

UREKA: Umbilical Ring Easy Kannula Access

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ABSTRACT

Background and Objectives: Standard techniques of laparoscopic access involve creating an abdominal wall defect and can result in complications. We describe the umbilical ring easy kannula access (UREKA) technique, evaluating safety and a decrease in complications related to port placement.

Methods: UREKA is performed via a supra- or infraumbilical incision followed by circumferential dissection of the umbilical stalk. The umbilical skin is dissected free from the fascia, exposing the umbilical ring. Pneumoperitoneum is established either before or after placement of a dilating port through the open ring. We reviewed all laparoscopic procedures performed by one pediatric surgeon over 14 months using UREKA.

Results: Ninety-four patients underwent laparoscopic surgery with initial port placement via UREKA. Appendectomy (n=57) was the most common procedure, followed by fundoplication (15) and cholecystectomy (10). No intestinal, solid organ, vascular, or bladder injuries related to port placement occurred. The only postoperative complication was a superficial wound infection in a 135-kg patient following cholecystectomy, treated successfully with oral antibiotics alone.

Conclusion: The umbilical ring persists to some degree in all pediatric patients and provides a safe portal of entry for laparoscopic surgery. UREKA has few complications and is a straightforward, reproducible technique for gaining initial laparoscopic access.

Key Words: Port placement, Umbilical, Abdominal wall defect.

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INTRODUCTION

Half of all major laparoscopic complications occur during initial access to the peritoneal cavity.^{1,2} The most common methods of initial abdominal access are the closed (Veress needle), open (Hasson), direct trocar, and optical access trocar techniques.³ All of these techniques and their variations involve the creation of a defect in the abdominal wall, and all have been associated with infrequent but significant complications.

In our experience with pediatric laparoscopic surgery, we noted in children with small umbilical hernias that initial access through the hernia defect was easy and safe. Based on this observation, we applied the concept to children without a known umbilical hernia and discovered that umbilical dissection yields a patent umbilical ring in essentially all pediatric patients. This open technique takes advantage of the patent umbilical ring for initial port placement instead of creating an iatrogenic fascial defect. We review our experience with umbilical ring easy kannula access (UREKA), describing the technique and evaluating its efficacy and safety in pediatric patients.

MATERIALS AND METHODS

Procedure

The UREKA technique is demonstrated in **Figure 1**. It can be performed via either a supra- or infraumbilical incision. The umbilical stalk is dissected circumferentially in the plane between fascia and subcutaneous tissue. The umbilical skin is then separated from the fascia. This exposes the umbilical ring, which is essentially always patent, even in the absence of a clinical umbilical hernia. A dilating port (Step Cannula, Covidien Autosuture, Norwalk, CT) can then be passed through the umbilical ring, followed by insufflation. Alternatively, a Veress needle, protected by pulling it back slightly into the dilating sleeve, can be gently passed and pneumoperitoneum established before port placement.

At the conclusion of the operation, after the pneumoperitoneum is evacuated and the umbilical port is removed, the fascia is closed with an absorbable figure-of-eight suture. This same suture is then used to secure the umbilical skin back down to the fascia. The skin is closed

