

## Original Research Article

# A comparison study between vessel sealing technique and conventional (Milligan Morgan) excisional hemorrhoidectomy

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### ABSTRACT

**Background:** Excisional hemorrhoidectomy including the Milligan-Morgan technique and its modification has been the most widely used and effective procedure for grade 3 and grade 4 hemorrhoids. But due its complications attempts were made to modify these conventional approaches by using different techniques or tools to decrease blood loss, and reduce operating time and postoperative analgesic requirement. The aim of the present study was to compare vessel sealing technique with conventional Milligan Morgan hemorrhoidectomy in terms of safety and efficacy.

**Methods:** This study was performed after the approval of the ethics committee of review board of Maharashtra University of Health Sciences during the period May 2010-2012 on patients of grade 3 and 4 hemorrhoids. 60 patients were included in the study after giving written consent. They were divided into two groups consisting 30 in each and conventional hemorrhoidectomy or vessel sealing technique hemorrhoidectomy was performed respectively. The demographic data, duration of surgery, blood loss during surgery, intraoperative and postoperative complications, postoperative pain, initiation of bowel movement and in hospital stay were evaluated. The postoperative pain was evaluated with the visual analogue score (VAS) after surgery.

**Results:** The mean operative time, blood loss, pain score and requirement of analgesia was significantly ( $p < 0.05$ ) higher in patients treated with conventional Milligan Morgan hemorrhoidectomy (MMH) compared to vessel sealing (VS) method. The time for first bowel movement, length of hospital stay was longer in MMH group compared to VS group. The ability of patient to return to normal activities had taken significantly ( $p < 0.05$ ) longer time in patients operated with conventional method compared to VS method. Experience of early and late complications after surgery in two groups was comparable but the difference was not significant.

**Conclusions:** Vessel sealing technique for hemorrhoidectomy is a feasible and time saving technique for the surgeon and a comfortable procedure for the patient.

**Keywords:** Vessel sealing, Hemorrhoidectomy, Milligan Morgan

### INTRODUCTION

Hemorrhoids, a varicose condition which causes per rectal bleeding, is one of the common illness in almost 50% of elders above 50 years. The effective and ultimate treatment for 3<sup>rd</sup> and 4<sup>th</sup> grade hemorrhoids was excisional hemorrhoidectomy.<sup>1-3</sup> Even though it is thought to be a small procedure but the postoperative complications with this technique such as pain, bleeding,

urinary retention, wound infections and prolonged healing made this as a last choice.

Hence, a definitive trend is developing towards innovative simple treatments for hemorrhoids. In this attempt a few alternative procedures including bipolar electro thermal device, circular stapler and ultrasonic scalpel have been introduced with the aim of minimizing pain, bleeding and postoperative complications.<sup>4,5</sup>

Conventional Milligan Morgan open hemorrhoidectomy (MMH) is still most commonly implemented procedure for prolapsing haemorrhoids.<sup>6</sup> However, the vessel sealing system is a novel, haemostatic device that seals blood vessels by an optimized combination of pressure and radiofrequency ablation.<sup>7</sup> It ensures complete occlusion of arteries and veins up to 7 mm in diameter with minimal surrounding dermal spread and limited tissue charring. Thus this operation can be recommended as the ideal technique because of the potential reduction in tissue trauma.<sup>8</sup>

The purpose of the study is to evaluate the efficacy of vessel sealing (VS) technique for hemorrhoidectomy in reducing operative blood loss, operating time per hemorrhoid, postoperative pain, analgesia required, complications and length of hospital stay and time for returning to normal activities.

## METHODS

This study was performed after the approval of the ethics committee of review board of Maharashtra University of Health Sciences during the period May 2010-2012 on patients of grade 3 and 4 hemorrhoids either diagnosed for the first time or already diagnosed before, who were referred to outpatient department. The patients were randomly divided into two equal groups consisting 30 in each, before surgery with a random number generator. Conventional hemorrhoidectomy or Vessel sealing technique hemorrhoidectomy was performed respectively on the sixty patients who had grade 3 or grade 4 hemorrhoidal diseases. The details of the study were explained to all the patients included in the study. The patients signed informed consent forms. No patient dropped out of the study during the study.

