LAPAROSCOPIC PERITONEAL COLPOPOIESIS: LONG-TERM ANATOMICAL AND FUNCTIONAL OUTCOMES

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The authors declare that they have no conflicts of interest

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vaginal agenesis, Mayer-Rokitansky-Küster-Hauser syndrome, neovagina, peritoneal colpopoiesis

Abstract

Objective: *To evaluate the long-term anatomical and sexual outcomes of laparoscopic peritoneal colpopoiesis among women with Mayer-Rokitansky-Küster-Hauser (MRKH) syndrome.*

Material and methods. *We conducted a retrospective and observational single center study. Between January 2007 and May 2017, 16 patients with MRKH syndrome were treated with laparoscopic peritoneal colpopoiesis procedure.*

Results. *The mean age of patients at the time of diagnosis was 18.8 years, and that at the time of hospitalization was 20.6 years. Concomitant congenital anomalies, such as urinary tract anomaly, were reported in six (37.5%) patients, various malformations of the cardiovascular system were reported in two (12.5%) patients. Mean surgery duration was 122.6 minutes (range 65 – 295 min); mean intraoperative blood loss was 75.3 ml (range 30 – 200 ml). Anatomical success, along with the absence of stenosis and reduction of the tissue flap was achieved in 100% cases. According to the female sexual function index (FSFI), results show good quality of sexual life. One of the patients, thanks to transvaginal donation of oocytes and surrogate motherhood, is raising her own child at the age of 3 years.*

Conclusion. *Laparoscopic peritoneal colpopoiesis can be used as an effective and low-traumatic technique for creating a neovagina, taking into account the anatomical structure of the perineum.*

Лапароскопиялық ішперделік кольпопоэз: алшақмерзімді анатомиялық және функционалдық нәтижелер

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Тұжырым

Мақсаты: *Майер-Рокитанский-Кюстер-Хаузер синдромы бойынша лапароскопиялық ішперделік кольпопоэз отасы жүргізілген пациенттер арасында ұзақмерзімді анатомиялық және функционалдық нәтижелерін бағалау.*

Материалдар мен әдістер. *Бірорталықты ретроспективті зерттеу жүргізілді. 2007 жылдың қаңтар айы мен 2017 жылдың мамыр айы мерзімі аралығында Майер-Рокитанский-Кюстер-Хаузер синдромы бойынша 16 пацентке «University Medical Center» КФ гинекология бөлімшесі аясында лапароскопиялық ішперделік кольпопоэз отасы жүргізілді.*

Нәтижелер. *Диагнозды растау мезетінде пациенттердің орта жасы 18,8 жасты, ауруханаға жатқызу мезетінде 20,6 жасты құрады. Қосарлы туа біткен ақауларың арасында несепшығару жүйесі ақаулары 6 науқаста (37,5%), түрлі жүрекқантамыр ақаулары 2 науқаста (12,5%) анықталды. Отаның орташа ұзақтығы 122,6 минутты құрады (диапазон 65-295 мин); орташа қанжоғалту 75,3 мл құрады (диапазон 30-200 мл). Қынап стенозының пайда болмауымен қатар санағанда, анатомиялық сәттілік 100% құрады. Арнайы сауалнама нәтижесіне сәйкес, ота жасалғаннан кейінгі кезеңде жыныстық өмір сапасы айтарлықтай жақсару нәтижесін көрсетті. Ооциттер донациясы мен суррогатты ана әдістерін ұсыну нәтижесінде бір пациент 3 жасар туған баласының анасы болып отыр.*

Қорытынды. *Лапароскопиялық ішперделік кольпопоэз отасы әйелдер сыртқы жыныс*

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Түйінді сөздер:
қынап агенезиясы, Майер-Рокитанский-Кюстер-Хаузер синдромы, неоқынап, ішперделік кольпопоэз

мүшелерінің анатомиялық құрылымына сәйкес неоқынап жасаудың оң нәтижелі және азжарақатты әдісі ретінде қарастырыла алады.

