



Review Article

Analysis of the main surgical techniques for hemorrhoids**Magno Otávio Salgado de Freitas^{a,*}, Jaciara Aparecida Dias Santos^{b,c},
Maria Fernanda Santos Figueiredo^a, Cristina Andrade Sampaio^a**^a Post-graduation Program in Primary Care in Health, Surgical Clinic Department, Universidade Estadual de Montes Claros (Unimontes), Montes Claros, MG, Brazil^b Universidade Estadual de Montes Claros (Unimontes), Montes Claros, MG, Brazil^c Program of Undergraduate Research, Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG), Belo Horizonte, MG, Brazil

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ABSTRACT

Introduction: Surgical treatment of hemorrhoidal disease is used in about 5–10% of cases where conservative treatments have not been effective.**Objective:** To learn the surgical techniques used in the treatment of hemorrhoidal disease grades III and IV in the light of literature.**Methods:** This is an exploratory study, with an integrative review of literature published from 2009 to 2015 from databases LILACS, SciELO, MEDLINE, PUBMED and the Portal of CAPES, using the following descriptors: “hemorrhoidectomy” and “hemorrhoids”, in the period from March to May 2015.**Results:** Nineteen articles were selected. In the four more described techniques, the surgical time ranged from 19.58 to 52 min, with relapses from 5%, from 17.5 to 35 min and recurrences of 7.5% to 8.2%, 23–35 min was 20% and 22.5% relapse, 12.5 and 13.2 min, 3.5% of relapses.**Conclusion:** Conventional techniques are still the most commonly performed with a good acceptance on the long-term resolution and low recurrence rate.© 2016 Sociedade Brasileira de Coloproctologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).**Análise das principais técnicas cirúrgicas para doença hemorroidária**

RESUMO

Introdução: O tratamento cirúrgico da doença hemorroidária é utilizado para cerca de 5 a 10% dos casos em que os tratamentos conservadores não surtiram efeito.**Objetivo:** Conhecer as técnicas cirúrgicas utilizadas no tratamento da doença hemorroidária grau III e IV à luz da literatura.

Palavras-chave:

Hemorroidectomia

Hemorroidas

PPH

* Corresponding author.

E-mail: freitasmagno49@gmail.com (M.O.S. de Freitas).<http://dx.doi.org/10.1016/j.jcol.2015.12.008>2237-9363/© 2016 Sociedade Brasileira de Coloproctologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Métodos: Trata-se de um estudo exploratório, com revisão integrativa da literatura publicada nos anos de 2009 a 2015, das bases de dados LILACS, SciELO, MEDLINE, PUBMED e no Portal da CAPES; a partir dos seguintes descritores: hemorroidectomia e hemorroidas, no período de março a maio de 2015.

Resultados: Foram selecionados 19 artigos. Nas quatro técnicas mais descritas, o tempo cirúrgico variou de 19, 58 a 52 minutos e recidivas de 5%, de 17,5 a 35 minutos e as recidivas de 7,5% a 8, 2%, de 23 a 35 minutos e houve de 20% a 22,5% de recidivas, de 12,5 e 13,2 minutos e 3, 5% de recidivas.

Conclusão: As técnicas convencionais ainda são as mais realizadas, com boa aceitação quanto à resolução a longo prazo e com baixo índice de recidivas.

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Introduction

Hemorrhoidal disease (HD) is a condition that afflicts about 4.4% of world population, and is the most common anal disorder. The age distribution shows a higher incidence among patients aged 45–65 years with decreased involvement after 65 years, and the fact that men are more frequently affected than women.^{1,2} The probable cause of the onset of hemorrhoids, according to the theory of Thompson, 1975, would be the prolapsed anal vascular cushions, which are constituted by muscle fibers – a tissue of fibroelastic consistence and vascular plexuses with arteriovenous anastomoses.³

The HD may be internal or external, depending on its relationship to the dentate line. HD is further classified into grades ranging from one to four, with three and four degrees the most serious ones. The possible etiologies of the disease include prolonged effort, pregnancy, constipation, heredity, increased intra-abdominal pressure with obstruction of the venous return, and probably aging. Thus, patients with hemorrhoids may report a bright red bleeding through the rectum, anal pain, protruding masses, itching, burning and discomfort.⁴

Currently, there are several therapeutic possibilities for the treatment of hemorrhoids, with the options ranging from changes in eating habits, medications that alleviate the symptoms, the use of outpatient techniques such as cryotherapy, sclerotherapy, laser photocoagulation and rubber band ligation, to surgical excision techniques for hemorrhoidal prolapses affected by the disease.^{5,6}

The surgical treatment is used in about 5–10% of cases in which the conservative treatment had no effect; patients with symptomatic or acute Grade III or IV hemorrhoids who have not improved with other treatments are elected for the procedure.³

