International Journal of Gynecology and Obstetrics xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

International Journal of Gynecology and Obstetrics

journal homepage: www.elsevier.com/locate/ijgo

www.figo.org

CLINICAL ARTICLE

The clinical application of laparoscope-assisted peritoneal vaginoplasty for the treatment of congenital absence of vagina

Chenglu Qin [a], Guangnan Luo [a,*], Min Du [a], Shi Liao [a], Chunping Wang [a], Keke Xu [a], Jie Tang [a], Baoyan Li [a], Juanjuan Zhang [a], Hongxin Pan [a], Tyler W. Ball [b,c], Yujiang Fang [b,c,**]

[a] Department of Gynecology and Obstetrics, Luohu Hospital, Shenzhen, China
[b] Department of Microbiology, Immunology and Pathology, Des Moines University, Des Moines, IA, USA
[c] Department of Surgery, University of Missouri School of Medicine, Columbia, MO, USA

ARTICLE INFO

Article history:
Received 29 April 2015
Received in revised form 11 November 2015
Accepted 17 February 2016

Keywords:
Congenital vaginal atresia
Laparoscopy
Peritoneal vaginoplasty

ABSTRACT

Objective: To evaluate the outcomes of laparoscope-assisted peritoneal vaginoplasty for the treatment of congenital vaginal atresia. *Methods:* A retrospective study enrolled patients diagnosed with congenital vaginal atresia who were treated with one of two different laparoscope-assisted peritoneal vaginoplasty techniques (named Luohu-one and Luohu-two) between October 31, 2001 and December 31, 2014. Operative time, intraoperative bleeding volume, surgical difficulty, complications, and post-procedure sexual satisfaction were reported. *Results:* Data were collected for 620 patients. The Luohu-one procedure was used in the treatment of 145 patients, while 475 patients were treated with the Luohu-two procedure. In 5 (0.8%) patients, it was necessary to perform a sigmoid colon vaginoplasty. During surgery, 16 patients experienced a rectal injury, among whom, 9 patients experienced a rectal–vaginal fistula. Follow-up data extending to 7 years were available for 285 patients. Of these 285 patients, 231 agreed to report details of their sexual experiences. In total, 222 (96.1%) patients reported being very satisfied with their vaginal conditions and sex life. The Luohu-two procedure demonstrated shorter operative and recovery time, and reduced intraoperative bleeding. However, both procedures demonstrated satisfactory results. *Conclusion:* Laparoscope-assisted peritoneal vaginoplasty demonstrated good safety and effectiveness in the treatment of patients with congenital vaginal atresia.

1. Introduction

The most common cause of congenital vaginal atresia is the atypical development of an embryo [1]. The prevalence rate is one per 4000–5000 female births. The etiology for congenital absence of vagina is still unknown; however, some studies have suggested that it might be due to gene anomalies [2,3]. Congenital vaginal atresia is often associated with uterine agenesis, although patients do have normal ovaries and developed fallopian tubes. These patients have either no vagina or only a vaginal dimple, with the depth of the vaginal dimple normally being shorter than 5 cm. These patients often experience primary amenorrhea or dyspareunia. Congenital vaginal atresia is normally diagnosed during adolescence and vaginoplasty can be performed following diagnosis [2]. In general, surgical vaginoplasty is recommended for adolescents if patients do not wish to create a vagina themselves using a dilator. Successful vaginoplasty should result in the neovagina having a new vaginal vault with sufficient size, adequate introitus, and an acceptable cosmetic external appearance [4]. Although several techniques have been reported in the literature [5–9], performing effective surgical procedures to treat this disorder is a significant challenge for clinicians.

The aim of the present study was to retrospectively evaluate the outcomes of two surgical techniques for the treatment of congenital vaginal atresia (named the Luohu-one and Luohu-two techniques).

