Incisional Hernia Following Hand-Assisted Laparoscopic Surgery for Renal Cell Cancer

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ABSTRACT

Objectives: For renal cell cancer, the hand-assisted laparoscopic approach provides several advantages while maintaining equal advantages with regards to patient recovery. We offer our experience with laparoscopic hand-assisted radical nephrectomy and the incidence of ventral wall hernia.

Methods: Between February 1999 and July 2002, we performed 50 laparoscopic hand-assisted radical nephrectomies. A midline or a muscle splitting right lower quadrant incision was used depending on the side of the tumor. Hand-port incisions were all between 7 cm and 8 cm and closed with #1 polydioxanone sulfate suture in a running fashion. Three (6%) patients developed hand-port incisional hernias. All hernias occurred in midline hand-port sites. The average body weight of those who developed an incisional hernia was 137 kg.

Although the cause of incisional hernia is multifactorial, we believe that obesity plays a significant role. The technical limitations involved in closing a short, deep ventral incision combined with the earlier return to activity of laparoscopy patients put this patient population at significant risk.

Conclusion: We now perform an interrupted closure with nonabsorbable suture for the hand-assist incision and limited activity for 4 weeks to 6 weeks post procedure in high-risk patients. We have had no further wound hernias since adopting these changes.

Key Words: Laparoscopy, Incisional hernia, Renal cell carcinoma.

INTRODUCTION

The laparoscopic approach to renal tumors is now widely accepted and practiced by urologists in academic and private practice. Hand-assisted laparoscopy has played an important role in this evolutionary process. The use of the intracorporeal hand allows a shorter learning curve, intact specimen retrieval, shorter operative times, and the same postoperative advantages with regards to hospital stay and convalescence, all of which have combined to foster a more rapid acceptance of laparoscopic radical nephrectomy by the urologists trained before the current era of laparoscopy. However, with such a rapid and widespread acceptance, should we be aware of potential complications specific to the utilization of the intracorporeal hand? We offer our experience with hand-assisted laparoscopic radical nephrectomy (HALN) and the incidence of ventral wall incisional hernia.

METHODS

We retrospectively analyzed our 50 consecutive hand-assisted laparoscopic radical nephrectomies performed between February 1999 and July 2002. There were 21 right-sided tumors and 29 left-sided tumors. Of the right-sided tumors, the initial 12 were performed with the hand port placed in the infra-umbilical midline position, a 10-mm midline supra-umbilical camera port, and a 12-mm right subcostal midclavicular line working port. If necessary, a 5-mm midline sub-xiphoid port was placed for liver retraction. All left-sided nephrectomies were performed with the hand port in the supra-umbilical midline position, a 10-mm midline supra-umbilical camera port, and a 12-mm right subcostal midclavicular line working port. The final 9 were performed with the hand port placed in a right lower quadrant (RLQ) muscle splitting incision, a 10-mm umbilical camera port, and a 12-mm right subcostal midclavicular line working port. If necessary, a 5-mm midline sub-xiphoid port was placed for liver retraction. All left-sided nephrectomies were performed with the hand port in the supra-umbilical midline position, a 10-mm subcostal midclavicular line camera port, and a 12-mm working port in the midclavicular line at the level of the umbilicus. Initially, the PneumoSleeve (Dexterity, San Antonio, TX) and then the Omniport (Weck Closure Systems, Research Triangle Park, NC) hand-assist devices were placed through the 7-cm to 8-cm incision. Standard hand-assisted laparoscopic radical nephrectomy was performed.

Once the specimen was free of all attachments and vas-
culature, it was removed through the hand-port incision. If the specimen could easily be removed through the existing incision with the hand-assist device protecting the wound edges, then no specimen bag was used. If the specimen was too large to fit through the hand-port device, then it was placed in an endocatch bag, the hand-assist device removed, and the fascial incision extended if necessary. Following removal of the specimen, all 10-mm and 12-mm trocars were closed with the Endoclose devise (Ethicon Surgery, Cincinnati, OH) with a 2–0 Vicryl and the hand-port fascial incision was closed with a #1 polydioxanone sulfate suture in a running fashion. On discharge from the hospital, patients were advised not to lift objects greater than 10 pounds for 7 days to 10 days.

