

## Original Research Article

# Early Outcomes of Sutureless LigaSure Hemorrhoidectomy in Advanced Hemorrhoids

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**Abstract:** **Background:** Grade III–IV hemorrhoids can be accompanied by serious symptoms and become the subject of surgical intervention. Sutureless LigaSure hemorrhoidectomy is a vessel-sealing procedure with the potential to cause less trauma of the operation and early recovery. **Objective:** To determine the early outcomes of sutureless LigaSure hemorrhoidectomy in patients with advanced hemorrhoids. **Methods:** The present prospective observational study was carried at Department of General Surgery, Chandka Medical College Teaching Hospital, Larkana, Sindh. during a period of six months between 25 March, 2025 to 25 September, 2025. Grade III or IV hemorrhoids were used as a criterion to select 40 patients through consecutive sampling. Preoperative evaluation comprised of clinical examination, lab tests, and symptom assessment. The patients were all subjected to sutureless LigaSure hemorrhoidectomy carried out either under spinal or general anesthesia. Data analysis was conducted in SPSS v26. Chi-square was used to determine the significance of associations with  $p \leq 0.05$ . **Results:** The overall operative time was  $24.6 \pm 5.2$  minutes, and the intraoperative blood loss was  $18.4 \pm 6.1$  mL. The scores in the postoperative pain were reduced gradually during the three days (VAS  $4.8 \pm 1.1$  at 6 hours to  $1.9 \pm 0.7$  at Day 3). The incidences of early complications were 22.5% of patients, consisting of urinary retention, bleeding, and wound edema. **Conclusion:** Sutureless LigaSure hemorrhoidectomy is a safe and efficacious procedure in the treatment of advanced hemorrhoids with the benefits of a decrease in the trauma of the operation, the low rates of complications, and quick post-operative recovery.

**Keywords:** LigaSure, hemorrhoidectomy, advanced hemorrhoids, postoperative results, sutureless technique.

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## INTRODUCTION

Hemorrhoidal disease (HD), also known as hemorrhoids, is one of the most common anorectal diseases that is seen in clinical practice all over the world.[1] It is an inflamed and enlarged tissue of the vascular cushions in the anal canal, which may cause painless bleeding, prolapse, and a great deal of pain, especially in later stages of the disease. [2] According to epidemiological studies, a significant percentage of adults have had hemorrhoidal symptoms at some point in their lives; estimates have indicated that about a quarter of the general population may also have such symptoms at any one point, and half or more can have such symptoms by mid-life.[3] This high prevalence highlights the burden on public health of this condition, as well as the common use of surgical intervention in symptomatic patients.

Advanced hemorrhoids (grade III to IV) are also usually referred to as being of degree of prolapse I to IV, depending on how much prolapse there is, which hinders normal daily proceedings and does not respond to conservative measures.[4-6] Surgical intervention is usually required in these stages to relieve the symptoms and to avoid recurrence. Traditional excisional resection procedures, including the Milligan-Morgan hemorrhoidectomy, have long been regarded as the gold standard of the process because of their effectiveness, but are also linked to significant postoperative pain, bleeding, increased surgery time, and late normal activity recovery, which can influence patient satisfaction and utilization of healthcare resources.[7, 8]

To address these difficulties, modern energy-saving tools such as the LigaSure™ system have been implemented in anorectal surgery to improve closure of tissues and reduce trauma during the operation.[9] It is a sutureless LigaSure hemorrhoidectomy procedure that uses bipolar energy to seal the vessels efficiently and could lower the amount of blood loss in the intraoperative period, shorten the time of operation, and reduce postoperative pain compared to traditional dissection and ligation.[9] Positive early results are emerging in large series, in comparative series, which indicate encouraging results as far as operative efficiency, lower complication rates, shorter hospital stay, and acceptable rates of recurrence in patients with advanced hemorrhoidal disease are

concerned.[10-12]

Although these encouraging reports are made, additional assessment of early clinical outcome is necessary, particularly in diverse clinical environments and different patient populations. Furthermore, the sutureless feature of the LigaSure system can provide practical benefits, including the ease of the procedure, the burden of operations on the surgeon, and the improvement of the postoperative outcome, which are not yet fully measured within most healthcare settings. Consequently, the research was aimed at evaluating the initial results of sutureless LigaSure hemorrhoidectomy in patients with stage III and IV hemorrhoids.

