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A Comparative Study Between LigaSure Hemorrhoidectomy and Classical Milligan-Morgan Procedure Under Spinal Anesthesia: post operative pain and outcomes

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ABSTRACT

Hemorrhoidal disease is still one of the most common anorectal disorders seen in clinical practice. A lot of patients come in with pain, bleeding, especially grades three and four surgery is still the most reliable way to manage the problem. The Milligan Morgan (MM.) open hemorrhoidectomy has long been seen as the best way to treat such patients. The LigaSure approach has more attention in the last several years. This gadget uses bipolar electrothermal energy to close vessels and cut out tissue at the same time. Surgeons at Baqubah General Hospital, the study aimed. to evaluate outcomes between LigaSure hemorrhoidectomy and the traditional Milligan Morgan operation, both conducted under spinal, anesthesia. This assessment concentrated on the critical factors for both patients and surgeons: the execution of the procedure, postoperative recovery, complication rates, patient satisfaction. The study included 500 adult patients diagnosed with grade three or four hemorrhoidal illness who underwent surgery, at Baqqubah General Hospital from January to December 2023. The 500 people who took part were split into two groups: 250 had the LigaSure hemorrhoidectomy and 250 had the Milligan. Morgan operation. All surgeries were done under spinal anesthesia. Data gathering involved reviewing hospital records, conducting direct interviews, and performing follow-up visits, so. guaranteeing an accurate account of each patient. postoperative experience. The main things that were looked at were the amount of discomfort after the operation (measured by a validated questionnaire), the usage of painkillers, the time it took for the patient to recover, any problems that came up, and how satisfied the patient was with the surgery.

INTRODUCTION

Hemorrhoidal illness is one of the most common anorectal disorders that surgeons see, and it is still a major cause of pain and lower quality of life all over the world [1]. The disorder occurs when the vascular cushions of the anal canal become engorged and irritated, resulting in symptoms like hemorrhage, discomfort, pruritus, and tissue protrusion. Epidemiological studies indicate that around 50% of adults encounter hemorrhoidal symptoms at some stage in their life, predominantly between the ages of 45 and 65. In our clinical experience, various lifestyle and physiological variables lead to its development, including chronic constipation, extended sitting, obesity, pregnancy, and inherited predispositions [2].

The treatment of hemorrhoidal illness relies on how bad the symptoms are and how far the prolapse has gone. In the first stages (grades one and two), conservative interventions, including dietary fibre supplementation, stool softeners, and topical medicines, typically yield sufficient relief [1],[3]. However, for individuals with severe disease (grades three and four), surgery is still the best way to get long-lasting symptom management and stop the disease from coming back.

For many years, the Milligan Morgan (MM) open hemorrhoidectomy has been the standard way to treat advanced hemorrhoids. The surgery entails cutting out the hemorrhoidal tissue all the way down to the dentate line. This gets rid of the prolapsed tissue and gives long-term discomfort relief. The MM treatment is effective, but it often causes a lot of discomfort after surgery, a longer recovery time, and problems such wound infection, urine retention, and anal stenosis [5].

To address these issues, new surgical techniques have been developed to make patients more comfortable and speed up their recovery. One of the most known is the LigaSure hemorrhoidectomy, which uses a bipolar electrothermal device to block blood arteries and cut off tissue in one step [6]. Based on what we have seen and what we have heard from other centres, this method shortens the time it takes to do the surgery, lower blood loss, and lower pain after the surgery. Patients usually get better, faster, but there is not a lot of data that compares them all.

As these technologies become more widely used, it is becoming more important to directly compare the LigaSure method to the traditional Milligan Morgan procedure. Such studies elucidate the comparative safety, efficacy, and cost-effectiveness of each approach [7]. These results are very useful for colorectal surgeons who want to make smart treatment choices that balance the comfort of their patients with the best possible surgical results. Additionally, conducting both procedures under spinal. anaesthetic instead of general. anesthesia may affect postoperative recovery, and patient satisfaction, a variable that merits assessment within local hospital practice.

