

# Harmonic Scalpel®

## The Usefulness of a Harmonic Scalpel® for Hemorrhoidectomy

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**Purpose:** The aim of this study was to compare conventional scissors and Harmonic Scalpel® hemorrhoidectomy.

**Methods:** Two hundred and five patients were prospectively assigned to two groups in the consecutive order group was divided into Group A (Harmonic Scalpel® excision; n=101) and Group B (conventional scissor excision; n=104). All other aspects of surgery and anesthesia standardized. Intramuscular opiate was available on during the postoperative period, and analgesic requirements were also recorded. All patients noted their pain on basis using a visual analogue scale (0=no pain; 10 pain). The length of hospitalization, operative postoperative complications were also analyzed.

**Results:** The operative time was 16.6±0.9 minutes 20.8 minutes in Group A and B, respectively (p<0.05). Length of hospital stay was 4.1±0.1 and 4.5±0.1 day (p<0.05). Pain scores in the group A were significantly less than in the group B (p<0.01). Analgesic requirements also significantly less in group A (p<0.05). Postoperative complications, such as urinary retention, fecal impaction, skin tags were rarer in group A. One patient in group A and two patients in group B developed secondary hemorrhage, but no patient had anal stricture.

**Conclusions:** The Harmonic Scalpel® excision significantly shortens the operative time for hemorrhoidectomy, less blood loss and postoperative pain without reoperation, early or late postoperative complications. **J Korean Coloproctol 2002;18:10-14**

**Key Words:** Hemorrhoidectomy, Harmonic Scalpel®, Postoperative pain, Bleeding

2500 가

가

3 4 가

(electrocautery), CO<sub>2</sub> Nd:YAG (circular stapled hemorrhoidectomy)

Harmonic Scalpel® (Ethicon Endo-Surgery, Cincinnati, OH, USA)

Amaral<sup>12</sup>

13,14

2001, 205 Harmonic

1 221-43  
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Scalpel<sup>®</sup> 가  
 1) 2000 3 2000 5 3  
 Harmonic Scalpel<sup>®</sup> (A )  
 가 (B )  
 , A 101 ( 47 ), 41.0 (17 76)  
 104 ( 55 ) 37.6 (19 65)  
 , Goligher (Table 1).

2) , 0.5% bupivacaine 1.0 ml  
 , prone jack-knife  
 2-0 chromic catgut  
 , B (

**Table 1.** Hemorrhoidectomy-Harmonic Scalpel<sup>®</sup> (group A) vs. conventional scissors (group B)

	Group A	Group B
No. of patients	101	104
Male/female*	47/54	55/49
Age*	40.8±1.2 (17 76)	36.6±1.0 (19 65)
Grade of hemorrhoids (2/3/4)*	12/75/14	10/83/11
No. of excision*	2.9±1.2	3.9±0.2

\*not significant.

2 : Harmonic Scalpel<sup>®</sup>  
 ) 1 : 100,000  
 5 ml  
 A Harmonic Scalpel<sup>®</sup>  
 가  
 loxopropfen sodium (Loxfen<sup>®</sup>)  
 , 가  
 가  
 meperidine hydrochloride (Demerol) 50 mg  
 magnesium oxide (Magmil<sup>®</sup>)  
 (Mutacil<sup>®</sup>)  
 가 6 가  
 3) 가  
 , ,  
 1, 2, 3, 7, 14, 21, 28  
 , VAS (Visual Analogue Scale)  
 0,  
 가 10 가  
 3  
 meperidine hydro-  
 chloride (Demerol)  
 loxopropfen sodium  
 (Loxfen<sup>®</sup>)

**Table 2.** Operative time, hospital stay and wound healing time

	Group A	Group B
Operative time (min)*	16.6±0.9	25.3±0.8
Hospital stay (days) <sup>†</sup>	4.1±0.1	4.5±0.1
Wound healing time (days) <sup>†</sup>	21.8±1.5	29.2±1.8

\*P < 0.01; <sup>†</sup> P < 0.05.