Surgical techniques are often described as five basic types: open and closed techniques, proposed by Milligan–Morgan and Ferguson, respectively, and the semi-closed, amputative, and stapled hemorrhoidopexy (PPH).⁵ With regard to rates of complications, hemorrhoidectomy presents rates ranging from 3% to 12%, and the most common complications are: urinary retention, local pain, bleeding, anal stenosis, perianal fistula, anal incontinence, and recurrence.⁷

In light of this, consideration must be given to the main surgical techniques used in the treatment of grades III and

IV hemorrhoidal disease, as well as aspects inherent to each technique that would interfere in the best prognosis for the patient – postoperative pain, recurrence, surgical time and return to normal activity. However, little has been discussed in the literature about these issues, and even less in Brazilian literature. Thus, this study aims to evaluate the surgical techniques used in the treatment of grades III and IV hemorrhoidal disease, according to the pertinent literature.

Method

This is an exploratory study that outlined, from an integrative review of scientific literature on current surgical, the techniques used in the treatment of grades III and IV hemorrhoidal disease. The choice of this method was due to the possibility of grouping, evaluate and synthesize the results of research on a particular subject in an organized and systematic manner, using it with the objective of obtaining a more comprehensive understanding of the studies on the proposed theme, besides working as a synthesis tool for published and scientifically established studies.⁸

In this research, publications available from 2009 to 2015 in the databases LILACS (Literatura Latino-Americana e do Caribe em Ciências da Saúde), SciELO (Scientific Electronic Library Online), MEDLINE (Medical Literature Analysis and Retrieval System Online), PUBMED and CAPES Portal were surveyed. The search took place from March to May 2015. The descriptors used were “hemorroidectomia [hemorrhoidectomy]”, “hemorroidas [hemorrhoids]” and “PPH”. These descriptors were chosen because they allow to cover and therefore enable the achievement of a diversified result with respect to surgical techniques.

The titles and abstracts of articles were scrutinized for identification of those studies which looked at the proposed objective, considering the following inclusion criteria: studies published in national and international journals written in English, Spanish and Portuguese, and accessed with a free and full text. Review articles, theses, editorials, letters to the editor and studies where the main focus was not the analysis of surgical techniques used in grades III and IV hemorrhoidal disease were excluded.

To data collection, a spreadsheet with seven items to ensure transcription of the most significant aspects of the

articles was produced, and the chosen variables were: name of the study, authorship/year, journal, study objective, study design and conclusions/recommendations. These variables were arranged in the collection instrument in the order in which they were found and selected during the search.

Results and discussion

From the defined strategy, the literature search resulted in 202 articles, of which 70 were found in MEDLINE, 63 in PUBMED, 17 in LILACS, 38 in the CAPES portal, and 14 in SciELO. After reading the titles and abstracts of these articles, 47 potentially relevant studies were found and then carefully read in their entirety. Of these articles, 19 were selected, because they strictly followed the inclusion criteria.

The analysis of the selected material was performed by means of a critical and qualitative reading which allowed the identification of convergences, enabling the following grouping by thematic axes: conventional techniques (Ferguson and Milligan–Morgan), PPH (procedure for prolapsed hemorrhoid), THD (transanal hemorrhoid dearterialization) and LigaSure™; these axes were also defined according to the main issues present in the discussions and with the study outcomes: surgical time, recurrence, postoperative pain and return to activity. After the interpretation of the results, a knowledge synthesis was carried out.

The results are listed in Table 1, in which the title of the study, authorship, journal, study objective, study design and conclusions/recommendations are identified.

In the analysis of the selected articles, we found four studies that compared conventional (open and closed) techniques versus PPH technique; four studies that evaluated PPH technique; two publications that analyzed PPH versus THD; four articles that addressed only conventional techniques; four studies that also analyzed conventional techniques versus LigaSure™; and one study that singly examined THD technique. The number and percentage of products related to the year of publication were also considered in this study, as described in Table 2.

It was observed that the period with the highest number of publications was the year 2013: 6 (31.5%) articles. The years 2011, 2014 and 2015 produced one article each (5.3%). Thus, it is clear that there was a decrease in the number of publications in the last year, showing a decreased concern with respect to the issue at hand. Regarding the country of origin of the publications, it was clear (Table 3) that Brazil and Chile had the highest number of publications: 3 (15.7%) each.

It was found that the four most widely used techniques were: conventional, PPH, THD and LigaSure™.