Перитонеальный кольпопоэз с лапароскопическим доступом: долгосрочные анатомические и функциональные результаты

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Аннотация

Цель: *Оценить отдаленные анатомические и функциональные результаты лапароскопического перитонеального кольпопоэза у женщин с синдромом Майера-Рокитанского-Кюстера-Хаузера.*

Материалы и методы. *Проведено одноцентровое ретроспективное исследование. В период с января 2007 по май 2017 года 16 пациентам с синдромом Майера-Рокитанского-Кюстера-Хаузера в условиях гинекологического отделения КФ «University Medical Center» проведена операция перитонеальный кольпопоэз с лапароскопическим доступом.*

Результаты. *Средний возраст пациентов на момент постановки диагноза составлял 18,8 лет, на момент госпитализации 20,6 лет. Сопутствующие врожденные аномалии, такие как аномалии мочевыводящих путей, были зарегистрированы у шести (37,5%) пациентов, различные пороки развития сердечно-сосудистой системы были зарегистрированы у двух (12,5%) пациентов. Средняя продолжительность операции составила 122,6 минут (диапазон 65-295 мин); средняя кровопотеря во время операции составила 75,3 мл (диапазон 30-200 мл). Анатомический успех, наряду с отсутствием стеноза, был достигнут в 100% случаев. Согласно валидированному опроснику, результаты показали значимое улучшение качества сексуальной жизни в послеоперационном периоде. Одна из пациенток, путем донации ооцитов и суррогатного материнства, имеет возможность воспитывать родного ребенка в возрасте 3 лет.*

Заключение. *Перитонеальный кольпопоэз с лапароскопическим доступом может быть использован как эффективный и малотравматичный метод создания неовлагалища с учетом анатомического строения промежности.*

Ключевые слова:
агенезия влагалища, синдром Майера-Рокитанского-Кюстера-Хаузера, неовлагалище, перитонеальный кольпопоэз

Introduction

Vaginal agenesis, also known as Müllerian agenesis or Mayer-Rokitansky-Küster-Hauser (MRKH) syndrome, is a congenital malformation characterized by the absence of the vagina with various variants of the development of the uterus [1]. The frequency of this malformation is 1 per 5000 (1 per 4000-10000 women) [2]. Researchers report a common occurrence of this syndrome in a family history, which confirms the hypothesis of a genetic nature according to an autosomal dominant inheritance with incomplete penetrance and expressivity [3, 4], indicating genetic or chromosomal mutations.

Patients with vaginal agenesis have a normal female karyotype with normal ovaries and ovarian function, so they develop normal secondary sex characteristics. Primary amenorrhea between the ages of 15 and 17 years is common. Vaginal agenesis is the second most common cause of primary amenorrhea after gonadal dysgenesis. Infertility and the absence of a normal sexual life have the greatest impact on the quality of life of patients with this pathology. After diagnosis in adolescence, patients experience severe psychological and emotional distress due to primary amenorrhea, which leads to low self-esteem and body image distortion [5, 6]. The surgery should be performed by experienced surgeons who are proficient in vaginoplasty and laparoscopy techniques. Psychological support of patients is important to obtain optimal post-surgery results [7 - 15].

There are many methods for reconstructing the vagina. In the presence of a vaginal bursa, a conservative method known as the Franks` method is used, the essence of which is to mechanically expand the vagina using graduated rigid dilators achieving a progressive intussusception of the bursa. This method is indicated for patients with a vaginal dimple. [16]. Timely diagnosis is important when planning surgical intervention [17, 18]. Safety, efficiency and practicality are an important advantage of laparoscopically assisted peritoneal colpopoiesis vaginoplasty. This technique is suitable for all types of perineal structure.