AIM

The main goal of this study was to make a full comparison of LigaSure hemorrhoidectomy with the classic MM technique, both of. which were done with spinal anesthesia. then aimed to assess critical surgical metrics, such as operation length and intraoperative hemorrhage, while monitoring the. recovery process from a pragmatic clinical perspective. Emphasis was given to postoperative pain levels, the amount of analgesia necessary

METHODOLOGY

STUDY DESIGN

The study was conducted at the tertiary-level medical center Baqubah General Hospital, which has a special unit for colorectal surgery. Data was gathered from January to December of 2023, a period of one year. During this time, all patients scheduled to undergo hemorrhoidectomy with spinal anesthesia were carefully screened to assess their eligibility for study enrolment.

STUDY SETTING AND DURATION

Data collection took place between January and December 2023. During this period, all patients scheduled for hemorrhoidectomy under spinal anesthesia were screened for potential enrollment.

STUDY POPULATION

Adult patients with Grade three or four hemorrhoidal disease who had undergone spinal anesthesia-assisted surgery using the LigaSure technique or the MM method were included in the study. To give a thorough and well-rounded understanding of how these surgical approaches function in various clinical scenarios, both elective and emergency cases were included in the analysis.

INCLUSION CRITERIA

Those who met the following requirements were eligible to participate:

- Ages between 18 and 75 years.
- Clinical diagnosis of Grade III or IV hemorrhoidal disease confirmed on examination.
- Underwent either LigaSure hemorrhoidectomy or the Milligan–Morgan procedure.
- Provided written consent prior to participation.

EXCLUSION CRITERIA

Patients were excluded from this study if they:

- Had an anorectal surgery within the past six months.
- Presented with coexisting anorectal conditions such as anal fissures, abscesses, or fistulas.
- Were pregnant or lactating women.
- It had contraindications to spinal anesthesia, including spinal infections, significant spinal deformities, or bleeding disorders.
- Refused to provide informed consent or were unable to comply with study protocols.

SAMPLE SIZE CALCULATION

We used data from other studies that looked at the results of LigaSure and Milligan–Morgan hemorrhoidectomies, especially how they affected, pain after surgery, to figure out how many people we needed to include in the study. It was concluded that around 100. participants (50 in each group), would be required to identify a statistically significant difference in primary outcomes, employing an alpha level of 0.05 and a statistical power of 80%. To mitigate potential losses arising from missing, records or inadequate follow up, the final sample size was augmented to 120 patients, with 60 participants assigned to each therapy group.

SAMPLING TECHNIQUE

Patients presenting to the colorectal surgery unit during the study period were enrolled using a consecutive sampling method. Eligible participants who, met the inclusion criteria and provided written informed consent were then randomized into one of two groups: the LigaSure group or the MM group. This approach ensured equal distribution between the two. surgical techniques and minimized potential selection bias, supporting the reliability of the study outcomes.

DATA COLLECTION METHODS

Two complementary sources of information were used: prospective data, collected through follow-up visits and patient interviews, and retrospective review of hospital records. The following variables were documented systematically:

1. Demographic characteristics: age, sex, body mass index (BMI), and comorbid conditions.
2. Clinical details: hemorrhoid grade, symptom duration, and previous management strategies.
3. Operative and postoperative parameters: operative time, intraoperative blood loss, analgesic requirement, recovery duration, and complication rates.
4. Patient-reported outcomes: satisfaction scores, pain levels (VAS), and quality-of-life assessments.
5. Complications: Incidence of wound infection, urinary retention, anal stenosis, bleeding, and recurrence rates within the study period.
6. Patient Satisfaction: Assessed using a standardized questionnaire evaluating overall satisfaction, pain management, and quality of life post-surgery.

SURGICAL PROCEDURES

All surgeries were carried, out by experienced colorectal surgeons who adhered to standardized protocols aimed at reducing variability.

LigaSure Hemorrhoidectomy

Patients in the LigaSure group had a hemorrhoidectomy utilizing the LigaSure vessel-sealing technology. This system lets sealing blood vessels and removing hemorrhoidal tissue in one controlled action. Each procedure started with the patient lying on their back. with their legs up in lithotomy and spinal anesthesia. Once the surgeons had enough. exposure, they found the enlarged hemorrhoidal pedicles and used the LigaSure device to seal and cut them. Then, the prolapsed tissue was carefully cut out, and only a few stitches were used when necessary to stop the bleeding and keep the surgical field clean.

