

## ORIGINAL RESEARCH

### **Maximum sutureless closed haemorrhoidectomy for symptomatic haemorrhoids grades III and IV: An observational cross-sectional study in Eastern Indian population**

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#### **ABSTRACT**

**Introduction:** Haemorrhoids are dilated vascular structures that act as a cushion around the anal canal. Haemorrhoidectomy is the gold standard surgical protocol for symptomatic haemorrhoids in grades III and IV. The incidence rate of symptomatic haemorrhoids ranges from 4.4 to 36.4% of the general population. There are many aetiological factors that can cause haemorrhoidal disease, which include: constipation, pregnancy, increased intra-abdominal pressure with obstruction of venous return, diarrhoea, prolonged straining, aging, and abnormalities of internal and sphincter. With the arrival of newer devices, hemorrhoidectomy resulted in less postoperative pain and less perioperative blood loss compared with haemorrhoidectomies done with conventional surgical techniques. Maximum (KLS Martin Group, Germany) is the new launch in vessel sealing systems that has been introduced recently. It is a bipolar electrosurgical device that is a combination of pressure and radiofrequency. It seals the blood vessels with a diameter of up to 6 mm by denaturing elastin and collagen from the vessel wall and connective tissue around them with minimal damage to the collateral structures limited to 2 mm over the surgical site. This coagulation zone can withstand up to 3 times the systolic blood pressure.

**Methodology:** After obtaining the approval of the ethical committee from the medical college institution, this prospective and observational study was conducted for a period of two year from July 2018 - June 2020 in the Department of Surgery, All India institute of Medical Science, Patna, Bihar (India) and Department of Surgery, Katihar Medical College and hospital, Katihar, Bihar (India). This study included 144 consecutive patients who underwent a sutureless closed haemorrhoidectomy with Maximum for grades III and IV symptomatic haemorrhoids from the period of July 2018–june 2020. The inclusion criteria include symptomatic haemorrhoids grades III and IV. Pregnancy, liver cirrhosis, hemorrhagic diseases, inability to provide written informed consent, some pre-existing anorectal diseases, previous surgical procedures, thrombosed haemorrhoids, inflammatory bowel disease, and unwilling patients.

**Results:** The results were statistically analysed and tabulated in the Table – 2 and Table – 3.

This study included 144 patients who had undergone Maximum – a sutureless closed haemorrhoidectomy for symptomatic haemorrhoids grade – III and grade - IV. Demographic details of the patients were noted as follows: 100 males (69.4%), 44 females (30.6) and  $p$  – value = 0.04. Age of all the patients ranged between 21 – 82 years where the median was 61 years and mean  $\pm$  SD was  $41.02 \pm 13.75$ y (Table 2). Intra-operative blood loss in this study ranged between 2 – 10 ml, median was 6.1 ml and  $n \pm$  SD was  $4.09 \pm 1.9$  ml. Operating time ranged between 10 – 27 min, median was 17 min and mean  $\pm$  SD was  $16.9 \pm 4.5$  min. post-operative pain scorings during the post-operative days were recorded; Day 0, Day 1 and Day 7 were 3-8, 2-6 and 1-4 respectively. Post-operative analgesic (Paracetamol) shot in day – 0 was in the range of 1-2 amp, Norgestic oral tablets in day – 1-7 was 6 – 16 tablets as tabulated in table – 3.

**Conclusion:** For symptomatic haemorrhoids of grades III and IV, maximum haemorrhoidectomy is a useful alternative to open surgery since it results in less blood loss, less postoperative pain, a shorter operating time, and a quicker return to regular life and activities. Maximum hemorrhoidectomy is a cost-effective surgical procedure because the price of the equipment and its accessories can be balanced by: shorter operating time, low quantity of anaesthesia, reduced postoperative analgesia needed due to low post-operative pain, no suture material used, and early return to work. Maximum haemorrhoidectomy is a simple and reliable technique for the surgeon to perform haemorrhoidectomy, as well as a safe and painless operation for the patient.