Conventional surgical techniques

The most commonly used conventional techniques were the open (Milligan–Morgan) and the closed (Ferguson) technique. The open technique is considered the gold standard for the surgical treatment of grade IV hemorrhoidal disease. Initially, this technique was proposed by Salmon in 1830 and popularized since 1937 by Milligan and Morgan; basically it consists of the excision of the hemorrhoidal tissue with ligation and

dissection of the vascular pedicle, leaving the wound open to heal by secondary intention.⁵

On the other hand, the closed technique is considered as a classical procedure; it was described in the literature by Ferguson in 1931 and published in 1959 by James Ferguson and Richard Heaton. This technique is characterized by the excision of the haemorrhoidal tissue, followed by the ligation of the vascular pedicle, but with sutures applied to dissected and resected areas. The surgical procedure includes a reduced surgical time, besides providing the patient with less scar formation and preservation of anal sensitivity.⁶

Surgical time and return to normal activity

According to data described in Fig. 1, the surgical time of the conventional technique ranged from 19.58 to 52 min. Thus, the comparative study between LigaSure™ versus Ferguson techniques, carried out in the surgery sector of the Regional Hospital of Rancagua, in Chile,⁹ showed that the closed technique showed a surgical time of 24.3 ± 7 min. In contrast, the comparison between these same techniques described by the Department of Surgery, Banaras Hindu University, India, showed a surgical time for Ferguson's technique of 29 min.¹⁰

On the other hand, the comparative study between hemorrhoidectomy technique by laser versus conventional open technique that was held in Aloka Hospital, Kosovo, showed a surgical time of 26.74 min.² The investigation developed in China with the open technique (Milligan–Morgan) got the shorter surgical time, which was 19.58 ± 2.71 min.¹¹ The longer surgical time has been reported in a Brazilian study that compared the conventional technique and PPH in a hospital in São Paulo, with the conventional technique, it took approximately 52 min and lasted PPH 31 min with statistical significance.⁷ A long surgical time can expose the patient to a higher risk of infection as the patient loses his/her first protective barrier (skin) against microorganisms, with perianal and perineal sepsis as a potential complication.¹²

With respect to the return to activity, patients returned after periods from 21 days to 10 weeks. In the study of Khanna et al.,¹⁰ this period was of 21 days. In their comparative study between the closed and semi-closed techniques performed in the Outpatient Surgery Department of the Hospital Barros Luco Trudeau in Chile, Azolas et al.¹³ point out that the return was in about 30 days. In his publication, Roldós¹⁴ describes that the return to normal life for his patients occurred within an interval of 29 days. Marianelli et al.⁷ described in their study that the return to normal activity occurred in 10 weeks. A meta-analysis that examined the results of comparisons of conventional hemorrhoidectomy versus LigaSure™ in 10 articles, showed that the use of LigaSure™ was statistically superior in many ways, including less operating time and postoperative pain, faster return to activity and lower rate of complications.¹

Pain and recurrences

Postoperative pain evaluated in this study followed the VAS (Visual Analog Scale) scale that was used in most of the selected studies. VAS is a tool that helps in measuring the intensity of pain, in addition to measuring the efficiency and effectiveness of treatment for the patient. As for the grade of

Table 1 – Distribution of the studies selected, according to the study name, authorship, journal, study objective, study design and conclusions/recommendations, 2009–2015.

Study name	Authorship	Journal	Study objective	Study design	Conclusions/recommendations
Evaluación funcional y encuesta de satisfacción de los pacientes operados de hemorroides con técnica de PPH	Heine, Cápona, López, Larach, Larach, Kronberg, et al. (2010)	Revista Chilena de Cirugía	Knowing the evolution and perception of patients operated for hemorrhoids with the PPH technique in the medium term.	Investigative study	Most patients favorably assessed the hemorrhoidectomy treated by PPH in terms of resolution of postoperative symptoms, functional status, and overall satisfaction in the medium term.
Surgical complications in 2840 cases of hemorrhoidectomy by Milligan–Morgan, Ferguson and combined techniques	Santos, Coutinho, Meyer, Sampaio and Cruz (2012)	Journal of Coloproctology	Review and update 87 cases of surgical complications from a series of 2840 patients undergoing hemorrhoidectomy using Milligan–Morgan, Ferguson and mixed techniques over the period of 46 years of professional activity in this specialty (1965–2011).	Original article	The acceptance of the surgical indication for hemorrhoidectomy was 25.7%, being more common and better accepted by women than by men. This operation was performed more often in patients in the fourth, fifth and third decades of life and the overall incidence of surgical complications was 3.0%. The most common complications were anal stenosis and severe bleeding, with no difference between surgical techniques.
Hemorroidectomia convencional versus Hemorroidopexia Mecânica (PPH). Estudio retrospectivo de 253 casos	Marianelli, Machado, Almeida, Baraviera, Falleiros, Lolli, et al. (2009)	Revista Brasileira de Coloproctologia	Review the experience of the coloproctology service, HSPM-SP, in surgical treatment of hemorrhoidal disease.	Documentary study	The most widely used method for the surgical treatment of hemorrhoids was conventional hemorrhoidectomy. It was also observed that mechanical hemorrhoidopexy (PPH) showed shorter operative time and faster postoperative recovery. Moreover, there was a greater tendency to late complications and recurrences, with the patients in need of a new surgery in the conventional hemorrhoidectomy group.
Hemorroidectomía cerrada y semicerrada: Estudio prospectivo aleatorizado	Azolas, Villalón, Danilla, Hasbún, Gatica and Salamanca (2010)	Revista Chilena de Cirugía	Compare the results of closed versus the half-closed semicerrada hemorrhoidectomy in terms of pain, complications, surgical time and healing.	Investigative study	The study revealed no significant differences for closed and semi-closed hemorrhoidectomy with respect to pain, postoperative complications, scarring and surgical time.

