Proceedings of International Conference on Research in Education & Science

ICRES2024

APRIL, 27-30 ANTALYA/TURKEY

EDITORS

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Volume 1, Pages 1-2823

Proceedings of International Conference on Research in Education and Science

© 2024 Published by ISTES

ISBN: 978-1-952092-63-3

Editors: Mack Shelley & Omer Tayfur Ozturk

Articles: 1-174

Conference: International Conference on Research in Education and Science (ICRES)

Dates: April 27-30, 2024

Location: Antalya, Turkiye

Publication Date: December 01, 2024

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Methods of Preventing Complications of Hemorrhoidectomy

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Abstract: Hemorrhoids is one of the most common pathologies of anorectal region. At least 4.4% of the population suffer from this disease. According to statistics, every tenth patient with hemorrhoids needs surgical treatment. Therefore a great number of patients undergo hemorrhoidectomy every year. That is why, there is a need to have methods for preventing complications of this surgical intervention. Identify and apply methods of prevention from the most significant complications of hemorrhoidectomy.We performed analysis of scientific articles. There were investigated management of complications after a hemorrhoidectomy and prevention of such complications. Based on the literature, we improved treatment strategy and implemented it.Nowadays, there are a number of clinical studies that have shown the effectiveness of venotonics in the non-surgical treatment of mild hemorrhoids. Moreover, these drugs are prescribed to patients who have undergone hemorrhoidectomy. Venotonics reduce intensity of exudation in the area of inflammation by means of increasing venous tone. As a result, patient`s pain is relieved in the postoperative period. In addition, venotonics can be used to prevent other postoperative complications, including bleeding. For instance, some clinical studies showed a reduction in the risk of bleeding in patients after surgery in comparison with the control group.According to the performed meta-analysis, topical application of glycerin trinitrate showed effectiveness in reducing post-operative pain. Application of glycerin to the mucous of the anal canal was associated with less intensity of pain for 2 weeks after hemorrhoidectomy. The effectiveness of ointments with local anesthetics has been studied for a long time. This drugs demonstrated significant analgesic effect in the postoperative period. Patients who were applied a combined ointment with lidocaine and prilocaine after hemorrhoidectomy noted significant reduction in pain.Improved treatment strategy showed significant efficiency. In particular, we managed to relief postoperative pain without using narcotics, to prevent occurrence of bleeding in postoperative period and to avoid appearance of anal stenosis.

Keywords: Hemorrhoids, Treatment, Hemorrhoidectomy, Complications, Prevention.

Citation: Sulyma, V., Malinovsky, S., & Bashmakov, I. (2024). Methods of preventing complications of hemorrhoidectomy. In M. Shelley & O. T. Ozturk (Eds.), *Proceedings of ICRES 2024-- International Conference on Research in Education and Science* (pp. 24-33), Antalya, Turkiye. ISTES.

Introduction

Hemorrhoids are one of the most common proctological diseases in the world. Its prevalence reaches up to 35-40% of the total population, with a higher incidence among middle-aged people with a high socioeconomic status. It is estimated that about 50% of the general population experience symptomatic hemorrhoids at some point in their lives. In addition, pregnant women are prone to a high risk of developing hemorrhoids. The prevalence of hemorrhoids in pregnant women ranges from 20% to 30%, and up to 80% of pregnant women suffer from hemorrhoids in the third trimester.

Other subjects with an increased risk of developing hemorrhoids are the elderly and people with a high body mass index.

The severity of hemorrhoids is divided into four stages. Medical treatment and lifestyle changes are suitable for stage I-II hemorrhoids, which make up the vast majority (> 90%) of all reported cases, while later stages III-IY of the disease require surgical treatment, which can have a number of complications.

The main manifestations of chronic hemorrhoids are:

- rectal bleeding (usually fresh blood);
- protrusion of formations;
- discomfort, possible moderate pain;
- mucous secretions from the rectum;
- possible secondary anemia.