**Keywords:** hemorrhoidectomy, sutureless, painless, maximum

## INTRODUCTION

Haemorrhoids are dilated vascular structures that act as a cushion around the anal canal. Haemorrhoidectomy is the gold standard surgical protocol for symptomatic haemorrhoids in grades III and IV.<sup>1</sup> Hemorrhoids are clinically graded, which is shown in Table 1.<sup>2</sup>

The incidence rate of symptomatic haemorrhoids ranges from 4.4 to 36.4% of the general population.<sup>3</sup> There are many aetiological factors that can cause haemorrhoidal disease, which include: constipation, pregnancy, increased intra-abdominal pressure with obstruction of venous return, diarrhoea, prolonged straining, aging, and abnormalities of internal and sphincter.<sup>4</sup> Symptomatic haemorrhoids are one of the most common surgical conditions that most of the general population suffers from. Hemorrhoids of grades I and II are typically treated conservatively with rubber band ligation, sclerotherapy, cryotherapy, or photocoagulation, whereas symptomatic haemorrhoids of grades III and IV require surgical intervention. Conventional haemorrhoidectomy performed by the Milligan–Morgan technique (open haemorrhoidectomy) or Ferguson technique (closed haemorrhoidectomy) are the most commonly used techniques.<sup>5</sup> *Dae Ro Lim* et al. though these two techniques are very effective in the treatment of grade III and IV haemorrhoids, complications such as perioperative ano-rectal bleeding, surgical-site anal pain, anal stenosis, and faecal incontinence can occur after surgery. These complications will also lengthen the patient's hospital stay, may delay the return to normal life and the workplace after surgery, and may prolong the hospital revisits. To overcome these postoperative problems, novel surgical equipment, surgical procedures, and supportive therapies have been introduced.<sup>6</sup> According to Akira Tsunoda and colleagues, "Recent advances in instrumental technology have developed revolutionary devices such as bipolar electrothermal devices, ultrasonic scalpels, and circular staplers that give viable alternatives that result in less postoperative pain and perioperative blood loss."<sup>7</sup> With the arrival of newer devices, hemorrhoidectomy resulted in less postoperative pain and less perioperative blood loss compared with haemorrhoidectomies done with conventional surgical techniques.<sup>8-10</sup> Maximum (KLS Martin Group, Germany) is the new launch in vessel sealing systems that has been introduced recently. It is a bipolar electrothermal device that is

a combination of pressure and radiofrequency. It seals the blood vessels with a diameter of up to 6 mm by denaturing elastin and collagen from the vessel wall and connective tissue around them with minimal damage to the collateral structures limited to 2 mm over the surgical site. This coagulation zone can withstand up to 3 times the systolic blood pressure. Therefore, this minimal spread of thermal energy decreases the post-operative pain and anal spasm, which allows for a bloodless hemorrhoidectomy with reduced post-operative pain and faster healing.<sup>11</sup> Sutureless closed hemorrhoidectomy with bipolar diathermy is a sutureless closed hemorrhoidectomy because the coagulum zone could just be divided where the anal mucosal edges are fused together.<sup>7</sup> The main objective of this study was to assess the outcomes of sutureless closed hemorrhoidectomy performed with Maximum with those of other studies that used both hemorrhoidectomy techniques, both novel and traditional, for symptomatic hemorrhoids grades III and IV.

## METHODOLOGY

After obtaining the approval of the ethical committee from the medical college institution, this prospective and observational study was conducted for a period of two year from July 2018 - June 2020 in the Department of Surgery, All India institute of Medical Science, Patna, Bihar (India) and Department of Surgery, Katihar Medical College and hospital, Katihar, Bihar (India). This study included 144 consecutive patients who underwent a sutureless closed hemorrhoidectomy with Maximum for grades III and IV symptomatic hemorrhoids from the period of July 2018–june 2020. The inclusion criteria include symptomatic hemorrhoids grades III and IV. Pregnancy, liver cirrhosis, hemorrhagic diseases, inability to provide written informed consent<sup>7</sup>, some pre-existing anorectal diseases, previous surgical procedures, thrombosed hemorrhoids, inflammatory bowel disease, and unwilling patients.<sup>12</sup> All patients who were included in the study underwent a proper pre-operative evaluation including history-taking, complete physical examination, and investigations like chest x-rays, electrocardiography, and laboratory investigations such as complete blood count, prothrombin time, fasting blood sugar, blood urea, serum creatinine, hepatitis B, hepatitis C, and HIV. Along with these, an anoproctoscopic examination was preoperatively performed. The study patients had a routine preoperative anaesthesiologic assessment, and all the patients were advised to use a laxidyle (laxative) suppository at night before surgery. They were admitted to the hospital in the morning of surgery. Every patient was given information regarding the hemorrhoidectomy technique and its complications. A signed consent was obtained from each patient. Prophylactic antibiotics were intravenously injected at the time of induction of anaesthesia (Cefotaxime vial 1 gm day/8-hourly for one day or Amikacin vial 500 mg/12-hourly for one day). As per preanesthetic assessment, some patients were provided with spinal or caudal anaesthesia, while other patients were given general anaesthesia where spinal or caudal anaesthesia failed. Patients were placed in a lithotomy position. A surgical anoscope was put into the canal to ensure a clear surgical field. Each hemorrhoidal mass was lifted with two pairs of Allen's clamps to lift them away from the internal anal sphincter, and the pedicle of the hemorrhoid was clamped with a curved arterial clamp. An incision was made at the mucocutaneous junction of the hemorrhoidal mass with a monopolar electrocautery. Maximum was used to coagulate the hemorrhoid's mass and pedicle, which lifts away from the internal anal sphincter. Finally, the coagulum zone was divided with scissors, leaving a dry and closed hemorrhoidal bed. Agauze covered with Xylocaine gel 5% was left in the anal canal at the end of the procedure. No suture material was used since the coagulum created by the maximum had fused the adjacent anal mucosa. And the patients were asked to document their pain score from day 0 till the postoperative day on a Visual Analog Scale (VAS)<sup>5</sup> that scored from 0 to 10. Patients were followed up for a week in the first month, then monthly for five months after the hemorrhoidectomy.

