

Original Article

## Comparison of LigaSure Hemorrhoidectomy and Harmonic Scalpel Hemorrhoidectomy

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### Key Words

LigaSure;  
Harmonic Scalpel;  
Hemorrhoidectomy

**Purpose.** Pain is the most disturbance issue after hemorrhoidectomy. Various of instrument has been applied and intended to solve this problem. LigaSure and harmonic Scalpel are the most common newly instrument that applied in hemorrhoidectomy. This study would like to compare the outcome of these two instruments.

**Methods.** We reviewed the cases with grade III and IV hemorrhoid who received either LigaSure hemorrhoidectomy or Harmonic Scalpel hemorrhoidectomy from Aug, 2011 to Feb, 2012. Eighty patients were included in this study. Post-operative pain scale and complications were analyzed.

**Results.** Total 80 patient's data were collected and 40 of them received LigaSure hemorrhoidectomy and rest of the 40 patients received Harmonic Scalpel hemorrhoidectomy. The post-operative pain showed no significant difference in both groups as well as the analgesic used or other complication.

**Conclusion.** LigaSure hemorrhoidectomy and Harmonic Scalpel hemorrhoidectomy archived comparable good results with no significant difference in post-operative pain or complication. New hemostatic devices used in hemorrhoidectomy are safe and effective.

[J Soc Colon Rectal Surgeon (Taiwan) 2013;24:9-13]

**H**emorrhoid, the congestion of vascular plexus around the anal canal is one of the most common problems in surgical practice for a colorectal surgeon. Surgical resection remains the most effective way to treat symptomatic grade III and IV hemorrhoid.<sup>1-6</sup> Nevertheless, post-operative pain is the most annoying problem after hemorrhoidectomy.<sup>3-5</sup> The surgical techniques evolved from Milligan-Morgan open technique to diathermy hemorrhoidectomy included bipolar electrocautery. Hence, LigaSure and Harmonic Scalpel were introduced to use in hemorrhoidectomy within decade.<sup>7-10</sup> The evolution of techniques and instruments were all pointing to reduce the pain and complication such as bleeding, stricture after

hemorrhoidectomy.

Theoretically, less collateral damage of the tissue during hemostasis and delivered minimal thermal energy for tissue charring can reduced the post-operative pain and tissue swelling.<sup>3</sup> Therefore, we were interested in these two following novel hemostatic devices. LigaSure is able to deliver the precise energy for electrocautery coagulation and sealing across the tissue that hold between the paddles. Harmonic Scalpel is a high frequency vibrating device that cuts through the tissue by using vibration and seals it using protein denaturation rather than heat. Performed hemorrhoidectomy by using these two devices might lead us to better results and outcome as well as pa-

Received: July 11, 2012.

Accepted: September 18, 2012.

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tients satisfaction. One double-blind randomized trial demonstrated LigaSure hemorrhoidectomy (LSH) reduces the pain and operative time compared to Harmonic Scalpel hemorrhoidectomy (HSH).<sup>1</sup> Another recent randomized controlled trial however showed no difference between bipolar electrocautery and Harmonic Scalpel hemorrhoidectomy.<sup>2</sup> We present our experience in using LigaSure and Harmonic Scalpel for hemorrhoidectomy to verify and compare the result with previous studies.

## Materials and Methods

Patients underwent LigaSure Hemorrhoidectomy and Harmonic Scalpel hemorrhoidectomy between Aug, 2011 to Feb, 2012 were selected from the database of two hospitals, National Taiwan University Hospital and Shuang Ho Hospital. Patients should meet the profiles of symptomatic Grade III or IV hemorrhoids. Patients with (1) other anorectal pathology such as anal fistula or fissure (2) bleeding tendency or end-stage renal disease (3) high risk for withdraw anti-coagulants, were excluded.

All patients had the conventional pre-operative preparation included sodium biphosphate edema before the operation. Procedure was performed under spinal anesthesia. Metzenbaum scissors was used for dissected the external hemorrhoid and LigaSure or Harmonic Scalpel then used for coagulation and removed both external and internal hemorrhoid along to

the apex of the hemorrhoidal plexus. The wound was approximated with a continuous Monocryl 3-0 suture. A Gelform sponge was used to cover the wound. Post-operatively, Morphine 5 mg given every 6 hours intravenously was allowed as requested for the day of surgery. Oral analgesic with NSAID was also used and took home for pain controlled. No antibiotic was given and all patient discharge at post-operative day 1 if no complication happened.

## Statistical analysis

All data were analyzed by use of the Statistical Package for the Social Sciences Version 13 software (SPSS Inc, Chicago, IL). Two-sample t-test was used to compare the amount of parenteral analgesic injections as well as the pain scores which were expressed as means  $\pm$  SD.  $p < 0.05$  was considered to be statistically significant.

## Results

A group of 80 patients (LSH 40, HSH 40) were included in this study and demographics of the population are shown in Table 1. No difference between both groups in the age, gender distribution, symptom duration or grading of the disease.