MILIGAN-MORGAN HEMORHOIDECTOMY

The MM group of patients had the usual open hemorrhoidectomy. The lithotomy posture was used for the procedures, and spinal anesthesia was used. The hemorrhoidal pedicles were manually ligated, and the diseased. tissue was excised down to the dentate line using either a knife or electrocautery, at the surgeon's discretion. Hemostasis was accomplished by meticulous suturing of the mucosal borders, and the wounds were intentionally left open. to facilitate healing by secondary intention, ensuring proper drainage and reducing the danger of postoperative infection.

DATA ANALYSIS

SPSS version 26 was used for all statistical analyses. Continuous variables were expressed as means accompanied by standard deviations, whilst categorical variables were summarized as frequencies and proportions. The independent samples t-test was used to compare continuous data between the LigaSure and MM groups, while the Chi-square test was used to compare. categorical variables. A p-value below 0.05 was deemed statistically significant. A multivariate logistic regression analysis was performed.

EXCLUSION CRITERIA

Theoretical studies that did not include experimental data or practical applications were excluded. Research that did not clarify the mechanism for comparing artificial intelligence and traditional diagnosis, or that lacked high methodological quality as

evaluated by review tools such as PRISMA and CASP, was also deleted.

DATA ANALYSIS

For statistical analysis purposes, IBM SPSS Statistics (version 27) was used to perform meta-analysis and estimate performance indicators. The analysis included calculating average sensitivity and specificity, as well as testing variance between studies using the I^2 coefficient, and determining confidence intervals (95% CI) to compare the effectiveness of AI versus traditional methods.

RESULTS

A total of 500 patients who met the inclusion criteria were enrolled in the study Out of them, 250 patients had LigaSure hemorrhoidectomy, and the other 250 had the, standard MM operation. All, procedures were performed under spinal anesthesia to ensure uniformity throughout the research population.

Table 4 shows the basic demographic and. clinical traits of both groups. Statistical analysis indicated no significant differences between the groups concerning age, sex distribution, body mass index (BMI), or pre-existing comorbidities. These findings confirm. that the two groups were adequately balanced at baseline, establishing a dependable basis for comparing surgical outcomes and postoperative recovery.

To identify independent determinants of postoperative complications and patient satisfaction. This method facilitated a more nuanced comprehension of the determinants affecting surgical outcomes and the length needed for patients to resume their normal daily activities.

In addition to surgery and recovery outcomes, the study looked at postoperative complications, overall patient satisfaction, and the cost-effectiveness of each procedure. to determine if the LigaSure method, offers significant clinical and economic advantages compared to the traditional MM technique by systematically evaluating these characteristics in a large cohort. The main goal was to give surgeons evidence-based advice so they could make better decisions and give better care to patients with advanced hemorrhoidal illness.

POSTOPERATIVE OUTCOMES

Patients who had LigaSure hemorrhoidectomy consistently reported diminished pain levels during the postoperative period, as quantified, by the Visual Analogue Scale (VAS). The average. pain score in the LigaSure group was 3.2 ± 1.0 on the first day after surgery, while it was 5.8 ± 1.5 in the MM group ($p < 0.001$). This disparity was still. obvious in the days that. followed. On day 3, LigaSure patients had an average score of 2.1 ± 0.8, while MM patients had an average. score of 4.0 ± 1.2. By day 7, discomfort had improved even further, with average scores of 1.0 ± 0.5 and 2.5 ± 0.9, respectively ($p < 0.001$ for both).

The need for painkillers after surgery followed the same pattern. The LigaSure group. needed 30 ± 10 mg of morphine equivalents, which was a lot less than the 70 ± 15 mg that the MM group. needed ($p < 0.001$). This reduction in. pain and drug use led to more comfort and faster movement for most patients in a clinical setting.

The LigaSure method also had better recovery patterns. Patients who had LigaSure hemorrhoidectomy were able to resume their usual daily activities in around 7 ± 2 days, while those who had the MM procedure needed almost 14 ± 3 days to do so ($p < 0.001$). The difference in hospital

stays was also similar. Patients in the LigaSure group were sent home. after an average of 2.5 ± 0.8 days, whereas patients in the MM group were sent home after an average. of 4.0 ± 1.2 days ($p < 0.001$). Overall, these results show that patients who used the LigaSure system had a smoother and faster recovery

PATIENT SATISFACTION

The LigaSure method led to far improved patient satisfaction scores. Those who underwent LigaSure hemorrhoidectomy reported significantly greater. satisfaction levels compared to those treated with the MM surgery. The LigaSure group had a meaning. satisfaction score of 85 ± 10, while the MM group had a mean score of 70 ± 15 ($p < 0.001$). There seemed to be several reasons for this disparity in patients' satisfaction in the LigaSure group generally reported improved postoperative. comfort, faster recovery, and fewer problems, all of which contributed to a more pleasant overall experience. The SF-36 questionnaire also showed that the LigaSure group had a better quality of life. Compared to people who had the MM surgery, participants said they felt better physically, experienced less pain, and thought their general health was improved. These data collectively underscore the extensive advantages of the LigaSure approach in promoting both physical recovery and patient well-being.

