

Hand-Assisted Laparoscopic Nephrectomy and Nephroureterectomy: Our Experience in Hospital Universiti Kebangsaan Malaysia

C C K Ho, MRCSEd*, M Z Zulkifli, MS*, J Nazri, MS*, M Sundram, FRCS**

*Urology Unit, Department of Surgery, Hospital Universiti Kebangsaan Malaysia, Jalan Yaakob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, **Department of Urology, Hospital Kuala Lumpur, Jalan Pahang, Kuala Lumpur

SUMMARY

Hand-assisted laparoscopic nephrectomy (HAL-N) and nephroureterectomy (HAL-NU) were introduced to bridge the gap between open and laparoscopic surgery. This newer technique has the benefits of both laparoscopic and open surgical approaches but has a shorter learning curve and decreased operative time compared to laparoscopic surgery. A review of our 2-year experience showed that for the seventeen cases of HAL-N that was performed, the mean operative time was 187.8 minutes while the mean length of hospital stay was 4.1 days. For the two HAL-NU cases, the mean operative time was 415 minutes while the mean length of hospital stay was 5.5 days. Only one complication occurred and it was an incisional hernia at the hand-port site. There was no recurrence for the carcinoma cases. Our experience shows that this technique is feasible and safe.

KEY WORDS:

Hand-assisted laparoscopic nephrectomy, Hand-assisted laparoscopic nephroureterectomy

INTRODUCTION

The first laparoscopic nephrectomy was reported by *Clayman et al*¹ in 1991. However, it has a steep learning curve and prolonged operative time during the initial period. To overcome this problem, *Nakada et al*² pioneered the hand-assisted laparoscopic nephrectomy in 1997. Our centre started performing hand-assisted laparoscopic nephrectomy (HAL-N) and hand-assisted laparoscopic nephroureterectomy (HAL-NU) in February 2005. We report our initial 2-year experience with this technique.

MATERIALS AND METHODS

A retrospective data collection was used to review the records of patients who underwent HAL-N and HAL-NU between February 2005 and January 2007 in Hospital Universiti Kebangsaan Malaysia. Data on patient demographics, operative time, duration of post-operative stay in hospital, pathology of resected specimen and surgical outcome were collected.

A standard surgical procedure is followed. The patient is given general anaesthesia and placed on a flexed table in a

full flank position. An incision large enough to fit the surgeon's hand is created. The peritoneum is then entered and the hand-port device inserted. The non-dominant surgeon's hand is then introduced into the abdominal cavity. Three laparoscopic trocars are then inserted. The position for insertion of the hand port and trocars are shown in Figure 1. The renal hilum is dissected in the standard fashion with adequate visualization of the renal artery and vein. The renal vessels are secured with haemalock and then divided with scissors. The specimen is then removed intact within a laparoscopic sac through the hand-port incision.

RESULTS

During this 24-month period, 17 patients (9 females and 8 males) successfully underwent HAL-N and two patients (1 female and 1 male) underwent HAL-NU. The mean age for patients in the HAL-N group was 55.8 years (range 28 - 77 years) and the HAL-NU group was 60.5 years (range 58-63 years). One patient for HAL-N had to be converted to open nephrectomy because of uncontrolled bleeding during surgery.

The operative time varied between 120 and 330 minutes with a mean of 187.8 minutes for the HAL-N. For the HAL-NU, the two cases were 320 and 510 mins, with a mean of 415 minutes. The mean duration of post-operative stay in the ward was 4.1 days for HAL-N and 5.5 days for HAL-NU. The results are shown in Tables I and II.

Out of the 17 cases of HAL-N, 8 were done for renal cell carcinomas while the other 9 were for non-functioning kidneys due to urolithiasis (7 cases) or benign pelviureteric junction (PUJ) strictures (2 cases). The 2 HAL-NU cases were for transitional cell carcinoma of the renal pelvis. The HAL-N case which was converted to open nephrectomy was for a non-functioning kidney secondary to a ureteric stone.

All patients, except one, were well at a median follow-up of 16 months (range 3-26 months). One patient in the HAL-N group, developed incisional hernia at the hand-port site. To date, there were no recurrences at the port site for patients with renal cell adenocarcinoma or transitional cell carcinoma at a median follow up of 10.5 months (range 3-25 months).