## MATERIAL AND METHODS

The study was done as a prospective observational cohort study to examine the initial results of sutureless LigaSure hemorrhoidectomy among patients with advanced hemorrhoids. A prospective design was also taken as a means of ensuring that the operative findings and postoperative outcomes were recorded in a standardized and real-time manner, enhancing the accuracy and completeness of the data collected. The research was conducted at Department of General Surgery, Chandka Medical College Teaching Hospital, Larkana, Sindh. for six months from 25 March, 2025 to 25 September, 2025. The openEpi version 3.01 was used to estimate one population proportion with an early (postoperative complication rate of about 2.1% when patients with advanced hemorrhoids underwent LigaSure hemorrhoidectomy. Using this prevalence ( $p = 2.1\%$ ), confidence level of 95%, and absolute precision of 5%, the minimum sample size calculated was 32 patients.[13] A sample size of 40 patients was added to compensate for the potential dropouts and incomplete follow-up. The sampling method was a non-probability consecutive sampling. During the study, all patients who arrived at the clinic with Grade III and Grade IV hemorrhoids and met the inclusion criteria were included consecutively until the desired sample size was reached. This strategy helped include all the eligible patients and reduce selection bias under the practical limitations of a hospital-based surgical investigation. Inclusion criteria were that the patients must be 18 years or older, have been clinically diagnosed with symptomatic Grade III or Grade IV hemorrhoids on examination and anoscopy, be fit to

undergo surgery under spinal or general anesthesia, and have provided written informed consent to take part in the study. Patients were excluded in the case of previous anorectal surgery, concomitant anorectal conditions (fissure, fistula, or perianal abscess), thrombosed hemorrhoids that could not be safely discontinued, inflammatory bowel disease, anorectal malignancy, or pregnancy. Eligible patients in the outpatient department and surgical wards were identified after getting the approval of the institutional ethical review committee. An extensive clinical history was taken, such as the length of the symptoms, bleeding in the rectum, prolapse, pain, and prior interventions. General physical and anorectal examination has been performed thoroughly, and hemorrhoids have been classified based on a clinical standard scale. Baseline tests such as complete blood count, coagulation profile, blood glucose, and other pertinent pre-anesthetic tests were conducted. All participants gave informed consent in written form. The procedures were conducted by well-trained surgeons who were trained in the LigaSure technique. Patients were put in the lithotomy position under spinal or general anesthesia. Hemorrhoidal pedicles were located, closed, and cut with the help of the

LigaSure vessel sealing system without the use of sutures. Intraoperative hemostasis was maintained. The patients were followed up after the operation concerning pain, bleeding, urinary retention, and other acute complications. The evaluation of pain was done using the Visual Analogue Scale (VAS) at 6 hours, 24 hours, and on the third day of the operation. The recorded parameters were operative time, intraoperative blood loss, length of stay, and time to resume usual activities. The patients were tracked through the initial postoperative period for two weeks to monitor the wound healing and early complications. All the data were documented in a structured proforma that was formulated specifically for the study. The data were input and processed in Statistical Package of Social Sciences (SPSS) version 26. The quantitative variables, including age, the length of operation, pain scores, and the length of stay, were expressed in mean and standard deviation. Frequencies and percentages were used to present the qualitative variables, including gender and postoperative complications. The chi-square test was used to determine the relationships among categorical variables. A p-value of below 0.05 was taken to be significant.

## RESULTS

The study involved 40 patients who had advanced hemorrhoids. The average age of the patient population was  $41.8 \pm 10.6$  years, and most of them (55%) were in the age range of 31-50 years. The study population was 65% males and 35% females. The majority of patients came with Grade III hemorrhoids (62.5%), and the other 37.5% exhibited Grade IV hemorrhoids. The presenting symptom was mostly prolapse as it was seen in all patients, then bleeding per rectum (85%), pain (45%), and mucous discharge (22.5%) (Table 1).