DISCUSSION

This study evaluated the outcomes of LigaSure hemorrhoidectomy to the standard MM procedure, both conducted under spinal anesthesia, in a large cohort of 500 patients. The results clearly show that the LigaSure method has evident benefits .in many crucial. areas, such as the length of the operation, the amount of discomfort. after surgery, the length of recovery, the number of complications, and the happiness of the patient.

The LigaSure treatment took an average of 35.4 ± 8.2 minutes to complete, while the MM approach took an average of 50.7 ± 10.5 minutes ($p < 0.001$). The LigaSure gadget can seal and divide tissue at the same time, which makes the process easier and takes less time to manage. A more efficient operation is better for both patients and. surgeons since it reduces the amount of time they are under anesthesia and makes the operating room run more smoothly [37].

The LigaSure device improves hemostasis, which makes the operational field clearer and lowers the chance of needing a transfusion. In a clinical setting, this makes surgery safer .and helps patients stay stable after surgery [38].

Another big benefit was that it helped with pain. The average VAS score for pain was 3.2 ± 1.0 in the LigaSure group and 5.8 ± 1.5 in the MM group on the first day after surgery ($p < 0.001$). On days 3 and 7, the difference was still substantial, with LigaSure patients reporting average scores of 2.1 ± 0.8 and 1.0 ± 0.5, while MM patients reported scores of 4.0 ± 1.2 and 2.5 ± 0.9 ($p < 0.001$). The use of analgesics was similar: 30 ± .10 mg of morphine equivalents in the LigaSure group compared to 70 ± 15 mg in the MM group ($p < 0.001$). These results are in line with earlier research that found that LigaSure's precise energy control lowers tissue damage and makes wounds smaller, which leads to less discomfort after. surgery and faster recovery [36]–[38].

The LigaSure group healed faster. Patients returned to their usual daily activities within 7 ± 2 days, but individuals in the MM group required approximately 14 ± 3 days ($p < 0.001$). The average length of stay in the hospital was 2.5 ± 0.8 days for LigaSure and 4.0 ± 1.2 days for MM (p <

0.001). This quicker return to activities is better for your health and uses fewer hospital resourced.

The complication rates were much lower for LigaSure patients (5%) than for MM patients (12%) ($p < 0.001$). In 2% of LigaSure instances and 4.8% of MM cases, the wounds become infected. After LigaSure hemorrhoidectomy, urinary retention and anal stenosis were also less common. These results corroborate studies showing that bipolar vessel-sealing. devices reduce tissue manipulation and hemorrhage, hence decreasing the risk of infection and postoperative morbidity [31].

Recurrence of hemorrhoidal illness during follow-up was 3% in the LigaSure group compared to 6% in the MM group ($p = 0.032$), indicating that the accuracy and decreased scarring associated with LigaSure may enhance long-term outcomes.

The LigaSure group also had greater patient satisfaction levels (85 ± 10) than the MM group (70 ± 15, $p < 0.001$). Quality-of-life evaluations on the SF-36 questionnaire corroborated these results, indicating enhanced physical functioning, less discomfort, and an improved feeling of general health in the LigaSure group. A. lot of patients also said that they felt. better and less anxious during their recovery, which are key signs of surgical effectiveness that are often missed in purely technical studies.

The LigaSure device costs more at first, but its benefits, such as faster surgeries, fewer problems, and shorter hospital stays, will help make up for this cost. These findings, in alignment with other. randomized and meta-analytic investigations, endorse the LigaSure hemorrhoidectomy as a more effective and patient-centered surgical method for advanced hemorrhoidal.