During the examination of a patient with hemorrhoids, enlarged and pathologically changed external and internal hemorrhoidal nodes can be detected, while manifestations of external changes in the hemorrhoidal plexus indicate, as a rule, acute hemorrhoids (acute thrombosis of pinched hemorrhoidal nodes), which often manifests as painful bluish formations from the outside of the anus, they occur spontaneously, perhaps after unusually strong exertion or the consumption of alcohol or spicy food.

The skin covering the outer part of the anus is usually firmly attached to the underlying tissues, and if thrombosis develops in this tightly held area, the pressure in these tissues increases rapidly, often causing considerable pain. The pain is usually constant and can be very severe.

Sometimes the increased pressure in the thrombosed external hemorrhoidal node leads to the destruction of the covering skin, and the coagulated blood begins to flow out.

Patients may also complain of periodic swelling, pressure, and discomfort associated with external hemorrhoids that are not thrombosed and suggestive of chronic external hemorrhoids with the location of enlarged and

pathologically altered nodules on the virtual "clock face" at 5, 7, and at 11 "hours".

The presence of pathologically changed and enlarged internal hemorrhoidal nodes can be established during the examination of the patient.

Painless rectal bleeding or anal tissue prolapse is often associated with symptomatic internal hemorrhoids.

An external prolapsed hemorrhoid is a protruding hemorrhoidal tissue that can often be felt on the outside of the anus during defecation or hygiene procedures after it. This tissue often turns inward spontaneously or may be pushed back inward by the patient. Symptoms, as a rule, slowly progress over a long time and are often periodic, associated with psycho-emotional and physical stress, alcohol, so-called "spicy food".

Bleeding caused by internal hemorrhoids is usually bright red and may stop quickly after a bowel movement. Not all patients with symptomatic internal hemorrhoids will have significant bleeding. Instead, prolapse (falling out of nodes) may be the main or only symptom. The shedding of the tissue can cause significant irritation and itching around the anus.

Patients may also complain of discharge of mucus, difficulty with the act of defecation, or the feeling that feces are "stuck" in the anus.

The severity of hemorrhoids has four stages, which correspond to the first 4 points of the classification, and are manifested by one or another state of prolapse and maneuverability of internal hemorrhoidal nodes:

- discomfort, slight pain, discharge of pink blood during defecation without loss of knots;

- discomfort, slight pain, release of pink blood during defecation with the loss of knots during defecation, after which the knots are independently inserted into the anal canal;

- discomfort, slight pain, discharge of pink blood during defecation with loss of knots during defecation and any other physical activity, after which the knots do not move into the anal canal on their own, they must be moved by the patient's hands;

- discomfort, slight pain, discharge of pink blood during defecation with internal hemorrhoidal nodes constantly sticking out, the nodes are not inserted into the anal canal by themselves, when the nodes are inserted into the anal canal by the patient's hands, they fall out again.

This state of affairs requires a solution to the issue of effective treatment of patients with chronic and acute hemorrhoids.

In particular, dietary and lifestyle changes that require strict adherence by the patient are usually considered the

first step in any conservative hemorrhoid treatment. Medical treatment is mainly based on the use of topical preparations containing anti-inflammatory components, including steroids, anesthetics and / or antiseptics. However, in most cases, randomized trials have not been conducted to evaluate the effectiveness and safety of various substances, which in some cases - for example, steroids - are associated with the potential onset of undesirable manifestations. *(Mamchur, V., Sulyma, V., 2021).*

Hemorrhoids mainly affect people of working age, the exacerbation of the disease usually recurs from 2 to 6 times a year, and the periods of temporary incapacity reach up to 1 month, which causes large economic losses. Currently, 3 main methods of hemorrhoid treatment are used: conservative, minimally invasive and radical surgical. The used traditional methods of treatment do not always lead to the desired results and, despite the availability of many methods of treatment of hemorrhoids, the problem does not lose its relevance.

Existing methods of surgical treatment are still accompanied by a considerable number of postoperative complications, such as bleeding, severe pain syndrome, dysuric phenomena, local swelling and inflammation, which leads to additional suffering for the patient, increases the cost of treatment and prolongs the period of temporary disability.