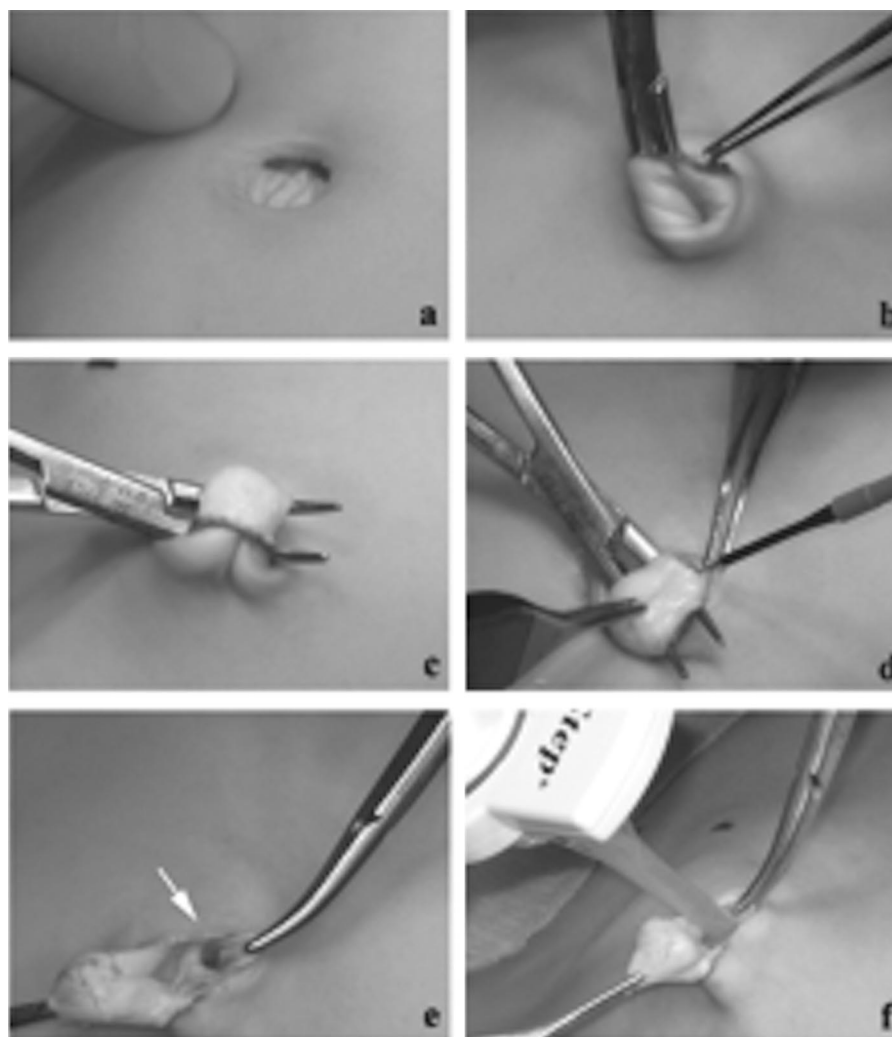


Figure 1. The UREKA Technique: A supraumbilical incision is made (a). The umbilical stalk is dissected free from the subcutaneous tissue (b) and exposed (c). The umbilical skin is then separated from the fascia (d). A patent umbilical ring (arrow) is identified (e), and the port is inserted under direct visualization (f).

with a rapidly absorbable suture. **Figure 2** shows a healed umbilical incision 2 years following UREKA for a laparoscopic appendectomy.

Patient Data

Medical records were retrospectively reviewed for all laparoscopic UREKA procedures performed by one pediatric surgeon over the 14-month period from August 2007 to October 2008. All pediatric laparoscopic operations were eligible, but in general, UREKA was not used for infant cases in which a 3-mm port was placed, such as laparoscopic pyloromyotomy. In these cases, a Veress needle technique was used. Collected data included patient age, weight, sex, procedure, diagnosis, and operative and postoperative complications.

RESULTS

During the study period, 94 pediatric patients (48 male) underwent laparoscopic surgery with initial port placement via UREKA. Ages ranged from 0.25 years to 18 years (mean, 10), and weights from 5kg to 135kg (mean, 44). Appendectomy (n=57) was the most common procedure, followed by fundoplication (15) and cholecystectomy (10). Eleven of the appendectomies were for perforated appendicitis. Other procedures included splenectomy, Ladd procedure, Meckel's diverticulectomy, ventriculoperitoneal shunt placement, omentectomy, and diagnostic laparoscopy.

No gastrointestinal, solid organ, vascular, or bladder injuries related to port placement occurred. No bleeding problems or



Figure 2. The healed umbilical incision of a 14-year-old boy, 2 years following UREKA for appendectomy. The arrows point to the other 2 laparoscopic incisions.

other intraoperative complications related to the UREKA port were encountered. The only postoperative complication was a superficial wound infection in a 135-kg patient following cholecystectomy, which was treated successfully with oral antibiotics alone. There has been no known development of an umbilical hernia postoperatively.