Table 1 – (Continued)

Study name	Authorship	Journal	Study objective	Study design	Conclusions/recommendations
Estudio comparativo entre hemorroidectomía cerrada de Ferguson y hemorroidectomía com LigaSure™	Jaramillo, Beltrán, Bozzo, and Larracheae González (2011)	Revista Colombiana de Cirurgia	Compare conventional hemorrhoidectomy, represented by Ferguson technique versus hemorrhoidectomy with LigaSure™.	Original article	The hemorrhoidectomy with LigaSure™ significantly shortens the surgical time, being comparable in terms of postoperative pain and of complications with Ferguson hemorrhoidectomy.
Nueva técnica quirúrgica para el tratamiento de la enfermedad hemorroidal	Roldós (2010)	Revista Cubana de Cirurgia	Reduce the morbidity of surgical treatment of the disease.	Original article	The proposed technique provides a new option to improve postoperative morbidity of surgical treatment in patients with hemorrhoidal disease. New randomized controlled trials on hemorrhoidectomy techniques are needed.
Análisis y Resultados de la Operación de Ferguson en el Tratamiento de la Enfermedad Hemorroidal	Ferrari, Jamier, Barrionuevo and Andrada (2013)	Revista Argentina de Coloproctología	Prospectively evaluate the results obtained from a series of hemorrhoidectomy procedures performed with Ferguson technique.	Original article	The hemorrhoidectomy with the Ferguson technique resulted in an appropriate and effective procedure for the treatment of grade II or III hemorrhoidal disease, with a low rate of postoperative complications.
Procedimiento para hemorroides con prolapso de mucosa: Técnica de Longo. Reporte preliminar.	Mederos, Pinto and Manzaneda (2009)	Revista Medica Herediana	Evaluate the efficacy and safety of PPH in patients with grades III and IV hemorrhoids with rectal mucosa prolapse.	Original article	Hemorrhoidectomy by PPH is effective in treating symptoms of grade III and IV hemorrhoids with prolapse of the mucosa, at least in the short and medium term.
Hemorroidectomía com LigaSure™ vs. diatermia convencional: Análisis retrospectivo monocéntrico	Papis, Parodi, Herrerías, Sánchez, Gómez, Sierra, et al. (2013)	Acta Gastroenterologica Latinoamericana	Compare the surgical outcomes between the hemorrhoidectomy performed according to Milligan–Morgan technique with use of LigaSure™ and that performed with conventional diathermy.	Original article	The hemorrhoidectomy performed with LigaSure™ proved to be a safe technique, with a low rate of postoperative pain and fewer complications.
Milligan–Morgan hemorrhoidectomy with anal cushion suspension and partial internal sphincter resection for circumferential mixed hemorrhoids	Lu, Shi, Wang, Wu, Liu and Wen (2013)	World Journal of Gastroenterology	Identify a more effective treatment protocol for mixed circumferential hemorrhoids.	Original article	The hemorrhoidectomy by Milligan–Morgan technique is the best treatment for circumferential mixed hemorrhoids, and can be widely used in the clinical setting.

Table 1 – (Continued)