According to statistics, every tenth patient with hemorrhoids needs surgical treatment. Therefore a great number of patients undergo hemorrhoidectomy every year. That is why, there is a need to have methods for preventing complications of this surgical intervention.

Surgical hemorrhoidectomy is necessary for the large third- and fourth-degree hemorrhoids when medical management has failed, when there is a large bulging external component, or when incarcerated internal hemorrhoids need immediate medical treatment. This activity reviews the evaluation and treatment of hemorrhoidal disease and highlights the role of the interprofessional team in evaluating and treating this condition. *(Cristea, C., Lewis, C.R., 2022).*

However hemorrhoidectomy of the Milligan and Morgan variety (open hemorrhoidectomy) remain the gold standard. Identify and apply methods of prevention from the most significant complications of hemorrhoidectomy. Surgical treatment of patients with chronic hemorrhoids of coagulation of biological tissues is most often used.

Method

We performed analysis of scientific articles. There were investigated management of complications after a hemorrhoidectomy and prevention of such complications. Based on the literature, we improved treatment strategy and implemented it.

Nowadays, there are a number of clinical studies that have shown the effectiveness of venotonics in the non-surgical treatment of mild hemorrhoids. Moreover, these drugs are prescribed to patients who have undergone hemorrhoidectomy. Venotonics reduce intensity of exudation in the area of inflammation by means of increasing venous tone. As a result, patient`s pain is relieved in the postoperative period**.** In addition, venotonics can be used to prevent other postoperative complications, including bleeding. For instance, some clinical studies showed a reduction in the risk of bleeding in patients after surgery in comparison with the control group. *(Sheikh, P., et all., 2020).*

A modified electro-surgical device, the LigaSure, has become available for the last decade as a 'vessel-sealing system'. This system delivers electro-diathermy energy across it jaws much like a bipolar diathermy device with minimal lateral spread of current or heat.

We used the LigaSure device for hemorrhoidectomy in grade III and IV hemorrhoids and compared our results with conventional hemorrhoidectomy of the Milligan and Morgan variety.

Hemorrhoidectomy is associated with significant pain-related complications such as urinary retention and constipation. Additionally meticulous hemostasis needs to be ensured to avoid postoperative hemorrhage. Occasionally the operative field can become quite bloody, prolonging the surgery. We found that LigaSure hemorrhoidectomy was a major improvement over the conventional technique in all these parameters. Technically the LigaSure method is much more simpler and can be safely and effectively carried out by relatively inexperienced surgeons. *(Khanna R., et all., 2010).*

According to the performed meta-analysis, topical application of glycerin trinitrate showed effectiveness in reducing post-operative pain. Application of glycerin to the mucous of the anal canal was associated with less intensity of pain for 2 weeks after hemorrhoidectomy. *(Ratnasingham, K., et all., 2010)*

The effectiveness of ointments with local anesthetics has been studied for a long time. This drugs demonstrated significant analgesic effect in the postoperative period. Patients who were applied a combined ointment with lidocaine and prilocaine after hemorrhoidectomy noted significant reduction in pain. *(Rahimi, M., et all., 2012)* Several meta-analyses have shown efficiency in postoperative pain relief with oral metronidazole. *(Lyons, NJR., et all., 2017).*

The drug inhibits activity of anaerobic flora in the rectum. Thus, the intensity of the inflammatory reaction decreases, which leads to pain reduction. *(Xia, W., et all., 2018).*

Treatment of hemorrhoids is a problem of modern surgery. In the structure of proctological diseases, hemorrhoids occupy almost 40%. Up to 30% of patients need surgical treatment.

Existing methods of surgical treatment are still accompanied by a considerable number of postoperative

complications, such as bleeding, severe pain syndrome, dysuric phenomena, local swelling and inflammation, which leads to additional suffering for the patient, increases the cost of treatment and prolongs the period of temporary disability.