The patients had no accompanying disease other than hemorrhoidal disease. Coexisting anorectal disease, previous anorectal operation, thrombosed hemorrhoids, hematologic pathology, inflammatory bowel disease, patients on antiplatelet medications, patients with hypertension, uncontrolled diabetes and liver cirrhosis and unwillingness of the patient were the exclusion criterias.

The demographic data, duration of surgery, blood loss during surgery, intraoperative and postoperative complications, postoperative pain, the initiation of bowel movement and in hospital stay were evaluated. The blood loss was calculated by measuring the blood volume collected in the receptacle of the suction device and by calculating the number of gauze pieces used intraoperatively (approx 5 ml/ gauze piece).

The postoperative pain was evaluated with the visual analogue score (VAS) after surgery. The visual analogue pain evaluation scale was presented and explained to the patients before surgery and their understanding was

confirmed. The patients unable to ascertain the scales were excluded from the study.

The patients were placed in the lithotomy position and a Sim's retractor was used to expose the hemorrhoids. In Vessel seal hemorrhoidectomy, the hemorrhoid bundle was grasped and retracted. The device was applied 1-2 mm away from the skin-mucosa junction. The hemorrhoid bundle resection was started at the junction of the hemorrhoid and the flat perianal skin up to the base of the pedicle without performing sub mucosal dissection. Povidone iodine ointment soaked gauze was inserted into the anal canal after the surgery.

All operations were performed under spinal anesthesia. Postoperative analgesic was given to the patients as per patient requirement 50 mg tramadol was given but never more than 4 tablets per day. All patients were started on stool softening agents from the day of surgery. After discharging the patients from the hospital they were called for examination on postoperative day seven, second and third weeks after surgery during the early postoperative period. To analyze the long term outcomes, the patients were followed up at regular intervals and findings noted using a specially prepared proforma. No patients dropped out of the study during the follow up period. The follow up data was collected from the outpatient clinic.

## Descriptive analysis

Continuous variables will be summarized by group using summary statistics (number of observations, mean and standard deviation with range of minimum and maximum). Categorical values will be summarized by treatment group using frequencies and percentages.

## Tests of significance

Comparison of variables representing categorical data that is early and late complications were performed using chi square Test. Other efficacy variables that are mean time to return normal activities, mean hospital stay, mean time for first bowl movement, mean pain score and mean analgesia required were compared by using student t test. All values were reported base on two-sided and all the statistical tests will be interpreted at 5% level of significance level.

## RESULTS

Table 1 reveals that 70.0% of the cases were male in MMH group which was significantly more as compared to 40.0% among VS group. 56.7% of the cases in MMH group belong to Grade 3 which was less than 76.7% among VS group but the difference was not significant. 76.7-83.3% cases had more than two number of hemorrhoids (H) among both the groups which were comparable and difference was insignificant.

**Table 1: Sex, grade and number of hemorrhoid distribution in both groups.**

| Parameters   | MMH        | VS        |
|--------------|------------|-----------|
| No. of cases | 30         | 30        |
| Sex (%)      |            |           |
| Male         | *21 (70.0) | 12 (40.0) |
| Female       | 09 (30.0)  | 18 (60.0) |
| Grade (%)    |            |           |
| 3            | 17 (56.7)  | 23 (76.7) |
| 4            | 13 (43.3)  | 07 (23.3) |
| No. of H (%) |            |           |
| 1            | 05 (16.7)  | 07 (23.3) |
| 2            | 16 (53.3)  | 14 (46.7) |
| 3            | 09 (30.0)  | 09 (30.0) |

\* = p <0.05, considered statistically significant

All parameters like Hb level, WBC count, protein and serum albumin levels were within normal ranges in both

the groups and difference was not statistically significant as given in Table 2.

The mean operative time (OT) for three grades of pile mass in MMH group was significantly higher compared to VS group and was shown in Table 3.

A significant increased mean blood loss was observed in MMH group for all the three grades of pile mass compared to group underwent with vessel sealing technique as observed in Table 4.

Data in Table 5 reveals the mean score of pain at baseline was significantly more as compared to VS group till the end of 2<sup>nd</sup> week. Mean score of pain at week 3 was 0.30 among MMH group and VS group which was same and thus the difference was statistically insignificant as in Table 5.