This article was accepted: 25 January 2008

Corresponding Author: Christopher Ho Chee Kong, Department of Surgery, Hospital Universiti Kebangsaan Malaysia, Jalan Yaakob Latiff, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur

Table I: Summary of Hand-Assisted Laparoscopic Nephrectomy Cases

Operative Time	Range (mins)	120-330
	Mean (mins)	187.8
	Standard Error	12.1
	95% Confidence Interval	162.1-213.5
	5% Trimmed Mean (mins)	183.6
	Median(mins)	180
	Standard Deviation	51.7
Post-operative Stay	Range (days)	2-6
	Mean (days)	4.1
	Standard Error	0.3
	95% Confidence Interval	3.5-4.6
	5% Trimmed Mean (days)	4.1
	Median(days)	4
	Standard Deviation	1.2

Table II: Summary of Hand-Assisted Laparoscopic Nephroureterectomy Cases

Operative Time	Range (mins)	320-510
	Mean (mins)	415
	Standard Error	95
	95% Confidence Interval	-792.1-1622.1
	Median(mins)	415
	Standard Deviation	134.4
Post-operative Stay	Range (days)	4-7
	Mean (days)	5.5
	Standard Error	1.5
	95% Confidence Interval	-13.6-24.6
	Median(days)	5.5
	Standard Deviation	2.1

DISCUSSION

Hand-assisted laparoscopic surgery was introduced in 1995, bridging the gap between open and laparoscopic surgery. It involves introduction of the surgeon's hand into the insufflated abdomen via a hand-port device. It is advantageous for laparoscopic procedures that require removal of a relatively large amount of tissue intact, which would otherwise necessitate an extended trocar incision.

Our mean operative time for HAL-N of 187.8 minutes was comparable to the mean operative time of 163 minutes as reported by *Wong et al*³, median of 180 minutes by *Martindale et al*⁴, and mean of 222 minutes by *Shichman et al*⁵. *Gaston et al*⁶ reported a faster median operative time of 140 minutes. Our mean operative time for HAL-NU was 415 minutes compared to 292.1 minutes as reported by *Shichman et al*⁵.

The median duration of post-operative stay for HAL-N as reported by *Guyton et al*⁶ was two days while the mean in the study by *Wong et al*³ was 42 hours. Our mean time of 4.1 days was longer comparatively because we were more cautious of discharging the patients early during the initial period of the learning curve. For the HAL-NU group, our mean duration of post-operative stay was 5.5 days as compared to 4.3 days reported by *Shichman et al*⁵.

Of late, HAL-N and HAL-NU have been advocated as procedures of choice in all extirpative renal surgery. The myth that this procedure violates the laparoscopic surgical principles have been invalidated by various studies. Studies^{4,7,8} have shown that there were no differences in terms of complication rates, length of hospitalization, recovery and analgesic use between pure laparoscopic nephrectomy and

HAL-N. In addition to that, it has been reported that the operative time was shorter^{4,7}.

There are many more advantages of HAL-N as compared to pure laparoscopic nephrectomy. *Gaston et al*⁶ showed that HAL-N has a relatively shorter learning curve. HAL-N also returns the tactile feel and three-dimensional perception that is lost to the surgeon in pure laparoscopic surgery. HAL-N also restores the ability to dissect tissues bluntly and permits safe retraction of large organs like spleen and liver. It is also easier to control bleeding.

In terms of cosmetic appearance, because the incision is made on an insufflated abdomen, postoperatively the wound shrinks to a smaller size; smaller than that of a standard open surgery. Also, since an incision would be required to remove the kidney from the abdomen, it seems illogical not to utilise that incision from the beginning. The HAL-N devices also cover the wound and protect it from contamination during specimen removal.

CONCLUSION

Our experience shows that the hand-port technique is a safe and effective tool for nephrectomy and nephroureterectomy. It incorporates the benefits of open surgery while maintaining the post-operative advantages of laparoscopy.

REFERENCES

1. Clayman RV, Kavoussi LR, Soper NJ, Dierks SM, Meretyk SD, Darcy MD. Laparoscopic nephrectomy: initial case report. *J Urol* 1991; 146: 278.
2. Nakada SY, Moon TD, Gist M, Mahvi D. Use of the pneumo sleeve as an adjunct in laparoscopic nephrectomy. *Urology* 1997; 49: 612.

3. Wong C, Mulholland T, Clair D, Fetzer A. Hand-assisted laparoscopic nephrectomy: the evolving standard in community private practice (abstract). *BJU International* 2004; 94(S2): 294.
4. Martindale A, Appanna TC, Goad J *et al*. The role of hand assisted laparoscopic nephrectomy (abstract). *BJU International* 2006; 97(S1): 14.
5. Schichman SJ, Wong JE, Sosa E *et al*. Hand-assisted laparoscopic radical nephrectomy and nephroureterectomy : a new standard for the 21st century (abstract). *J Urol* 1999; 161(4S): 23.
6. Gaston KE, Moore DT, Pruthi RS. Hand-assisted laparoscopic nephrectomy: prospective evaluation of the learning curve. *J Urol* 2004; 171: 63-67.
7. Nakada SY, Fadden P, Jarrad DF *et al*. Hand-assisted laparoscopic nephrectomy: comparison to open radical nephrectomy. *Urology* 2001; 58: 517-20.
8. Wolf JS, Moon TD, Nakada SY. Hand-assisted laparoscopic nephrectomy: Comparison to standard laparoscopic nephrectomy. *J Urol* 1998; 160: 22-27.