Study name	Authorship	Journal	Study objective	Study design	Conclusions/recommendations
Clinical observations on the treatment of prolapsing hemorrhoids with tissue selecting therapy	Wang, Zhang, Zeng, Zhang, Zhu, Liu, et al. (2015)	World Journal of Gastroenterology	Compare the effects and postoperative complications between the tissue from stapled therapeutics and Milligan–Morgan hemorrhoidectomy.	Original article	Therapy with the use of a stapler for severe prolapsed hemorrhoid is a satisfactory technique for obtaining faster recovery, lower complication rates and higher operating safety.
Laser Hemorrhoidoplasty Procedure vs. Open Surgical Hemorrhoidectomy: a Trial Comparing 2 Treatments for Hemorrhoids of Third and Fourth Degree	Maloku, Gashi, Lazovic, Islami and Juniku-Shkololli (2014)	Acta Informatica Medica	Compare the laser procedure for symptomatic hemorrhoids with an open surgical procedure in outpatient care	Original article	The laser procedure for hemorrhoids was more effective than open surgical hemorrhoidectomy. Postoperative pain and surgical time are only two indicators for this difference.
Comparison of LigaSure™ Hemorrhoidectomy with Conventional Ferguson's Hemorrhoidectomy	Khanna, Khanna, Bhadani, Singh and Khanna (2010)	Indian Journal of Surgery	Compare LigaSure™ hemorrhoidectomy versus conventional Ferguson's 'closed' hemorrhoidectomy for the treatment of grade III and IV hemorrhoids.	Original article	The LigaSure™ hemorrhoidectomy is a safe and effective procedure, with less blood loss, postoperative pain, and complications compared with conventional hemorrhoidectomy. Technically, it is much simpler, by obviating the use of sutures and hemostasis.
Milligan–Morgan Hemorrhoidectomy vs Stapled Hemorrhoidopexy.	Kashani, Mehrvarz, Nzeini and Erfanian (2012)	Trauma Monthly	Evaluate and compare the results of these two surgical procedures in terms of recovery, improvement of symptoms and incidence of complications	Original article	Both techniques are effective methods for the treatment of grade III and IV hemorrhoids and are associated with a recovery rate over 95%. Overall, the results are the same for both techniques. Low postoperative pain was the only advantage of stapling technique versus Milligan–Morgan technique.

Table 1 – (Continued)

Study name	Authorship	Journal	Study objective	Study design	Conclusions/recommendations
Como o Coloproctologista Brasileiro Vê a Doença Hemorroidária–Análise de Dados Colhidos de Questionário Dirigido aos Especialistas Filiados à Sociedade Brasileira de Coloproctologia	Cruz, Alvarenga, Constantino, Andrade, Gomes, Faria, et al. (2009)	Revista Brasileira de Coloproctologia	Analyze the responses to an extensive questionnaire with 52 questions about hemorrhoidal disease (HD)	Original article	The main surgical indication for hemorrhoidal disease was the intensity of symptoms (64.47%), with a preference for the Milligan–Morgan open technique (65.79%).
Transanal haemorrhoidal dearterialisation with mucopexy versus stapler haemorrhoidopexy: a randomized trial with long-term follow-up	Lucarelli, Picchio, Caporossi, De Angelis, Di Filippo, et al. (2013)	Annals of the Royal College of Surgeons of England	Compare the long-term results of transanal hemorrhoidal dearterialization (THD) versus mucopexy and stapled haemorrhoidopexy (SH) in the treatment of grade III and IV hemorrhoids.	Original article	The recurrence rate after THD with mucopexy is significantly higher than after long-term SH, although the results were similar with respect to the control of symptoms and patient satisfaction.
Resultados a um año tras desarterialización hemorroidal guiada por doppler	Gomez-Rosado, Sanchez-Ramirez, Capitan-Morales, Valdes-Hernandez, Reyes-Diaz, Cintas-Catena, et al. (2012)	Cirugia Española	Evaluate the safety and efficacy of this technique (Doppler-guided hemorrhoidal dearterialization) after 1-year follow-up.	Original article	Doppler-guided hemorrhoidal dearterialization appears to be effective after one year, with a low complication rate.
Stapled hemorrhoidectomy; results of a prospective clinical trial in Saudi Arabia	Guraya and Khairy (2013)	Journal of Clinical and Diagnostic Research	Evaluate the effectiveness of stapled hemorrhoidectomy (SH) in terms of cure of symptoms and control of postoperative pain.	Original article	SH is a safe, fast and convenient surgical option grade III and IV hemorrhoids, with a low complication rate, minimal postoperative pain, and early discharge from hospital.
Stapled hemorrhoidopexy e Initial experience from a general surgery center	Jaiswal, Gupta and Davera (2013)	Medical Journal of Armed Forces of India	Knowing the initial experience of a hospital service, regarding stapling technique.	Original article	The PPH method is associated with less postoperative pain and early resumption of activities of daily living. Although the procedure seems simple to perform, it may be associated with serious complications and cannot yet be considered as the standard of care in the surgical treatment of internal hemorrhoids.