Every patient had a sutureless LigaSure hemorrhoidectomy, with the mean length of operation of  $24.6 \pm 5.2$  minutes and mean intraoperative hemorrhage of  $18.4 \pm 6.1$  mL. The average length of stay of the hospital was  $1.4 \pm 0.5$  days, and the patients returned to normal activities after an average of  $6.3 \pm 1.8$  days. The postoperative pain measured in terms of Visible Analogue Scale (VAS) revealed that the pain was reducing over time, with means of  $4.8 \pm 1.1$  at 6 hours,  $3.2 \pm 0.9$  at 24 hours, and  $1.9 \pm 0.7$  at the third postoperative day (Table 2).

The primary postoperative complication was 22.5%, and the most frequent of these complications were urinary retention (7.5%), wound edema (10%), reactionary bleeding (2.5%), and surgical site infection (2.5%). There was no significant relationship between the presence of complications with either the grade of hemorrhoids ( $p = 0.412$ ) or the gender of the patient ( $p = 0.587$ ) (Table 3 and Table 4).

**Table 1: Baseline Demographic and Clinical Characteristics of study participants (n = 40)**

| Variable                                    | Frequency (n)                     | Percentage (%) |
|---------------------------------------------|-----------------------------------|----------------|
| <b>Age (years) (Mean<math>\pm</math>SD)</b> | <b><math>41.8 \pm 10.6</math></b> |                |
| 18–30 years                                 | 8                                 | 20.0           |
| 31–50 years                                 | 22                                | 55.0           |
| >50 years                                   | 10                                | 25.0           |
| <b>Gender</b>                               |                                   |                |
| Male                                        | 26                                | 65.0           |
| Female                                      | 14                                | 35.0           |
| <b>Grade of Hemorrhoids</b>                 |                                   |                |
| Grade III                                   | 25                                | 62.5           |

|                            |           |             |
|----------------------------|-----------|-------------|
| <b>Grade IV</b>            | <b>15</b> | <b>37.5</b> |
| <b>Presenting Symptoms</b> |           |             |
| <b>Bleeding per rectum</b> | <b>34</b> | <b>85.0</b> |
| <b>Prolapse</b>            | <b>40</b> | <b>100</b>  |
| <b>Pain</b>                | <b>18</b> | <b>45.0</b> |
| <b>Mucous discharge</b>    | <b>9</b>  | <b>22.5</b> |

**Table 2: Operative and Postoperative Outcomes of study participants (n = 40)**

| <b>Variable</b>                              | <b>Mean ± SD</b>  |
|----------------------------------------------|-------------------|
| <b>Operative time (minutes)</b>              | <b>24.6 ± 5.2</b> |
| <b>Intraoperative blood loss (ml)</b>        | <b>18.4 ± 6.1</b> |
| <b>Hospital stay (days)</b>                  | <b>1.4 ± 0.5</b>  |
| <b>Time to resume normal activity (days)</b> | <b>6.3 ± 1.8</b>  |
| <b>VAS pain score at 6 hours</b>             | <b>4.8 ± 1.1</b>  |
| <b>VAS pain score at 24 hours</b>            | <b>3.2 ± 0.9</b>  |
| <b>VAS pain score Day 3</b>                  | <b>1.9 ± 0.7</b>  |

