surgery, intensity of pain after surgery, use of anaesthetics, hospitalisation and rehabilitation time, number of complications and postoperative wound healing time. Nevertheless, the results vary between authors and require further investigation. Although the procedure has many positive effects, some researchers did not find that pain was significantly reduced after the procedure. In addition, this method does not completely eliminate the possibility of bleeding in the postoperative period, as long rehabilitation and wound healing times are required compared to conventional electrocoagulation methods [4,11,18].

During surgery, there are problems with the instruments grasping large areas of tissue. This makes the instruments unsuitable for removing large hypertrophic nodes. To remove external haemorrhoidal nodes, either prior dissection of the skin around the anal region using traditional instruments or isolated removal using conventional techniques is necessary [10].

**Conclusions:** Thus, when we reviewed the scientific literature on minimally invasive techniques for the treatment of chronic haemorrhoids, it became evident that there is still no ideal minimally invasive method for the treatment of this disease. Conflicting estimates of the effectiveness of existing methods and often accompanied by a high incidence of postoperative complications. This was the impetus for the present study and optimisation of methods for the treatment of chronic haemorrhoids.

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