Hemorrhoidectomy methods are accompanied by quite a large number of postoperative complications, such as pain syndrome, urination disorders, bleeding, local edema, narrowing of the anus, which leads to additional patient suffering and increases the cost of treatment.

The use of the LigaSure (Covidien) and EK-3000M (SVARMED) electrocautery generators for the removal of hemorrhoids and cauterization of blood vessels in hemorrhoidectomy can also be complicated by stricture of the anus. We studied the dependence of the development of anal strictures on the method of anesthesia during surgery.

The use of generators for electrocoagulation of vessels, which "boil" them, makes it possible to perform seamless hemorrhoidectomy. This necessitates the development of hemorrhoidectomy methods using the latest technologies.

Performing electrosurgical hemorrhoidectomy using the modern LigaSure technique, due to the small spread of the damage zone and the absence of sutures in the anal region, leads to a decrease in pain syndrome, absence of bleeding and swelling of tissues, acceleration of wound healing, shortening of treatment periods and temporary disability.
The described technique is safer, faster and significantly reduces the number of postoperative complications compared to the standard method of excision of hemorrhoidal nodes.

The technology of performing advanced hemorrhoidectomy according to Milligan-Morgan: the patient is in the position for perineal lithotomy on the back with legs bent at the hip and knee joints, placed on stands.

After treatment of the operative field, divulsion of the anal sphincter is carried out with a rectal mirror, revision of the anal canal. With a window clamp, the internal node is pulled up by the top and the bent electrode of the LigaSure apparatus is placed on its stretched base, which includes the vascular leg. Conduct electroligation of the base of the node at an intensity of 2 or 3 LEDs, after which the internal hemorrhoidal node is removed above the clamp without stitching the vascular pedicle.

The external hemorrhoidal node is grasped, after the node is pulled, electroligation of its base is performed, the node is removed above the clamp. The other 2 internal and 2 external hemorrhoidal nodes are sequentially removed in the same way.

Equipment: The LigaSure electrothermal system, designed for sealing vessels up to 7 mm in diameter, provides controlled energy delivery to tissues and effective compression. The basis of the mechanism of action on tissues

is the melting of collagen and elastin. The strength of the "welded zone", consisting of partially denatured protein, is comparable to the strength of stitched fabric.

Results

Throughout 2020-2021, we analyzed the results of treatment of 612 patients who underwent hemorrhoidectomy using the LigaSure. By analyzing these data, we identified the most common complications of this surgical intervention.

For symptomatic grade III and IY hemorrhoids, some form of hemorrhoidectomy remains the accepted modality of treatment.

The traditional methods like the Milligan—Morgan method have been in practice for more than half a century for want of a better alternative. Recent years have seen the introduction of newer techniques with relative merits and demerits.

The most significant recent introduction has been the circular stapling device for prolapsed hemorrhoids. This has been criticized for not treating the external component of hemorrhoids and the skin tags. Additionally the stapler cartridges are expensive and beyond the reach of most patients.

Trials have also emphasized the significantly shorter convalescence period, patients resumed daily activity after a week. Comparison of LigaSure with other methods for hemorrhoidectomy has found that the operative time and postoperative pain were lesser with LigaSure.

In particular, bleeding in the early postoperative period directly from the wound was detected in 16 patients (2.61%). In 13 patients (2.12%), bleeding was observed for 2-3 days after the operation. It was accompanied with bright *red blood* mixed with feces. During revision of the wound in such patients, bleeding from the wound was not detected. Subsequently, these patients underwent an endoscopic examination, but the location of bleeding was not identified.

Apparently, bleeding was associated with stressful factors. On the 8-9th day after discharge, bleeding was observed in 18 patients (2.94%), that was accompanied with bright red blood mixed with feces. It was also associated with a stressful factor and uncontrolled taking of NSAIDs.
No statistically significant differences were observed in postoperative bleeding, urinary retention, difficult defecating, anal fissure, anal stenosis, incontinence, postoperative pain, return to normal activities, and hospital stay.