**Table 3: Early Postoperative Complications and Associations (n = 40)**

| <b>Variable</b>              | <b>Complication Present<br/>n (%)</b> | <b>No Complication<br/>n (%)</b> | <b>p-value</b> |
|------------------------------|---------------------------------------|----------------------------------|----------------|
| <b>Overall Complications</b> | <b>9 (22.5)</b>                       | <b>31 (77.5)</b>                 | <b>—</b>       |
| <b>Grade of Hemorrhoids</b>  |                                       |                                  | <b>0.412*</b>  |
| <b>Grade III (n = 25)</b>    | <b>4 (16.0)</b>                       | <b>21 (84.0)</b>                 |                |
| <b>Grade IV (n = 15)</b>     | <b>5 (33.3)</b>                       | <b>10 (66.7)</b>                 |                |
| <b>Gender</b>                |                                       |                                  | <b>0.587*</b>  |
| <b>Male (n = 26)</b>         | <b>5 (19.2)</b>                       | <b>21 (80.8)</b>                 |                |
| <b>Female (n = 14)</b>       | <b>4 (28.6)</b>                       | <b>10 (71.4)</b>                 |                |

*\*Chi-square test applied and  $p \leq 0,05$  was considered as significant.*

**Table 4: Types of Early Postoperative Complications Within 2 Weeks of study participants (n = 40)**

| <b>Complication Type</b>       | <b>Frequency (n)</b> | <b>Percentage (%)</b> |
|--------------------------------|----------------------|-----------------------|
| <b>Urinary retention</b>       | <b>3</b>             | <b>7.5</b>            |
| <b>Reactionary bleeding</b>    | <b>1</b>             | <b>2.5</b>            |
| <b>Wound edema</b>             | <b>4</b>             | <b>10.0</b>           |
| <b>Surgical site infection</b> | <b>1</b>             | <b>2.5</b>            |

## DISCUSSION

In a prospective observational cohort study of sutureless LigaSure hemorrhoidectomy on 40 patients with advanced hemorrhoids, we discovered that the surgery was a relatively short procedure that was associated with a low rate of intraoperative blood loss, early postoperative pain scoring was acceptable, the complication rate was low, and the patients returned to normal activities relatively quickly. Our results on operative time and blood loss are in line with the results of current comparative studies. In a large comparative study in 2025, it was proven that the time of operation ( $18 \pm 4.6$  minutes) and the amount of blood loss during the operation ( $17 \pm 6.3$  mL) of patients treated with LigaSure hemorrhoidectomy were significantly shorter and lower, respectively, than the respective data of conventional methods ( $p < 0.0001$  in both cases).[14] According to similar evidence of current prospective work, LigaSure significantly shortens the duration of operation and

bleeding, in line with our mean of  $24.6 \pm 5.2$  minutes of operation and low blood loss.[15] Concerning postoperative pain, a number of studies have reported similar results in the recent past. In the example, visual analogue scale (VAS) pain scores after LigaSure were lower than after conventional procedures ( $2 \pm 1.16$  vs.  $6.17 \pm 1.5$ ;  $p < 0.0001$ ), which is consistent with our cohort, where the mean VAS scores rapidly decreased during the first three days of the postoperative period.[14] Other studies indicate a decrease in pain with vessel sealing technology, with LigaSure being advantageous in minimizing nerve irritation and tissue harm.[16] Regarding the postoperative complications, the outcome posted in our group (22.5%) was typically smaller compared with numerous accounts of conventional surgery, and no explicit comparisons would be made with LigaSure-only studies. A cohort of 2025 patients who underwent adjunct lateral internal sphincterotomy showed low complication levels (13%) and high functional outcomes, indicating that technical