2. Materials and methods

In a retrospective study, data were reviewed from patients diagnosed with congenital vaginal atresia who underwent laparoscopy-assisted peritoneal vaginoplasty between October 31, 2001 and December 31, 2014 at Shenzhen University affiliated Luohu Hospital, China. Patients were included if they were diagnosed with congenital vaginal atresia and were thought to be sufficiently healthy to undergo anesthesia, were aged at least 18 years and were capable of independently deciding to undergo the surgery. Exclusion criteria included patients diagnosed with congenital vaginal atresia who had experienced an unsuccessful intestinal vaginoplasty procedure and patients who could not assume a modified dorsolithotomy position. The present study was

* Correspondence to: G. Luo, Department of Gynecology and Obstetrics, Luohu Hospital, Shenzhen, 518001, China. Tel.: +86 131 3888 5621; fax: +86 755 8229 4969.
** Correspondence to: Y. Fang, Department of Microbiology, Immunology and Pathology, Des Moines University College of Osteopathic Medicine, Des Moines, IA, 50312, USA. Tel.: +1 515 271 1435; fax: +1 515 271 1543.
E-mail addresses: szlhlgn@126.com (G. Luo), yujiang.fang@dmu.edu (Y. Fang).

http://dx.doi.org/10.1016/j.ijgo.2015.11.015
0020-7292/

approved by the Institutional Review Board of Shenzhen Luohu Hospital. Written informed consent for the surgical procedures was provided by all patients at consultation and patients agreed that their data could be included in retrospective analyses.

Preoperative preparations were similar to those performed during regular gynecologic surgical procedures; patients were instructed to maintain a liquid diet for 1–2 days before surgery and a cleaning enema was performed 1 day prior to surgery. Metronidazole and gentamicin were administered 1 day before surgery. On the day of surgery, a prophylactic antibiotic (cefazolin 2 g) was administered 30 min before beginning the operation. A long stick (approximately 25 cm in length), 1.8 cm wide, and six plastic dilators of increasing size (designed by G.L.) were prepared. Two condoms filled with petroleum jelly gauze were also prepared for surgical use.

Surgical procedures were performed under general anesthesia with patients in a modified dorsolithotomy position. Procedures were performed using one camera port and two working ports. After trocar placement, the operative table was changed to a 35° head-down position to ensure the clearance of the intestines from the pelvis.

Two different vaginoplasty techniques developed by one of the study authors (G.L.), named the Luohu-one and Luohu-two techniques, were performed throughout the study period at the study institution. Initially, patients with a vaginal dimple less than 2 cm deep were treated using the Luohu-one procedure and all other patients were treated with the Luohu-two procedure. However, as operating experience increased, all new patients treated during the final 6 years of the study period were treated with the Luohu-two procedure.

The Luohu-one procedure was performed in several stages. After exploratory laparoscopy, 200 mL of normal saline was injected into the space between the urethra, bladder, and rectum to separate the pelvic peritoneum. A perineal cavity between the urethra, bladder, and rectum was created by the dissection of the center of the arcus tendineus and the recto-urethral muscle. The cavity was approximately 9–10 cm in length, 2–3 cm wide, and the top of the cavity was located at the pelvic peritoneum. After the cavity was established, the camera port in the navel was expanded to 2 cm in width. The long stick was inserted into the abdomen and the pelvic peritoneum was expelled from the pelvis through the cavity. A long-handled Deschamps ligature carrier was used to attach the peritoneum to the cavity; fixation of the peritoneum was required. After the peritoneum graft had covered the neovaginal wall, a peritoneum–perineum anastomosis was performed using interrupted 3–0 polyglactin absorbable sutures (Ethicon Inc., Somerville, NJ, USA). Following this, the neovagina was established. A long-handled Deschamps ligature was used to laparoscopically sew the peritoneum to the top of the intra-abdominal portion of the pelvic cavity using 1–0 polyglactin sutures. Finally, a condom filled with petroleum jelly gauze was inserting into the neovagina to act as a mold.