We evaluated the anatomical success of the

neovagina created by laparoscopic peritoneal colpopoiesis (LPC) and the subjective effectiveness of the patients' sexual activity.

Materials and methods

This study was a retrospective and observational single center study. Institutional local ethics committee approval was obtained. We contacted all the 16 patients who underwent LPC between January 1, 2007 and May 31, 2017 at the Gynecology Department, University Medical Center (Astana, Kazakhstan). A control group of 26 age-matched, childless, sexually active women were examined during the same period. Those patients came for routine check-up to our outpatient department. All patients provided written informed consent to participate in the study.

Medical and surgical history, initial purpose of consultation, urogynecological symptoms, physical examination results, perioperative data, hospitalisation data, postoperative data and recurrence or the need for secondary surgery were collected retrospectively from medical files.

To assess long-term anatomical and functional results patients underwent a clinical examination and a detailed interview with Russian validated Female Sexual Function Index (FSFI) questionnaire between June and August 2022. All patients underwent the basic evaluation of anatomical outcomes. Pelvic Organ Prolapse Quantification (POP-Q) was assessed for every patient. Physical examination was performed by one clinician. The FSFI questionnaire includes 6 domains: desire, arousal, lubrication, orgasm, satisfaction, and comfort. Subjects obtaining a total FSFI score of 27.50 or lower were considered to have sexual dysfunction [19].

Data analysis

These clinical results were analyzed using SPSS-statistics 26. A set of descriptive statistics was used for the quantitative parameters: mean values, standard deviation, and minimum and maximum values. P values less than 0.05 were considered significant. Variables that were not normally distributed ($P < 0.05$ by Shapiro-Wilk test) were analyzed via the Mann-Whitney U test.

Results

The mean age of patients at the time of diagnosis was 18.8 years, and that at the time of hospitalization was 20.6 years. Mean age of women from the control group was 24.4±4.35. Complaints included amenorrhea among all patients, painful intercourse in two (12.5%) patients and post-traumatic rupture of the urethra in one (6.25%) patient. Preoperative length of the vagina was 1.6 cm. Concomitant congenital anomalies, such as urinary tract anomaly, were reported in six (37.5%) patients, various malformations of the cardiovascular system were reported in two (12.5%) patients, an operated pediatric anal atresia and aplasia of the coccyx were diagnosed in one (6.25%) patient.

Mean surgery duration was 122.6 minutes (range 65 – 295 min); mean intraoperative blood loss was 75.3 ml (range 30 – 200 ml). There was no blood transfusion. In 2 cases, surgeries were complicated with damage to the intestines and bladder, which were immediately fixed intraoperatively. There were no cases of early postoperative complications. Mean duration of hospital stay was 9.4 days (range 3 – 17 days).

Anatomical success, along with the absence of stenosis and reduction of the tissue flap was achieved in all patients. Upon physical examination at time of study, mean neovaginal length was 7.1 cm and all women were in the POPQ-0 stage. In the control group, all women were also in the POPQ-0 stage.

The average time of onset of sexual activity in the post-surgery period was 9.5 months for eleven (68.7%) patients and 3 years for two (12.5%) patients. Thirteen patients (81.3%) from the MRKH group declared a satisfactory sexual life and this was confirmed by the FSFI questionnaire results. In the control group, sexual satisfaction was declared by 100% of all women, but the FSFI results confirmed this in 23 (88.5%) cases. According to FSFI, results show good quality of sexual life in both groups. FSFI results are shown in Table 1.

One of the patients, thanks to transvaginal donation of oocytes and surrogate motherhood, is raising her own child at the age of 3 years.