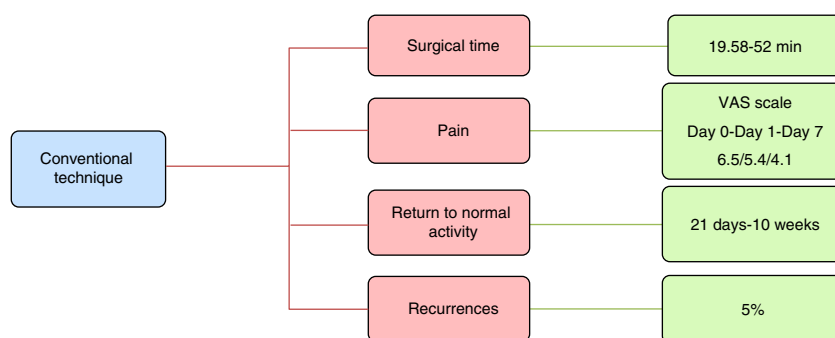


Fig. 1 – Distribution of studies according to surgical time, pain, return to activity and recurrences in the conventional technique, 2009–2015.

pain, it ranges from 0 to 10 (where 0 is related to a total absence of pain and 10 being the maximum level of bearable pain).¹⁵

On average, pain on day zero received a grade = 6.5 (moderate); on day 1, 5.4 (moderate); and on day 7, 4.1 (light), with 5% of recurrences. Jaramillo et al.⁹ observed in their study that pain on day 0 received a grade = 6.1; on day 1, 4.8; and on day 7, 6.3. There were no recurrences. In their study, Khanna et al.¹⁰ found that the pain in VAS scale at day 0 = 8.6; on day 1 = 6.4; and on day 7 = 1.6, with 5% of recurrences. The recurrence rate was confirmed by the study by Kashani et al.¹⁶; these findings compared PPH versus Milligan–Morgan technique in a hospital in Iran; however, the pain grade was = 4.6 on day zero and = 2.3

on day 7. Lu et al.¹¹ only rated the pain as mild, moderate or severe, and the rate of recurrence was not evaluated.

An important point in relation to conventional technique is a lower recurrence rate that, as described in the literature, ranges from 3.1 to 31%.⁷ In this study, the recurrence rate was also lower in comparison with THD techniques and PPH, which suggests better efficiency/effectiveness of the technique, from Cerato et al.³ point of view, who corroborate these findings, emphasizing that the current meta-analyzes and cohort studies comparing PPH versus conventional surgery showed higher recurrence in patients who were treated with PPH.

Relapses cause the occurrence of multiple disorders, since the patient will have to undergo a new surgical procedure. Evidence of lesser pain after surgery and faster recovery times for patients submitted to PPH was also observed, when this technique was compared with the conventional technique.³

Studies suggest that in comparison with the conventional technique, the use of LigaSure™ technique may benefit patients in terms of less postoperative pain and fewer complications, since the intense and prolonged postoperative pain, caused by removal of hemorrhoids always constitutes an important concern for both surgeons and for patients.¹⁷

Procedure for prolapsed hemorrhoid (PPH)

This technique was described by Longo in 1993 as a new surgical option for the treatment of hemorrhoidal disease; with PPH, an annulus of mucosa and submucosa is removed with the use of a circular stapler above the dentate line, with fixation the hemorrhoidal pad for correction of the prolapse.¹⁸

PPH showed a surgical time variation of 17.5–35 min. Not all studies assessed pain by VAS scale; in some articles pain was described as mild or tolerable; the average in those studies that used the VAS scale was: on day zero, grade 5 (moderate); on day 1, grade 3 (mild); and on day 7, grade 2.4 (light). The return to normal activity took place in a period from 7 days to 6 weeks, with a recurrence rate ranging from 7.5% to 8.2% (Fig. 2).

Surgical time and return to normal activity

Both studies of Kashani et al.¹⁵ and Lucarelli et al.¹⁹ (this latter in Italy) obtained surgical times of 35 min and, according to the descriptions of these studies, the time of return to activity took place in 7 and 12 days, respectively. Marianelli et al.⁷

Table 2 – Distribution of the sample according to the year of publication, 2009–2015.

Year	n	%
2009	3	15.8
2010	4	21
2011	1	5.3
2012	3	15.8
2013	6	31.5
2014	1	5.3
2015	1	5.3
Total	19	100

Table 3 – Distribution of the sample according the country of origin of the studies, 2009–2015.

Year	n	%
Saudi Arabia	1	5.3
Argentina	1	5.3
Brazil	3	15.7
Chile	3	15.7
China	2	10.52
Cuba	1	5.3
Spain	2	10.5
India	2	10.5
Iran	1	5.3
Italy	1	5.3
Kosovo	1	5.3
Peru	1	5.3
Total	19	100

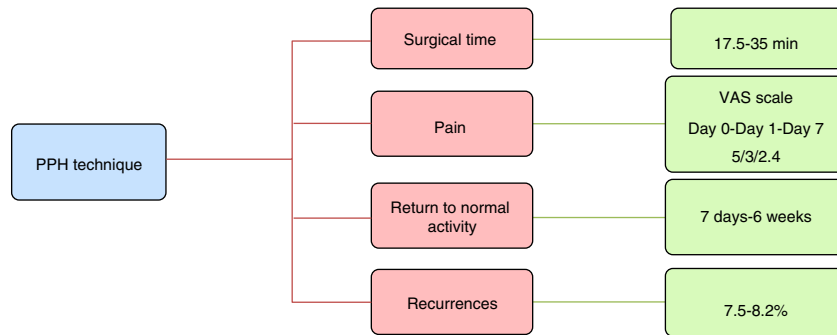


Fig. 2 – Distribution of studies according to surgical time, pain, return to activity and recurrences in the PPH technique, 2009–2015.