Intraoperative blood loss, patient demographics, operating time, post-operative pain scoring, post-operative analgesia requirement, and quality of life were recorded completely. The blood loss was calculated by subtracting the dry weight of the used gauze from the wet gauze weights.<sup>11,13</sup> Data collected was statistically analysed using IBM SPSS v. 22 (IBM Co., Armonk, NY, USA) and the variable values were analysed using the chi-square or Fisher exact test, while continuous variables were analysed using the student t-test or Mann-whitney U rank test. "P 0.05" was considered statistically significant.

## RESULTS

The results were statistically analysed and tabulated in the Table – 2 and Table – 3. This study included 144 patients who had undergone Maximum – a sutureless closed haemorrhoidectomy for symptomatic haemorrhoids grade – III and grade - IV. Demographic details of the patients were noted as follows: 100 males (69.4%), 44 females (30.6) and p – value = 0.04. Age of all the patients ranged between 21 – 82 years where the median was 61 years and mean  $\pm$  SD was  $41.02 \pm 13.75$ y (Table 2). Intra-operative blood loss in this study ranged between 2 – 10 ml, median was 6.1 ml and  $n \pm$  SD was  $4.09 \pm 1.9$  ml. Operating time ranged between 10 – 27 min, median was 17 min and mean  $\pm$  SD was  $16.9 \pm 4.5$  min. post-operative pain scorings during the post-operative days were recorded; Day 0, Day 1 and Day 7 were 3-8, 2-6 and 1-4 respectively. Post-operative analgesic (Paracetamol) shot in day – 0 was in the range of 1-2 amp, Norgesic oral tablets in day – 1-7 was 6 – 16 tablets as tabulated in table – 3.

**Table 1: Clinical grading of haemorrhoids**

Grade I	Prominent haemorrhoidal vessels but no prolapse.
Grade II	Prominent haemorrhoidal vessels but no prolapse.
Grade III	Prolapse with Valsalva but require manual reduction.
Grade IV	Chronically prolapse, manual reduction is ineffective.



**Fig. 1** showing Grade III haemorrhoids



**Fig.2** showing Grade IV interno external haemorrhoids

**Table 2: Patients demographic features**

Sex	Patients		Age statistics/year				
	No.	%	Minimum	Maximum	Median	Mean $\pm$ SD	P- value
Male	100	69.4	21	75	-	-	
Female	44	30.6	22	82	-	-	0.04
Total	144	100	21y	82y	61y	41.02 $\pm$ 13.75	

**Table 3: Descriptive statistics results of the study**

Study variables	No	Minimum	Maximum	Median
Age/y	144	21	82	61
Intraoperative blood loss/ml	144	2	10	8
Operating time/min	144	10	27	17
Postoperative pain, Day – 0	144	3	8	5
Postoperative pain, Day – 1	144	2	6	4
Postoperative pain, Day – 7	144	1	4	2
Postoperative analgesic injections	144	1	2	1
Postoperative oral analgesics	144	6	16	10