The Luohu-two procedure was also performed using a step-based approach (Fig. 1). Following exploratory laparoscopy, blunt dissection was used to separate the vaginal dimple, and the six plastic dilators of increasing sizes were used to push the tissue between the urethra, bladder, and rectum from the perineum to reach the pelvis. A U-shaped incision was made laparoscopically in the peritoneum above the dilator in the pelvis. Following this, a wide perineal incision was made between the urethra, bladder, and rectum by dissecting the center of the arcus tendineus and the recto-urethral muscle. The peritoneum was then sutured to the entrance of the neovagina using absorbable interrupted sutures with the neovagina positioned deeply inside the perineal cavity. Unabsorbable interrupted sutures were used to sew the peritoneum to the top of the intra-abdominal portion of the neovagina in the pelvis. Finally, the vaginal mold (a condom filled with petroleum jelly gauze) was inserted into the neovagina.

Post-surgical follow-up procedures were the same for all patients included in the present study. Unabsorbable interrupted sutures were used to suture the labia initially to prevent the mold from leaving the neovaginal cavity. A catheter was inserted in all patients for 6 h following surgery. The filled condom was removed from the neovagina 10 days after surgery. During hospitalization, patients' neovaginas were dilated for 5–10 min each day. Patients were discharged 3–4 weeks after surgery and were instructed to dilate the neovagina each day for a period of at least 3 months or until they had experienced normal satisfactory intercourse.

Operative time, intraoperative bleeding volume, difficulties experienced during surgery, and intra-operative and postoperative complications were recorded for all procedures. Data were also collected on patient sexual function and satisfaction following vaginoplasty.

3. Results

A total of 620 eligible patients were treated during the study period. The mean age of patients was 24.54 years (range 18–40 years). All patients had primary amenorrhea. Of the 620 patients, eight complained of episodic abdominal pain. All patients had normal secondary sexual characteristics and cunnus. The depth of patients' vaginal dimples ranged between 1 cm and 5 cm. Symmetric uterine buds were found inside the pelvis of 615 patients but all of these patients

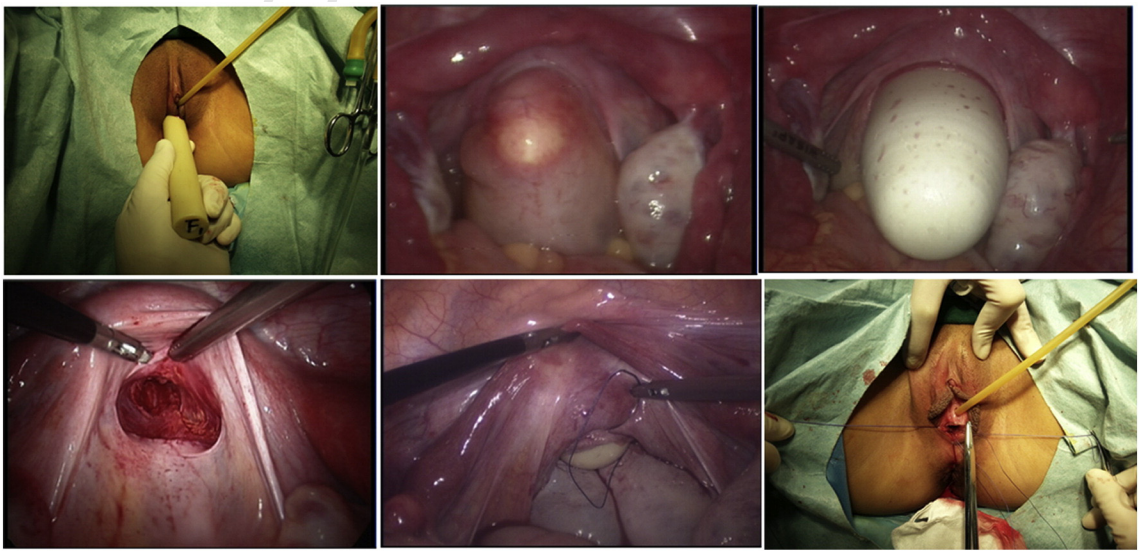

Fig. 1. Representative pictures of the major intraoperative stages in the Luohu-two technique.

Please cite this article as: Qin C, et al, The clinical application of laparoscope-assisted peritoneal vaginoplasty for the treatment of congenital absence of vagina, Int J Gynecol Obstet (2016), http://dx.doi.org/10.1016/j.ijgo.2015.11.015