**Table 2: Duration of surgery among study groups.**

| Parameters    | (Mean±sd)       |                 |
|---------------|-----------------|-----------------|
|               | MMH (N=30)      | VS (N=30)       |
| Hb level      | 10.90±1.75      | 10.78±1.71      |
| WBC count     | 7323.33±2149.53 | 6790.00±2132.73 |
| Protein level | 5.92±0.28       | 5.85±0.27       |
| Serum albumin | 3.11±0.34       | 3.14±0.37       |

**Table 3: Comparison of mean operative time as per pile mass.**

| Pile mass | N  | Mean OT time in minutes (mean±sd) |    |           |
|-----------|----|-----------------------------------|----|-----------|
|           |    | MMH                               | N  | VS        |
| 1         | 30 | 13.43±2.33*                       | 30 | 5.20±1.81 |
| 2         | 25 | 13.56±2.50*                       | 23 | 5.13±1.66 |
| 3         | 09 | 13.22±2.44*                       | 09 | 4.67±1.66 |

\* = p <0.05, considered statistically significant

**Table 4: Comparison of mean blood loss as per pile mass.**

| Pile mass | N  | Mean OT time in minutes (mean±sd) |    |           |
|-----------|----|-----------------------------------|----|-----------|
|           |    | MMH                               | N  | VS        |
| 1         | 30 | 57.67±15.91*                      | 30 | 8.97±4.81 |
| 2         | 25 | 56.80±14.92*                      | 23 | 7.61±3.95 |
| 3         | 09 | 55.56±15.90*                      | 09 | 8.33±2.50 |

\* = p <0.05, considered statistically significant

The requirement of tramadol capsules as analgesics from day 1-3 in Milligan Morgan technique underwent group was significantly more than vessel sealing procedure operated group as given in Table 6.

The comparison of mean time for first bowel movement after surgery and duration of stay in hospital were comparable between the two groups but the difference was not significant statistically. The time taken for patients to return to their normal daily activities was

significantly longer in conventionally operated group compared to patients operated with vessel sealing technique as seen in Table 7.

retention anal stenosis and occurrence of fissures was more in MMH group as compared to VS group. But the difference was not significant.

Table 8 reveals that the development of early and late complications after surgery like bleeding, urinary

**Table 5: Comparison of mean pain score between procedures.**

| Duration | Mean pain (mean±sd) |           |
|----------|---------------------|-----------|
|          | MMH (N=30)          | VS(N=30)  |
| POD 1    | 5.73±1.28*          | 2.80±0.76 |
| POD 2    | 5.20±1.52*          | 2.57±0.73 |
| POD 3    | 5.10±1.47*          | 2.43±0.77 |
| Week 1   | 2.97±1.33*          | 1.63±0.81 |
| Week 2   | 2.40±1.63*          | 0.77±0.82 |
| Week 3   | 0.30±0.60           | 0.30±0.53 |

**Table 6: Comparison of mean analgesia required.**

| Duration in Days | Mean analgesia required (mean±sd) |           |
|------------------|-----------------------------------|-----------|
|                  | MMH (N=30)                        | VS (N=30) |
| POD 1            | 3.27±0.64*                        | 1.70±0.84 |
| POD 2            | 2.87±0.63*                        | 1.43±0.73 |
| POD 3            | 2.73±0.74*                        | 1.43±0.77 |

**Table 7: Comparison of mean time for first bowel movement, hospital stay and return to normal activities.**

| Groups     | Mean time for first bowel movement in days (mean±sd) | Mean hospital stay in days (mean±sd) | Mean return to normal activities in days (mean±sd) |
|------------|--|--------------------------------------|--|
| MMH (N=30) | 1.43±0.50  | 2.30±0.75                            | 17.80±3.01   |
| VS (N=30)  | 1.40±0.50  | 2.13±0.78                            | 14.27±1.96   |

