Specimen extraction with a surgical glove during laparoscopic radical prostatectomy

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Introduction and objective: *Cost containment during techniques of laparoscopic radical prostatectomy remains an ongoing concern. We present a cost-effective alternative technique of specimen extraction using a surgical glove.*

Materials and methods: *We describe an alternative technique of prostate removal using a surgical glove in seven patients who underwent laparoscopic radical prostatectomy using a robotic-assisted technique.*

Results: *The glove extraction technique was successful in all seven patients for which the method was attempted without complication.*

Conclusion: *Similar to commercially available devices, a surgical glove provides a reliable straightforward means of specimen extraction during laparoscopic radical prostatectomy.*

Key Words: specimen extraction, surgical glove, laparoscopy, laparoscopic radical prostatectomy

Introduction

Laparoscopic radical prostatectomy (LRP) is increasingly utilized for definitive management of localized prostatic adenocarcinoma. LRP can be performed using a pure laparoscopic technique or with robotic assistance.[1-4] Following prostatectomy, intact specimen extraction is warranted for accurate pathologic assessment. A variety of commercially available devices are currently used for specimen removal.

Cost containment during LRP remains an ongoing concern.[5,6] While commercial devices are reliable and easy to use, cost of these disposables is disadvantageous. We describe an alternative technique of prostate removal using a surgical glove.

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Materials and methods

LRP is performed as previously described using a pure or robotic-assisted technique.[1-4] The surgical glove can be placed through any 12-mm port site. In preparation for insertion, a glass rod (5 mm) is placed in the index finger of a size 6.5 Maxxus glove (Johnson and Johnson Healthcare, Inc., Piscataway, NJ USA). The remaining fingers and palm portions of the glove are tightly wrapped around the glass rod, Figure 1. At the predetermined glove insertion site, the 12-mm port is removed. Sterile surgical lubricant is liberally applied to the glove surface and port site. Under direct visualization, the glove/glass rod is placed through the port site. As the glove is visualized, laparoscopic forceps are used to grasp the glove and facilitate insertion.

The 12-mm trocar is then replaced. The assistant surgeon retracts the glove open at two points using laparoscopic forceps. The surgeon then grasps the glove at a third point with one instrument and places the prostatectomy specimen into the glove using another instrument. The specimen is maneuvered into the palm region of the surgical glove. Depending on prostate size, two or three hem-o-lock clips (Weck Closure Systems, Research Triangle Park, NC USA) are used to occlude the glove opening.

Prior to specimen removal, the glove is positioned beneath the intended extraction site. The glove is visualized after the port site incision is extended on either side. The glove is maneuvered such that the opening is upward during removal. Variables considered in evaluation of the technique were difficulties encountered with glove placement and associated perioperative complications related to the technique.

Figure 1. Surgical glove rolled around the glass rod prior to intra-abdominal insertion.

Results

The glove extraction technique was successful in all seven patients for which the method was attempted without complication. In the first patient, glove/glass rod placement directly through the 12-mm trocar was unsuccessful. In all cases, glove/glass rod insertion was successful when placed directly through the port site after the trocar was removed. In three cases, the glove required manipulation via the extraction incision for the opening to be upward prior to delivery through the abdominal wall.

Discussion

Cost containment during LRP remains an ongoing concern. In recent cost analyses, laparoscopic and robotic radical prostatectomy were found to be cost inferior to radical retropubic prostatectomy.[5,6] In part, the differences in cost between open and laparoscopic techniques are related to disposables used with minimally invasive surgery. To combat this issue, reusable laparoscopic instrumentation has been introduced. Available technologies for specimen retrieval, however, are not reusable thereby increasing cost during LRP.

Specimen retrieval can be performed using deployable entrapment devices (Endopouch, Ethicon Endosurgery, Cincinnati, OH USA or Endocatch, US Surgical, Norwalk, CT USA) or a LapSac (Cook, Spencer, IN USA). Prior to use of the glove technique, we routinely used deployable entrapment systems for specimen retrieval during LRP. These devices are easy to use and for the most part reliable during LRP. In a few instances, we have encountered troublesome ripping of the retrieval sac off the insertion tool during prostate placement into the bag. Furthermore, in rare instances we have had to open a larger deployable entrapment system after we discovered the specimen would not fit into the initial device. A significant disadvantage of these retrieval bags is cost. If an assumption is made that surgical gloves costs $5.00 and that specimen entrapment systems could range in cost from $50 - $150, a 10-30 fold cost savings for this aspect of LRP could be realized when using surgical gloves for specimen removal.

In addition to actual instrument cost, other variables should be considered when using surgical gloves as entrapment devices. One concern related to laparoscopic cancer treatment has been port site recurrence.[7,8] Port site recurrence is related mostly to tumor biology, yet specimen extraction device and removal techniques (i.e. morcellation vs. intact) can be

contributing factors. Prostatic adenocarcinoma has a low propensity for port site recurrence and specimens are removed intact for accurate pathologic review.[9] Permeability and burst tension are other factors to consider. Among the commercially available bags, the LapSac have proven best in this regard.[10,11] None of the studies evaluating specimen extraction devices, however, have looked at the use of surgical gloves for this purpose. Nonetheless, gloves are considered a safe, effective barrier for health care professionals during surgery. Orienting the glove opening upward before pulling it through the abdominal wall should also decrease potential contact of the prostate with the abdominal wall. Lastly, operative time related to the glove technique and ease of use should be considered. If the glove was less expensive but the technique took significantly longer to perform, then impact on cost would be negligible or nonexistent. In our experience, we found qualitatively that the glove technique was not lengthy and actually reduced the number of steps we typically perform during robotic LRP. While the design of a glove was not as easy to work with as purpose-built deployable specimen bags, the open end of the glove was much easier to work with in our experience than the LapSac.

Although use of a surgical glove has not to our knowledge been previously used for specimen removal during LRP, a surgical glove has been used as a cost savings measure during laparoscopic cholecystectomy and laparoscopic removal of gastric phytobezoars with excellent results.[12-14] Use of a surgical glove for specimen extraction may also have indications for use in the upper urinary tract. While a glove would not be indicated during nephrectomy, a role could be potentially established for partial nephrectomy and adrenalectomy.

Potential limitations to this report require comment. Operative time required for the technique was not specifically recorded. In addition, the technique has been performed on a relatively small group of patients. Additional clinical experience could potentially uncover technical disadvantages. Although not experienced to date, the prostate could potentially fall out of the glove during manipulation. The rubbery nature of surgical gloves adhering to the specimen and the use of hem-o-lock clips to close the glove would appear, however, to reduce this risk. Lastly, the glove technique is theoretically associated with a risk of abdominal injury during placement, glove breakage during extraction, and a very low potential risk of port site recurrence. These risks, however, appear to be no greater with a glove than with other extraction devices. □

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