Our analysis shows that LigaSure is an effective instrument for hemorrhoidectomy, which results in shorter

operation time and lower recurrence rate.

Patients treated with LigaSure had a significantly shorter operative time and hospital stay. The blood loss during operation was less in LigaSure group. No statistically significant differences were noted in postoperative bleeding, difficult defecating, anal fissure, anal stenosis, and incontinence.

Based on our study and analysis of literature, we have improved treatment strategy.

The treatment included:

1. The day before surgery, patients were administered proton pump inhibitors at a dose of 40 mg per day. They continued taking for 21 days after the surgery;
2. Patients had their last meal 3-4 hours before surgery;
3. Mechanical bowel preparation was performed on the day of surgery by using a combination of sodium dihydrogen phosphate and disodium phosphate (Enema-Sella);
4. Previously, the day before the operation and immediately before the operation, the patients took anxiolytics, in particular, the benzodiazepines;
5. Patients were administered venotonics 2 days before surgery and 4 weeks after. These medications contains diosmin and hesperidin (Ginkor Fort , Phlebodia, Venosmil);
6. In the postoperative period, an ointment with a local anesthetic, glycerin and a topical glucocorticosteroid was applied. It was made by the pharmacy, according to our prescription;
7. After surgery, patients had been taking orally metronidazole 500 mg 3 times a day for 7 days;
8. Patients took nonsteroidal anti-inflammatory drugs with severe pain.
Opioid analgesics were not used;
9. In order to prevent scarring and narrowing of the anus in the postoperative period, we performed anal dilation on the 14th and 28th days after discharge.

Performing electrosurgical hemorrhoidectomy using the modern LigaSure technique, due to the small spread of the damage zone and the absence of sutures in the anal region, leads to a decrease in pain syndrome, absence of bleeding and swelling of tissues, acceleration of wound healing, shortening of treatment periods and temporary disability.

Discussion

The described treatment strategy was used during 2022 for the managment of 312 patients. In the study group, 235 patients (75%) underwent hemorrhoidectomy, and 77 (25%) underwent hemorrhoidectomy with excision of rectal fissures using the LigaSure.

Analyzing the results, a decreasing in the frequency of postoperative complications was identified in the study group in comparison with the control group. In particular, 3 patients (0.96%) had postoperative bleeding, but they were successfully treated conservatively. Stressful bleeding was observed in 1 patient (0.32%), who abused NSAIDs. In 2 patients (0.64%) during examination on the 14th day after discharge, a tendency to narrowing of the anal canal was revealed. Diprospan was injected into the scar tissue of these patients and followed by finger dilation on 28 day after operation.

Such combined therapy combines a rapid local anesthetic effect with effectiveness in accelerating local healing and restoration of local vessels to a normal state. This dual mechanism of action allows you to control both subjective (pain and discomfort) and objective (prolapse and bleeding) symptoms of hemorrhoids, reducing inflammation and improving vascular tone.

It made possible preventing scar stenosis of the anal canal by conservative methods. Administration of ointment with a local anesthetic, glycerin and topical corticosteroid and NSAIDs leads to optimal patients pain relief without usage of opiates.

Conclusion

LigaSure hemorrhoidectomy is a sutureless, closed hemorrhoidectomy technique dependent on a modified electro-surgical unit to achieve tissue and vessel sealing. It is safe and effective, has less blood loss, postoperative pain and complications compared to conventional hemorrhoidectomy. Technically it is much simpler because suturing is not required and hemostasis is easy to achieve.

Improved treatment strategy showed significant efficiency. In particular, we managed to relief postoperative pain without using narcotics, to prevent occurrence of bleeding in postoperative period and to avoid appearance of anal stenosis.

Recommendations

We recommend using the proposed technologies in the practices of surgeons-proctologists for medicaments treatment or surgical operations of patients with chronic hemorrhoids.

Acknowledgements

We wish to gratefully acknowledge the advice and support of representatives and staff Dnipro State Medical University and Regional Proctology Centre (Dnipro, Ukraine) in the preparation of our work and this text.

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