**Table 3.** Pain scores for group A and group B

	Days after operation							
	0*	1*	2*	3*	7*	14*	21*	28 <sup>†</sup>
Group A	4.6±0.1	3.7±0.2	3.2±0.2	3.6±0.2	1.8±0.1	1.0±0.1	0.4±0.1	0.2±0.1
Group B	5.8±0.2	4.8±0.2	4.3±0.2	4.9±0.2	3.8±0.2	2.3±0.2	0.9±0.1	0.2±0.0

\*P<0.01; † not significant.

**Table 4.** Analgesic requirements after Harmonic Scalpel<sup>®</sup> and conventional hemorrhoidectomy

	Demerol (50 mg/ample)*	Loxoprofen (68.1 mg/tablet)*
Group A	1.0±0.1 (Ample)	4.4±0.3 (Tablet)
Group B	1.5±0.2 (Ample)	5.7±0.5 (Tablet)

\*P<0.05

**Table 5.** Postoperative complications

	Group A (n=101)	Group B (n=104)
Urinary retention	4	12
Early bleeding	0	3
Late bleeding	1	2
Fecal impaction	0	9
Skin tag	3	6
Postop. fissure	2	3
Abscess	1	0

3). A (P<0.05)(Table 4).

Unpaired student's t-test<sup>2</sup>  
test ±  
, P 0.05

1 3)  
B 29.2±1.8 A 21.8±  
1.5 (P<0.05)(Table 2).

4)  
A B 가 4  
1) (4.0%) 12 (12.5%), fecal impaction B 9  
가 . B 3 가 ,  
A 1 , B 2 가 .  
A B  
A 16.6±0.9 ,  
B 25.3±0.8 A  
, A (P<0.01).  
A 4.1±0.1 , B 4.5±0.1  
, (P<0.05)(Table 2).

2)  
A B , 1, 2, 3, 7, 14,  
21, 27 visual analogue scale  
, 27 A 가  
(P<0.01)(Table

2)  
A B , 1, 2, 3, 7, 14,  
21, 27 visual analogue scale  
, 27 A 가  
(P<0.01)(Table

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A B 가 4  
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A 1 , B 2 가 .  
A B  
A 16.6±0.9 ,  
B 25.3±0.8 A  
, A (P<0.01).  
A 4.1±0.1 , B 4.5±0.1  
, (P<0.05)(Table 2).

가

가

(Treitz' muscle)

가

가 가

Kusunoki<sup>18</sup> Harmonic Scalpel®

forceps coagulation technique (FCT)

, FCT

(heat generation)

(carbonization)가

, Harmonic Scalpel®

가

가

가

Harmonic Scalpel®

Harmonic Scalpel®

(lateral thermal injury)

가

가 가

(seroma),

(tissue dissection)

가

Harmonic Scalpel®

가 hand piece

(transducer)

hand piece

blade

50

Harmonic Scalpel®

, Armstrong<sup>19</sup>

Blade가

, 55,000

, 60

100 µm

Harmonic Scalpel®

(hydrogen bond)