found a surgical time of 31 min, with a time of return to activity of 6 weeks. Wang et al.,²⁰ in their comparative study of Milligan–Morgan versus PPH techniques conducted in a hospital in China, noted a surgical time of 18.3 min; however, these authors did not evaluate the return to activity.

The study solely on PPH technique conducted by Mederos et al.¹⁸ in a hospital in Peru had the shorter surgical time, 17.5 min; and in the study by Guraya and Khairy,¹² the duration of the surgical procedure was 21.7 min, and as in these other cited studies, the return to activity has not been evaluated.

Pain and recurrences

In studies using the VAS scale, the average pain on day zero was grade 5; on day 1, grade 3; and on day 7, grade 2.4, with recurrence of 7.5–8.2%. Thus, Kashani et al.¹⁶ demonstrated that the most intense pain got grade 4 on day 0 and 1.7 on day 7, with recurrence of 7.5%. Wang et al.¹⁸ obtained grade 5 on day 0; grade 3 on day 1; and on subsequent days, an average of 2.4; the recurrence was not evaluated. In the study by Lucarelli et al.,¹⁹ the average of the three situations of pain assessment in the VAS scale was = 3, with a recurrence of 8.2%.

As was seen with the application of the VAS scale, postoperative pain was lower, particularly on day 7, compared with the conventional technique. This finding may also be associated with an earlier return to normal activity and with a better well-being of the patient, also in the immediate postoperative period. However, although PPH presents a large number of complications, generally the overall index is similar to that of the conventional technique.³

However, although PPH presents a large number of complications, generally the overall percentage is similar to that of the conventional technique. In addition, PPH “is not effective for bulky external hemorrhoids, or for the thrombosed ones”.³

LigaSure™

This technique was described by Joel Sayfan 2001; in it, one uses a blood vessel sealant tool known as LigaSure™.²¹

Using LigaSure™, surgical times ranged from 12.5 to 13.2 min. On average, the EVA scale on day zero was 5.5 (moderate); on day 1, 3.9 (slight); and on day 7, 2.1 (light). Patients returned to activity after 7 days; 3.5% of them relapsed (Fig. 3).

Surgical time and return to normal activity

In the study conducted by Khanna et al.,¹⁰ the surgical time was 12.5 min and the return to activity occurred in 7 days. In the study by Jaramillo et al.,⁹ the surgical time was 13.2 min, and the return to activity also took place in 7 days. The LigaSure™ technique showed the smallest variation in surgical time; therefore, this is an optimal surgical option with regard to the control of post-operative infections, as well as promoting an earlier return to preoperative routine.

Pain and recurrence

Khanna et al.¹⁰ report that the pain in VAS scale on day zero = 4.9; on day 1 = 3.8; and on day 7 = 1.4; recurrences occurred in 3.5% of cases. Jaramillo et al.⁹ reported that, in their study, the pain in VAS scale on day 0 = 6.1; on day 1 = 4.1; and on day 7 = 2.8. No recurrences were reported.

The hemorrhoidal resection with LigaSure™ is an optimal alternative, by allowing surgical time reduction, of the analgesics needed in the first 24 h, and of postoperative pain.^{21,22} The presence of severe pain within the first 24 h after surgery may promote urinary retention and constipation.¹⁰

Compared with conventional hemorrhoidectomy, the LigaSure™ method attenuates postoperative pain and the need to prescribe parenteral analgesia, since there is a minimal thermal expansion and also by the lack of sutures.³

Hemorrhoidal transanal dearterialization (THD)

Described by Morinaga et al. in 1995 in order to be a new surgical approach in the treatment of hemorrhoids, THD “uses a kit with anoscope that reaches the upper portion of the distal rectum, where with a Doppler device pinpoints the terminal branches of the hemorrhoidal arteries in positions 1, 3, 5, 7, 9 and 11 h in the rectal circumference”. These vessels are cranio-caudally connected [. . .] “to the upper and lower portions of the ligation and are attached; with this, prolapse reduction and fixation occur”.³

THD, the fourth technique covered in the publications surveyed, showed surgical time of 23–35 min. The pain in VAS scale on day zero was 5.5 (moderate); on day 1, 3.0 (slight); and on day 7, 1.4 (light). The return to normal activity took place in 8–14 days, with 20–22.5% of recurrences (Fig. 4).