All patients in LSH group received spinal anesthesia where all in HSH group received intravenous anesthesia. However, there is no evidence shows that

**Table 1.** Demographics of the patients who receive LSH or HSH

|                          | LigaSure hemorrhoidectomy<br>n = 40 | Harmonic Scalpel hemorrhoidectomy<br>N = 40 | <i>p</i> |
|--------------------------|-------------------------------------|---------------------------------------------|----------|
| Age                      |                                     |                                             |          |
| Mean $\pm$ SD            | 47.67 $\pm$ 9.53                    | 51.17 $\pm$ 10.18                           | 0.486    |
| Sex                      |                                     |                                             |          |
| Male                     | 19 (47.5%)                          | 19 (47.5%)                                  |          |
| Female                   | 21 (52.5%)                          | 21 (52.5%)                                  |          |
| Symptom duration (month) |                                     |                                             |          |
| < 1                      | 24                                  | 11                                          | 0.210    |
| 1~3                      | 13                                  | 5                                           |          |
| > 3                      | 3                                   | 24                                          |          |
| Grade                    |                                     |                                             |          |
| III                      | 7 (17.5%)                           | 6 (15%)                                     | 0.550    |
| IV                       | 33 (82.5%)                          | 34 (85%)                                    |          |

different type of anesthesia affect the outcome of the surgery. The operating time, post-operative pain score (VAS) and number of parenteral analgesic injections were found no significantly difference between two groups. Due to the National health insurance policy of Taiwan, all patients were discharge at post-operative day 1 if no specific complication was found. Hospital stay is considering no difference between two groups (Table 2).

Five patients in LSH group and three in HSH group suffering from retention of urine and temporary urinary catheter was needed for symptom relieve at post-operative day. All patients were discharge as schedule at the post-operative day 1. Only one patient in LSH group had rectal bleeding and secondary surgery was needed for hemostasis. One patient in the HSH group suffered from significant post-operative pain and need another three days for parenteral analgesic controlled before discharge. There were no delayed complications in both groups.

## Discussion

Hemorrhoidectomy remains the most common surgery for a colorectal surgeon. For symptomatic grade III and IV hemorrhoid, hemorrhoidectomy has been well established as the most effective way to control it. Pain is considering a major problem after hemorrhoidectomy. New technics and instruments are developed but some of them have limitation such as Stapled hemorrhoidopexy can't deal with external hemorrhoid and skin tags. LigaSure hemorrhoidectomy (LSH) and Harmonic Scalpel hemorrhoidectomy (HSH) are two new technics which can solve both internal and external hemorrhoid with better cosmetic results.

A double-blind, randomized trial has been designed by S.Y. Kwok et al.<sup>1</sup> and shorter operative time and less post-operative pain were found in LSH group. Another randomized controlled trial reported by A.A Abo-hashem et al.<sup>2</sup> showed the different result where the LSH group has less analgesic requirement then the group is using bipolar electrocautery. However, in our study both groups present satisfactory results. LigaSure and Harmonic Scalpel both achieved great hemostasis, the pain from peri-anal skin and ano-derm

**Table 2.** Operative detail and comparison of outcomes

|                                        | LSH (n = 40) | HSH (n = 40) | p     |
|----------------------------------------|--------------|--------------|-------|
| Operative time (min)                   | 26.25 ± 10.9 | 25.5 ± 8.23  | 0.110 |
| Pain score (VAS)                       |              |              |       |
| Post-operative day 1                   | 4.15 ± 2.2   | 4.35 ± 2.05  | 0.427 |
| Post-operative day 2                   | 2.13 ± 1.28  | 1.8 ± 1.22   | 0.591 |
| No. of parenteral analgesic injections | 1.08 ± 1.21  | 1.08 ± 1.27  | 0.781 |

are limited due to the thermal energy is precisely transmitted between the paddles and the lateral injury is small.

Increased cost over the conventional hemorrhoidectomy by using both two new instruments might be the most considerable disadvantages. However, reduced post-operative pain, the used of intravenous anesthesia, excellent hemostasis are considered as great advantages.

## Conclusion

LigaSure hemorrhoidectomy and Harmonic Scalpel hemorrhoidectomy are safe and effective and there are no significant differences between both groups in the outcome.

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原 著

## 使用血管凝結儀 (LigaSure) 與 協波刀 (Harmonic Scalpel) 切除痔瘡之比較

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**目的** 痔瘡切除術後最讓人困擾的是術後的疼痛，因此許多新式的器械被應用在這方面用以解決問題。

**病人與方法** 收集並統計自 2011 年 8 月至 2012 年 02 月間，第三與第四級痔瘡使用血管凝集儀與協波刀手術各 40 名的病人進行比較。共 80 位病人分為兩組，比較使用不同儀器進行痔瘡切除在術後各方面的差別。

**結果** 兩組不論是在術後疼痛、止痛藥使用的劑量與頻率和術後併發症並無明顯統計上的差異。

**結論** 不論使用血管凝結儀 (LigaSure) 與協波刀 (Harmonic Scalpel) 進行痔瘡切除手術，皆是安全有效的方法，皆能達到良好的結果。

**關鍵詞** 血管凝結儀 (LigaSure)、協波刀 (Harmonic Scalpel)、痔瘡。