, 50

100°C

coagulum

가

blunt mode

5 mm

, 3 mm

Seow-Choen<sup>5</sup>

<sup>17</sup>

Harmonic Scalpel®

<sup>17</sup> Blade tip

가

Harmonic Scalpel®

, Armstrong

(intracellular fluid) 가

가 가

tissue plane

Harmonic Scalpel®

tissue plane

(cavitation effect),

vascular plane

<sup>17</sup>

24

Harmonic Scalpel®

blade tissue pad

1

. 2 7 14

Scalpel<sup>®</sup> Harmonic

1

Matsuda<sup>20</sup> Harmonic Scalpel<sup>®</sup>

1.8%

가 가 가 가

가 가

Harmonic Scalpel<sup>®</sup>

Harmonic Scalpel<sup>®</sup>

Harmonic Scalpel<sup>®</sup> 가 Har-

가 가

REFERENCES

1. 宇都宮讓二 ほか. 實地醫家に役立つ肛門疾患の知識. 大阪: 永井書店; 1995.
2. Bleday R, Pena JP, Rothenberger DA, Goldberg SM, Buls JG. Symptomatic hemorrhoids: current incidence and complications of operative therapy. *Dis Colon Rectum* 1992;35:477-81.
3. MacRae HM, Mcleod RS. Comparison of hemorrhoidal treatment modalities: a meta-analysis. *Dis Colon Rectum* 1995;38:687-94.
4. Ibrahim S, Tsang C, Lee YL, Eu KW, Seow-Choen F. Prospective, randomized trial comparing pain and complications between diathermy and scissors for closed hemorrhoidectomy. *Dis Colon Rectum* 1998;41:1418-20.
5. Seow-Choen F, Ho YH, Goh HS. Prospective, random-

- ized trial comparing pain and clinical function after conventional scissors excision/ligation vs. diathermy excision without ligation for symptomatic prolapsed hemorrhoids. *Dis Colon Rectum* 1992;35:1165-9.
6. Andrews BT, Layer GT, Jackson BT, Nicholls RJ. Randomized trial comparing diathermy hemorrhoidectomy with scissors dissection Milligan-Morgan operation. *Dis Colon Rectum* 1993;36:580-3.
7. 1997;13:121-9.
8. Senagore AJ, Mazier WP, Luchtefeld MA, MacKeigan JM, Wengert T. The treatment of advanced hemorrhoidal disease: a prospective randomized comparison of cold scalpel vs. contact Nd:YAG laser. *Dis Colon Rectum* 1993;36:1045-52.
9. Nd: YAG 1999;15:203-8.
10. 宇都宮高賢, 菊田信一. レ - ザ - メス使用による根部結紮のない痔核手術方法. *日本大腸肛門病學會誌* 1999;52:253-4.
11. Ho YH, Cheong WK, Tsang C, Ho J, Eu KW, Tang CL, et al. Stapled hemorrhoidectomy-cost and effectiveness. randomized, controlled trial including inconsistency scoring, anorectal manometry, and endoanal ultrasound assessments at up to three months. *Dis Colon Rectum* 2000;43:1666-75.
12. Amaral JF. Laparoscopic cholecystectomy in 200 consecutive patients using an ultrasonically activated scalpel. *Surg Laparosc Endosc* 1995;5:255-62.
13. Maruta F, Sugiyama A, Matsushita K, Ishida K, Ikeno T, Shimizu F, et al. Use of the Harmonic Scalpel in open abdominoperineal surgery for rectal carcinoma. *Dis Colon Rectum* 1999;42:540-2.
14. Rothenberg SS. Laparoscopic splenectomy using the Harmonic Scalpel. *J Laparoendosc Surg* 1996;6:S61-3.
15. Thomson WH. The nature of haemorrhoids. *Br J surg* 1975;62:542-52.
16. Haas PA, Fox TA Jr, Haas G. The pathogenesis of hemorrhoids. *Dis Colon Rectum* 1984;27:442-50.
17. Lee SJ, Park JH. Ultrasonic energy in endoscopic surgery. *Yonsei Med J* 1999;40:545-9.
18. Kusunoki M, Shoji Y, Yanagi H, Ikeuchi H, Noda M, Yamamura T. Current trends in restorative proctocolectomy: introduction of an ultrasonically activated scalpel. *Dis Colon Rectum* 1999;42:1349-52.
19. Armstrong DN, Ambroze WL, Schertzer ME, Orangio GR. Harmonic Scalpel<sup>®</sup> vs. electrocautery hemorrhoidectomy: a prospective evaluation. *Dis Colon Rectum* 2001;44:558-64.
20. 松田直樹. ハーモニック・スカルペルを用いた痔核手術. *消化器外科* 1999;22:1845-51.