DISCUSSION

The umbilical ring is the opening in the abdominal wall through which the umbilical cord passes into the fetus. The ring is supposed to close down shortly after birth, but when it does not, an umbilical hernia results. It is generally felt that if no clinical hernia is present, then the umbilical ring must be completely closed. In our experience with UREKA, however, we found that after dissecting the umbilical skin from the fascia, that at least a small opening was present in every patient.

Because of the occasional difficulties and complications related to initial laparoscopic access, multiple techniques have been developed. Some reports found no clear evidence for an optimal laparoscopic entry technique^{4,5} or any difference in major complications⁶ between techniques, while others favored the open Hasson technique.^{7,8} In a study by Schafer et al⁹ comparing needle and trocar placement, small bowel injury was the most reported visceral injury, followed by large bowel and liver.

A few reports of laparoscopic access techniques have described the fact that the umbilical base is the shortest distance between the skin and the peritoneal cavity. This site was used as the preferred entry point in these studies,¹⁰⁻¹² which report reproducible, safe umbilical base or stalk techniques with few com-

plications. Unlike the UREKA technique, however, reports of these other studies do not describe a complete elevation of the umbilical skin with visualization of the patent umbilical ring. UREKA has the advantages of being both an umbilical base or ring technique and an open technique. It is a straightforward, rapid, reproducible method that uses a natural opening in the abdominal wall rather than the creation of a new abdominal wall defect. Although our numbers are too small at this point to conclude that UREKA is superior to other entry techniques, our early results have been quite favorable.

References:

1. Jansen FW, Kapiteyn K, Trimbos-Kemper GCM, Hermans J, Trimbos JB. Complications of laparoscopy: a prospective multicenter observational study. *BJOG*. 1997;104:595–600.
2. Yuzpe AA. Pneumoperitonium needle and trocar injuries in laparoscopy: a survey on possible contributing factors and prevention. *J Reprod Med*. 1990;35:485–490.
3. Jobe BA, Hunter JG. Minimally-invasive surgery. In: Brunicaudi FC, Andersen DK, Billiar TR, et al, eds. *Schwartz's Principles of Surgery*. 8th ed. The McGraw-Hill Companies, Inc.;2005;379–401.
4. Molloy D, Kaloo PD, Cooper M, Nguyen TV. Laparoscopic entry: a literature review and analysis of techniques and complications of primary port entry. *Aust N Z J Obstet Gynaecol*. 2002;42:246–254.
5. Vilos GA, Ternamian A, Dempster J, Laberge PY. Laparoscopic entry: a review of techniques, technologies, and complications. *J Obstet Gynaecol Canada*. 2007;29:433–465.
6. Ahmad G, Duffy JM, Phillips K, Watson A. Laparoscopic entry techniques. *Cochrane Database Sys Rev*. 2008;2:CD006583.
7. McKernan JB, Champion JK. Access techniques: Veress needle–initial blind trocar insertion versus open laparoscopy with the Hasson trocar. *Endosc Surg Allied Technol*. 1995;3:35–38.
8. Yerdel MA, Karayalcin K, Koyuncu A, et al. Direct trocar insertion versus Veress needle insertion in laparoscopic cholecystectomy. *Am J Surg*. 1999;177:247–249.
9. Schafer M, Lauper M, Krahenbuhl L. Trocar and Veress needle injuries during laparoscopy. *Surg Endosc*. 2001;15:275–280.
10. Antevil JL, Bhojru S, Brunson ME, Vierra MA, Swadia ND. Safe and rapid laparoscopic access—a new approach. *World J Surg*. 2005;29:800–803.
11. Roy GM, Bazzurini L, Solima E, Luciano AA. Safe technique for laparoscopic entry into the abdominal cavity. *J Am Assoc Gynecol Laparosc*. 2001;8:519–528.
12. Carbonell AM, Harold KL, Smith TI, et al. Umbilical stalk technique for establishing pneumoperitoneum. *J Laparoendosc Adv Surg Tech A*. 2002;12:203–206.