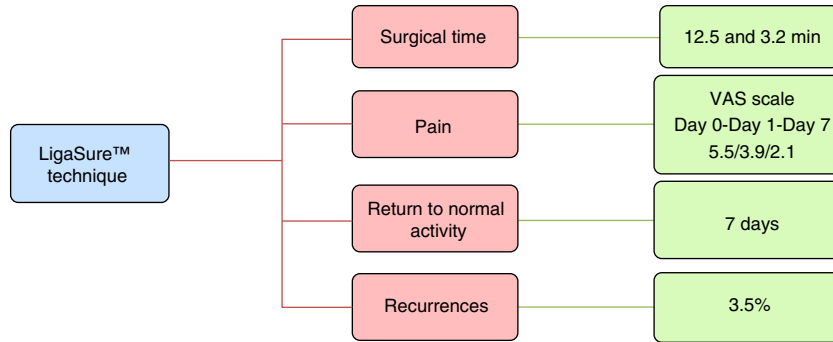


Fig. 3 – Distribution of studies according to surgical time, pain, return to activity and recurrences in the LigaSure™ technique, 2009–2015.

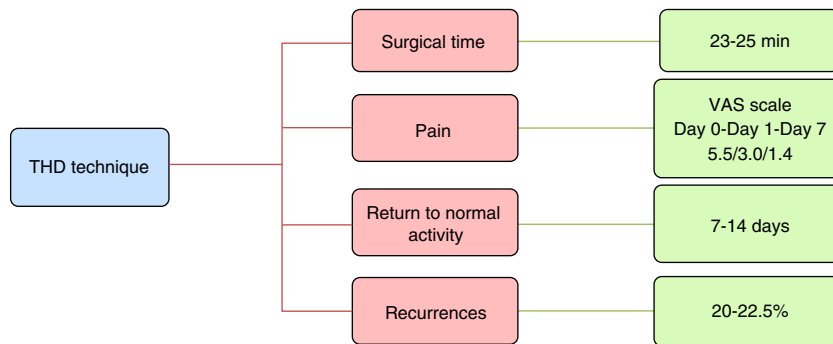


Fig. 4 – Distribution of studies according to surgical time, pain, return to activity and recurrences in the THD technique, 2009–2015.

Surgical time and return to normal activity

In the study by Lucarelli et al.,¹⁹ the surgical time was 35 min and the return to activity took place in 14 days. On the other hand, in the study by Gomez-Rosado et al.,²² performed in a clinic in Spain and that evaluated only THD, the surgical time was about 23 min, and the return to activity took place in 8 days.

Compared with LigaSure™, THD showed a relatively longer surgical time; however, this surgical time is similar to that for PPH, and shorter than that for the conventional technique, suggesting that THD is a good option. The return to activity occurred in a shorter time when compared to conventional techniques and PPH. In addition, THD has the best cost-benefit ratio, as well as a less intense postoperative pain versus PPH. The disease recurrence was similar for both techniques.³

Pain and recurrence

The variation in observed pain was similar to that found by Gomez-Rosado et al.,²² and the recurrence rate was around 22.5%; on the other hand, the study conducted by Lucarelli et al.¹⁹ demonstrated an average pain grade of approximately 4 (light) in the evaluated days, with 20% recurrence rate. A study comparing THD versus PPH for treatment of grade III hemorrhoidal disease concluded that both techniques are comparable. THD has the best cost-effective rate, as well as a less intense pain versus PPH. Recurrence rates were similar.¹ In contrast, the study demonstrates higher recurrence rates for THD technique.

It was observed that after the publication of Thompson’s studies in 1975 on the pathophysiology of this disease, several surgical options have emerged, in an attempt to correct the changes in the vascular cushions and supporting tissue of these structures. Therefore, surgical treatment should be based on symptoms, disease classification, and selection of individual patients, so one can offer the best surgical technique for each case. Thus, an aspect exceedingly important, to be examined by the surgeon, is the proper care of the pain postoperatively, since pain can be a hindrance to the use of a particular technique, even when more modern and efficient.³

Conclusion

Conventional techniques are still the most practiced, with good acceptance as to the long-term resolution and to the low recurrence rate, despite a period of slower recovery and more intense pain. The latest techniques, as THD and LigaSure™, show good results in grade III disease, with shorter surgical times and less pain, but with unsatisfactory long-term results. Thus new studies are required for a safer evaluation.

Although some studies have shown that PPH is also a good option, with shorter surgical times and earlier return to normal activity compared with conventional techniques, that technique has a more limited use, due to the complications that may arise. In this context, this study may provide subsidies to academic and public health professionals, so they have an overview of current and significant studies in the scientific

environment that are crucial to a good understanding of the hemorrhoidectomy.

Conflicts of interest

The authors declare no conflicts of interest.

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