improvements can further reduce the negative occurrence.[17] There was also a positive trend in another prospective study in 2021, which demonstrated a reduction in complications, especially pain, bleeding, and perianal fistula formation in LigaSure patients and not in the traditional technique.[18] In terms of hospital stay and recovery, our mean hospital stay of  $1.4 \pm 0.5$  days is not a bad result compared to the literature, with shorter hospital stays commonly found in the case of a LigaSure procedure due to better hemostasis and less postoperative discomfort. The latest study reflected fewer days in the hospital in the LigaSure group than in traditional surgery ( $2 \pm 0.5$  vs.  $2.96 \pm 0.6$  days;  $p < 0.0001$ ).[14] In previous studies, this has been observed with faster mobilization and normal return to activities with the LigaSure, which we also found in the clinical setting, with a mean return to activity of about  $6.3 \pm 1.8$  days.[19] Comparative designs have repeatedly demonstrated that LigaSure hemorrhoidectomy is better intraoperatively and has lower morbidity as compared to conventional designs or open designs. A randomized trial of 2025 showed a statistically significant shortening of the operating times and a reduction in blood loss in the LigaSure arm, but no statistically significant differences in pain scores.[20] Although certain results vary, these trials demonstrate the overall advantage profile of the LigaSure technology. Interpretation of our results is also informed by comparative research outside of the field of conventional surgery. Indicatively, comparative studies between LigaSure and other minimally invasive procedures (e.g., laser hemorrhoidoplasty) have discovered that laser procedures might provide even less pain and hospitalization in a select few patients at the expense of increased recurrence in some cases. Although these other modalities are of interest, the majority of evidence of which we are part still confirms LigaSure as a fairly reliable technique with promising initial results in the case of advanced disease. Collectively, the sources published starting in 2021 and continuing to 2025 have shown consistent results that LigaSure hemorrhoidectomy offers significant benefits in terms of efficiency and early postoperative comfort and smooth recuperation over traditional methods. These observations are generally consistent with our results, which support the usefulness of LigaSure as a surgical intervention in patients with grade III and IV hemorrhoids. The results of the present research indicate that sutureless LigaSure hemorrhoidectomy is a safe and effective procedure that can be used in patients with advanced Grade III and Grade IV hemorrhoids. The lower time spent operating and the less blood loss during the operation process are the signs to suggest that the surgical efficiency is enhanced in our cohort, which can be translated into better utilization of the operating room and reduced exposure to anesthesia. The improved patient comfort and accelerated recovery after surgery are further

supported by a relatively low score on postoperative pain/short hospital stay. The high incidence of early postoperative complications supports the validity of vessel sealing technology in obtaining sufficient hemostasis without necessarily any suture ligation. This can possibly decrease the occurrence of reactionary hemorrhage and limit tissue injury. The reduced time to resume normal daily functioning emphasizes the possible socioeconomic advantage of this method, especially among working-age groups, as it reduces productivity loss and enhances quality of life in general. The LigaSure hemorrhoidectomy can be of practical benefit in resource-constrained circumstances where the availability of hospital beds and time spent operating matters. This reproducibility of the results when conducted by suitably trained surgeons could also be a result of standardization of the procedure and decreased technical complexity compared to other conventional ligation methods.

**Limitations** This research has some limitations, despite the positive outcomes. To begin with, the sample size is relatively small, and thus the results may not be applicable in larger populations. External validity would be more robust with larger multicenter studies. Second, the lack of a comparison group, e.g., patients with a conventional hemorrhoidectomy, limits the direct assessment of the applicability of the LigaSure technique's superiority. A comparative or randomized study would be more effective in offering evidence on its comparative benefits. Third, the follow-up period paid attention to early postoperative outcomes only, and the long-term outcomes, like recurrence, anal stenosis, or chronic pain, were not evaluated. Hence, this study cannot be used to conclude on long-term efficacy. Also, the subjective method of pain evaluation by the Visual Analogue Scale, despite its popularity, can be biased by personal experience of pain, and analgesics can be used. Lastly, the study was only carried out in one tertiary care center, and therefore, institutional practices and surgeon experience could have affected the results. It is advisable that further, large-scale, randomized, and long-term studies be conducted to confirm these findings and come up with conclusive clinical guidelines.

## Conclusion

The sutureless LigaSure hemorrhoidectomy had good initial results in patients with Grade III and IV hemorrhoids, with reduced operating time, reduced blood loss, tolerable postoperative pain, reduced complications, and normal activities were resumed too soon. This method was demonstrated to be safe, effective, and clinically reliable during the first postoperative stage. The results of LigaSure hemorrhoidectomy as a workable, contemporary surgical procedure in the treatment of intermediate hemorrhoidal disease as a viable medical intervention in terms of patient recovery and operative results. It should be further investigated with large-scale and

long-term studies to establish its role as a standard procedure in modern anorectal surgery.

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