RESULTS

Three patients developed a ventral hernia at the hand-port site, for an overall incidence of 6%. All 3 occurred in midline hand-port sites and none in the RLQ muscle splitting incision. No trocar site hernias occurred. All 3 were easily repaired by re-exploration and fascial closure with interrupted prolene sutures.

For the entire study population, tumor staging included T1 in 33, T2 in 7, T3 in 5, and T4 in 5. Average weight was 82.95 kg, American Society of Anesthesiologists (ASA) score was 2.51, operative time was 223 minutes, estimated blood loss (EBL) was 357 mL, and hospital stay was 3.2 days. For the 3 patients who developed an incisional hernia, all 3 had T1 tumors, the average body weight was 137 kg, ASA score was 3, operative time was 213 minutes (range, 170 to 300), EBL was 367 mL, and hospital stay 3 days.

DISCUSSION

Multiple causal issues are involved in the development of an incisional hernia. These include poor surgical technique in closure of the wound; patient factors that may increase the risk of poor wound healing, such as obesity and chronic illness; postoperative complications, such as wound infection or prolonged ileus; and early postoperative vigorous activity inflicting stress upon a recent wound. It is often difficult to delineate which factors play a more dominant role, and we believe that it most likely is multifactorial.

Although our incisional hernia rate of 6% is disconcerting, it seems to be consistent with that in other reported series of hand-assisted laparoscopy for renal cell carcinoma. Strup et al reported an incidence of 3.4% in their series of 118 cases while Nelson and Wolfe reported an incidence of 4.5%. In comparison with open surgery, these rates appear high. Carlson et al reviewed all studies published after 1984 that looked at wound dehiscence and found an incidence of 1.2% in 18,153 cases. In their review, they found that the average postoperative day of dehiscence was about 7 with a range of 1 to more than 21 days.

We believe that for hand-assisted laparoscopy, 2 significant risk factors exist, obesity and earlier return to activity.

First, we isolated the 3 patients who developed wound dehiscence to see whether co-morbidities or perioperative complications may have played a significant role. All 3 patients had T1 lesions, indicating that specimen size did not play an intricate role. There were also no differences in operative time or EBL to implicate a complicated or prolonged surgery. All 3 patients had an ASA score of 3, and none were diabetic, heavy smokers, or immune compromised. Hospital stay was 3 days for all 3 patients, indicating an uncomplicated postoperative course. The 1 patient factor that did seem to be consistent among the 3 patients was obesity. Their average body weight was 137 kg compared with an average weight of 82.9 kg for the entire series.

Skin incisions were all between 7 cm and 8 cm in length. Because the skin is more pliable then the underlying fascia, often times the fascial incision is extended farther then the skin incision to accommodate the surgeon’s hand. In the obese patient, this can make fascial closure difficult as the fascial corners tend to retract within the overlying fat. The thick abdominal wall also creates a deep, narrow incision that can make proper closure of the fascial corners somewhat precarious. A recent metaanalysis of wound closure techniques has shown that the incidence of wound dehiscence is the lowest with nonabsorbable suture. We have now adopted a meticulous closure of the hand port using interrupted prolene placed in a vertical mattress with particular attention focused on the fascial corners.

A second plausible factor unique to laparoscopic surgery is the earlier return to activity. Nakada et al reported in their series of 18 HALN cases that return to normal activity occurred at 15.8 days and 100% normal activity at 28 days. Nelson and Wolfe reported a return to nonstrenuous activity to occur at 14 ± 9 days in their series of 22 patients. Available data in 36 of our patients indicate that return to routine activity occurred at 11.8 days. Carlson et al reported the average postoperative day of dehiscence was 7, a time when many laparoscopy patients are beginning to return to their daily routine activities. Furthermore,
several investigators\textsuperscript{6–8} have found wound strength (both with and without sutures) are at 40\% to 80\% of that of unwounded tissue at 3 weeks to 6 weeks, a time at which many laparoscopy patients are beginning to return to normal activity. Can it be surmised that we are allowing high-risk patients to return to full activity too soon?

\textbf{CONCLUSION}

We believe that the factors involved in hand-port incisional hernias are multifactorial, but that obese patients are particularly at high risk. The deep and short fascial incisions encountered in these patients make closure a challenge, so we have adopted a meticulous closure using interrupted prolene placed in a vertical mattress with particular attention focused on the fascial corners. It is also apparent that earlier return to activity may also contribute, so strenuous activity is limited for 4 weeks to 6 weeks postoperatively in high-risk patients.

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