Patient	Mean ± SD	Test U Mann-Whitney (p)
MRKH group (n = 13)	27.6±3.2	0.33
Control group (n = 26)	31.0±2.8	

Table 1.
Evaluation of the subjective effectiveness of the neovagina using the Female Sexual Function Index (FSFI) questionnaire

Discussion

There are two surgical techniques of vaginoplasty at the present stage: traction and transplantation. Traction techniques include the Vecchietti procedure, Davydov technique, intestinal vaginoplasty, McIndoe technique. McIndoe vaginoplasty is the preferred technique. [20]. There was a report on the use of a multidisciplinary approach to performing vaginoplasty with a single-hole autologous buccal graft in patients with vaginal agenesis. The anatomical success of a neovagina created using this method is achieved by completely absorbing the donor graft, thus maintaining a sufficient length and diameter of the vagina. The use of fenestrated autologous buccal mucosa is described by Morrison S.D. et al. [21], Yesim Ozgenel et al. [22], Lin et al. [23] and Grimsby et al. [24] (Table 2). Complications reported in these research included bladder injury, vaginal bleeding, urethral injury, oral contracture, and resurgeries. Long-term post-procedure data on sexual function are unknown.

Table 2.
Features of surgical techniques for creating neovagina

Parameters	**Vecchietti procedure** [14]	**Peritoneal colpopoiesis** [10]	**Intestinal vaginoplasty** [31-35]	**McIndoe technique** [36]	**Vaginoplasty using fenestrated autologous buccal mucosa** [25-28]
Access	Vaginal access + laparotomy/ laparoscopy	Vaginal access + laparotomy/ laparoscopy	Vaginal access + laparotomy	Vaginal access	Vaginal access
Vaginal flap	Nonoxidized cellulose	Abdominal mobilization of the peritoneum, attaching the peritoneum to the vaginal opening and suturing the top of the new vagina	Various parts of the intestine	Spread skin flap (obtained from the skin of the buttocks or thigh area); amnion; autologous *in vitro* cultured vaginal tissue; musculocutaneous flaps	Buccal mucosa
Post-surgery use of a vaginal dilator	Yes	Yes	No	Yes	Yes
Vagina length, cm	6-9	10-12	6-8	7-9	8-10
Advantages	Does not require transplantation of foreign tissues	The procedure is convenient in relation to granulation and scarring of the neovagina	Excellent blood supply to the flap	Sexual satisfaction.	Sufficient secretion; lack of hairiness in the texture; color similar to natural vaginal tissue
Disadvantages	Possible complications associated with the installation of traction threads in the vesico-rectal space and possible subsequent prolapse of the vagina	Poor lubrication of the neovaginal flap; Risk of bowel and bladder injury	Intestinal anastomosis; Significant vaginal discharge; Post-surgery intestinal obstruction; intestinal ulceration; risk of malignancy; diversion colitis	Scarring and contracture of the graft; Staining and the presence of hair in tissues; Poor cosmetic appearance of the donor site	Requires long-term studies of sexual activity in patients with vaginal agenesis

MRKH diagnosis represents a stressful event, with negative emotional reactions characterized by increased sensitivity to difference and impaired sense of femininity, especially due to infertility [4, 25]. This study demonstrates that LPC is an efficient long term corrective surgery for patients with MRKH syndrome; moreover, we confirmed that LPC method is well accepted by patients in the aspect of sexual satisfaction.

The main weakness of our study is the fact that it was observational and retrospective, leading to information bias.

The strength of our study is the long-time span of observation with a median follow up of 5 years. This surgery demonstrates the anatomical success of the neovagina in terms of vaginal length and diameter, which allows for self-expansion, cosmetic appearance, and satisfaction with the patient's sexual activity, as evidenced by the results of our research. In addition, our study provides ongoing evidence that sexual function and satisfaction improves after reconstructive surgery for MRKH syndrome and that an important part of the improvement may be due to psychosocial aspects of sexual health rather than physiologic functions.

Conclusion

Laparoscopic peritoneal colpopoiesis can be used as an effective and low-traumatic technique for creating a neovagina, taking into account the anatomical structure of the perineum. This technique allows to achieve good cosmetic results, which is especially important for young patients.

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