**Table 8: Profile of early and late complications.**

| Early complication | MMH (N=30) |      | VS (N=30) |      | Late complication | MMH (N=30) |      | VS (N=30) |      |
|--------------------|------------|------|-----------|------|-------------------|------------|------|-----------|------|
|                    | No.        | %    | No.       | %    |                   | No.        | %    | No.       | %    |
| Bleeding           | 05         | 16.7 | 02        | 06.7 | Anal stenosis     | 01         | 03.3 | 01        | 03.3 |
| Urinary retention  | 04         | 13.3 | 02        | 06.7 | Fissure           | 02         | 06.7 | 01        | 03.3 |
| Perianal abscess   | -          | -    | 01        | 03.3 |                   |            |      |           |      |

**DISCUSSION**

For treating grade 3 and 4 hemorrhoids conventional Milligan –Morgan technique is the best method of choice but it is associated with significant pain-related complications such as urinary retention and constipation. Additionally hemostasis needs to be done to avoid postoperative hemorrhage. We found that vessel sealing

technique was safe, effective and the best alternative hemorrhoidectomy over the conventional method to avoid all these parameters.

The present study compares the vessel sealing technique to convention hemorrhoidectomy in grade 3 and 4 hemorrhoid patients. The use of this technique allows a shorter operating time with a statistically significant

difference. Moreover, the system is simple and easy to learn and the mean time reported in our study, ranging from 3 to 7 minutes. A reduction in postoperative pain score, due to minor tissue damage becomes significant during the first, second and third postoperative days, decreasing similarly in the two groups one and two week after surgery, however three weeks later the difference in pain score is not significant.

In our study it was observed that amount of intraoperative bleeding per hemorrhoid was much less than in vessel sealing technique ( $8.97 \pm 4.81$  ml) than in conventional method ( $57.67 \pm 15.91$  ml) of hemorrhoidectomy. According to our study, vessel sealing hemorrhoidectomy had a low rate of postoperative complications but the overall incidence does not significantly differ between the two groups ( $P > 0.05$ ), even with a follow up prolonged up to 24 months. All patients were discharged on second postoperative day at the most except for one case in each group who were discharged on III postoperative day.

Previous randomized studies have also found the similar results. Compared with conventional hemorrhoidectomy, vessel sealing technique reduces mean operative time and requirement of analgesia as similar to the earlier studies.<sup>9-11</sup> Other studies have also emphasized that lower intraoperative bleeding.<sup>10,11</sup>

Comparing early complication rates, nine cases in conventional hemorrhoidectomy method (5 bleeding and 4 acute urinary retention) and five cases in the vessel sealing group (2 bleeding, 2 urinary retention and 1 perianal abscess) These patients were managed conservatively and there was no need for redo surgery. These findings are in consistent with the studies of Filingeri et al and Wang et al.<sup>12,13</sup>

Our findings reveals that there was no difference in the time required for the first bowel movement and in hospital stay between two groups which is in accordance with Gentile et al, study which concluded that there was no difference in hospital stay since patients were discharged  $24 \pm 2$  hours after the operation in both groups, and delayed discharges were registered in two cases of each group (III postoperative day) due to minor bleeding (2 conventional vs 1 vessel seal hemorrhoidectomy) and acute urinary retention (1 vessel seal hemorrhoidectomy) ( $P = 1$  NS).<sup>9</sup>

In our experience only one case of anal stenosis was detected and the incidence seems to be in line with the data of the literature (4-5%). This complication was treated by nifedipine topical ointment with a good final result, however as a useful trick to avoid the development of a circular scar, we preserved intact anoderm and mucosal bridges between the wounds.

A quicker healing and a more comfortable condition support also a faster return to daily activities: patients of

the vessel seal group returned to work activities in a significantly shorter time than conventional diathermy patients. ( $12.2$  vs  $16.4$  days,  $P < 0.0001$ ) and the results are similar to the previous studies of Sayfan et al, observed a shorter convalescence period ( $7.4$  vs  $18.6$  days).<sup>7</sup> On contrary Chung and Wu found no difference in this outcome parameter.<sup>14</sup> Regarding vessel seal safety, no recurrence was detected as well as no complaint for any kind of incontinence due to sphincter damage: same results were recorded in conventional hemorrhoidectomy group.

## CONCLUSION

Vessel sealing hemorrhoidectomy is effective technique resulted in a shorter operative time, a lower postoperative pain, less intraoperative bleeding per hemorrhoid with a faster return to work and an overall complications rate similar to conventional diathermy. Moreover, the procedure is safe, with a minimum risk of impaired continence.

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