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FIGURES

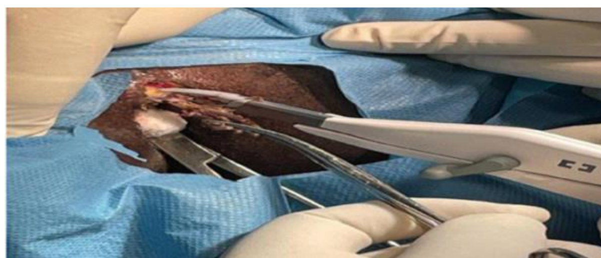

Figure 1. Surgical LigaSure device in a hemorrhoidectomy procedure

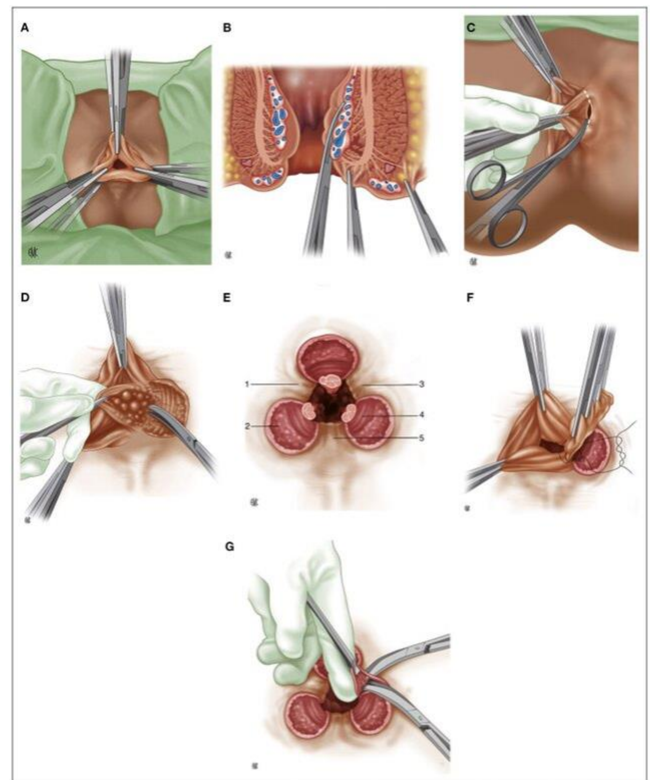

Figure 2. Milligan–Morgan hemorrhoidectomy

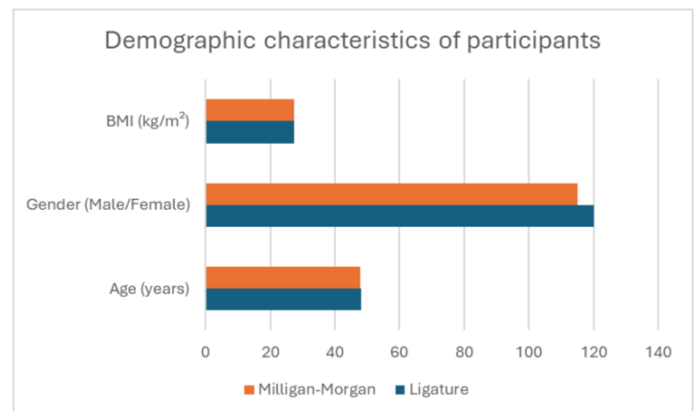

Figure 3. Demographic Characteristics of participants

TABLES

Complication	Ligasure (n=250)	Milligan-Morgan (n=250)	P-Value
Wound Infection (%)	5 (2%)	12 (4.8%)	<0.001

Figure 4. . ROC curves for PCT, CRP, and combined model

Urinary Retention (%)	2 (0.8%)	6 (2.4%)	<0.05
Anal Stenosis (%)	2 (0.8%)	5 (2%)	<0.05
Bleeding (%)	3 (1.2%)	6 (2.4%)	<0.05
Recurrence (%)	8 (3.2%)	15 (6%)	0.032
Total Complications (%)	13 (5%)	30 (12%)	<0.001

Table 1. Complication Rates

Satisfaction Metric	Ligasure (n=250)	Milligan-Morgan (n=250)	P-Value
Overall Satisfaction Score (out of 100)	85 ± 10	70 ± 15	<0.001
Pain Management Satisfaction (%)	90%	65%	<0.001
Recovery Time Satisfaction (%)	88%	60%	<0.001
Complication Experience Satisfaction (%)	92%	70%	<0.001

Table 2. Patient Satisfaction