## DISCUSSION

For the treatment of grade III-IV haemorrhoids, conventional haemorrhoidectomy procedures such as Milligan Morgan open haemorrhoidectomy, Ferguson closed haemorrhoidectomy, and diathermy haemorrhoidectomy are the most appropriate surgical approaches. However, these conventional surgical techniques are mostly accompanied by complications such as postoperative pain, ano-rectal bleeding, anal stenosis and anal incontinence.<sup>6</sup> Recent haemorrhoidectomy done with circular staplers and other newly developed equipment's have been reported to result in less postoperative pain, less anorectal bleeding, less complications rates, shorter operating times and reduced hospital stays.<sup>6,14</sup> However, this study recruited 144 consecutive patients who underwent a sutureless closed haemorrhoidectomy with Maximum for symptomatic haemorrhoids of grades III and IV. Demographic distribution of these patients was as following; 100 males (69.4%), 44 females (30.6%) and p-value = 0.04. Patients' ages ranged 21-82y, median was 61y and mean  $\pm$  SD was 41.02  $\pm$  13.75y. *Maurizio Gentile et al*<sup>14</sup> in his study included 52 patients with age mean of 47y for diathermy, 48y for Liga Sure patients and overall range 19-80y. These results are rather similar to our current study demographic results. Also, this study showed, male: female ratio of 2:1 that was statistically significant (p-value = 0.04) than in the former study. Regarding intraoperative blood losses, the studies<sup>5,11,12,15-17</sup> reported intraoperative blood losses of LH groups: 6.53  $\pm$  2.90 ml, 17.0  $\pm$  3.6 ml, 11.5  $\pm$  2.5 ml, 51.92 ml respectively, while intraoperative blood losses of CH groups were; 28.42  $\pm$  7.32 ml, 26.56  $\pm$  11.30 ml, 22.0  $\pm$  4.5 ml, 70.34 ml respectively. This MH study had intraoperative blood loss of 4.9  $\pm$  1.9 ml. These results revealed that LH technique is associated with less intra-operative blood loss of when compared with conventional techniques. These results also revealed that MH had the least intraoperative blood loss in the two groups of the surgical techniques.

In respect to the operating time, some studies<sup>5,11,12,13,15-18</sup> reported that the operating time of LH groups: 11.22 m, 10.75  $\pm$  6.70 m, 12.5  $\pm$  3.0 m, 18 m, 22.3 m, 24  $\pm$  8.0 m, 36.6 m, 7.6  $\pm$  2.5 m respectively, while operating times of their CH groups were; 28.42 m, 32.72  $\pm$  9.72 m, 29.0  $\pm$  5.2 m, 36 m, 27.4 m, 41  $\pm$  12 m, 52.5 m, 18.9  $\pm$  4.5 respectively. Despite significant differences in operating time between these studies, LH groups had shorter operating times than CH groups in general. Comparing the postoperative pain scoring, few studies<sup>5,11,12,13,15-18</sup> reported that the postoperative pain scores of LH groups were less than those of CH groups.

Maximum haemorrhoidectomy had a postoperative pain score that was similar to the LH groups' pain scores but lower than the CH groups' pain scores in the studies above. Wagih M Ghannam<sup>11</sup> found that the mean of required analgesics and sedation for the LH group was NSAIDs = 3 injections, pills = 19.5/14 days, but the CH group's mean of required analgesics and sedation was 3 NSAIDs, 3 doses of Pethidine, and tablets = 32/14 days. In my study, the required postoperative analgesics injections (Paracetamol) in Day 0 were  $1.4 \pm 0.5$  amp and analgesic oral tablets (Norgesic) during postoperative days 1-7 were  $10.56 \pm 2.05$  tablets. Thus, the amounts analgesia required for patients of LH group of study and MH were lower than required for patients of CH group of study.<sup>11</sup>

## CONCLUSION

Maximum haemorrhoidectomy is an effective alternative to open surgical procedures for symptomatic haemorrhoids of grades III and IV because it results in less blood loss, less postoperative pain, shorter operating time, and an early return to normal life and activities. Maximum haemorrhoidectomy is a cost-effective surgical procedure because the price of the equipment and its accessories can be balanced by: shorter operating time, low quantity of anaesthesia, reduced postoperative analgesia needed due to low post-operative pain, no suture material used, and early return to work.

Maximum haemorrhoidectomy is a simple and quick technique for the surgeon to perform haemorrhoidectomy, as well as a safe and painless operation for the patient

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