



# Laparoscopic-assisted perineal pull-through vaginoplasty

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**Abstract** Hematometrocolpos is the result of vaginal obstruction and can become an emergency in the pubertal period. The treatment of imperforate hymen is well defined, but the treatment of vaginal atresia is more complex. We report a case of hematometrocolpos secondary to distal vaginal atresia that was operated on in the pubertal period. The patient had isolated distal atresia without persistence of the urogenital sinus. A combined abdominal laparoscopic and perineal approach and a posterior vaginoplasty were carried out. Finally, an abdominoperineal pull-through was successfully performed. Neovagina was successfully developed with this method. The embryology and literature are reviewed. The classification, indications, and surgical technique are discussed. We suggest that this procedure is suitable for patients with vaginal agenesis and a normal uterus.

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Vaginal agenesis is known as one of the Müllerian anomalies. Müllerian anomalies occur during gonadal development and differentiation, and may lead to complex outcomes. Possible reasons for these anomalies include cessation or regression of Müllerian duct development and deficiency of estrogen and gestagen receptors. This syndrome is frequently associated with malformations of the urinary tract and skeletal system, which are observed in 40% and 10% of cases, respectively. These findings suggest an embryological link between genitourinary and bone development. Familial cases have been reported, which supports the notion that this is an inherited syndrome, but with variable expression and reduced penetrance [1-3]. These anomalies usually manifest themselves in neonates and in young girls aged 9–15 years who have good secondary sexual development. Lower abdominal mass and tense bulging bluish membrane at introitus is the most common presentation. About 15% of cases of abdominal mass in

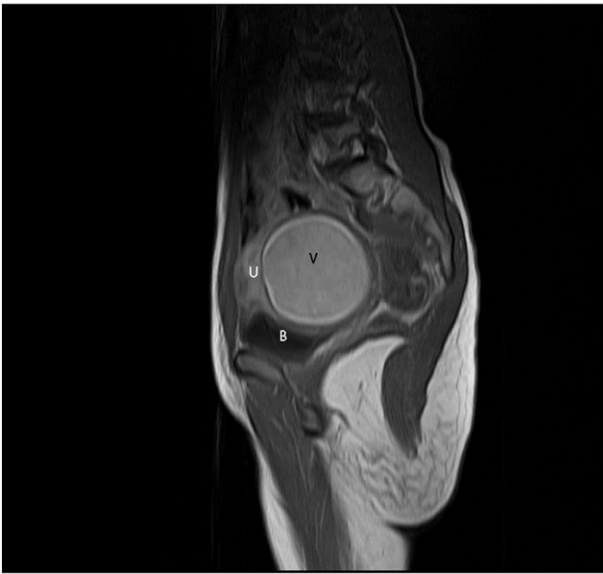
newborn girls are due to hydrometrocolpos [4]. Respiratory distress due to enormous abdominal distension has been reported in neonates [4]. An over-distended vagina compresses the adjacent organs and can cause abdominal pain, intestinal obstruction, urethral obstruction, hydronephrosis, bladder perforation, and venous stasis in the lower extremities. Unusual presentations in adolescent girls include backache and acute abdomen mimicking acute appendicitis [5]. In such cases, hematometrocolpos is suspected first, due to the absence of distal extension. Ultrasound and magnetic resonance imaging and laparoscopy modalities provide useful information [6].

Distal vaginal agenesis is a urogenital sinus anomaly which is rarely isolated. Our patient was one of those uncommon cases.

## 1. Case report

A 13-year-old girl presented to the emergency department with cyclic abdominal pain. Initial examination revealed an intraabdominal 10-cm mass. She was subsequently referred to our clinic. On obtaining a medical

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**Fig. 1** Magnetic resonance imaging of case before operation. (U, uterus; V, vagina; B, bladder).

history, she had no menstrual periods despite experiencing monthly or bimonthly abdominal pain that persisted persisting for a couple of days. An abdominal examination showed a swelling in the pelvic region. Palpation revealed a fixed mass with a smooth surface, accompanied by tenderness, within the area corresponding to the anatomic location of the bladder. Examination of the external genitalia showed normal labia majora and minora, urethra, and clitoris; however, the vaginal opening was not present.

Abdominal ultrasound showed a mass of 12 cm in diameter in the pelvic region, whereas magnetic resonance imaging displayed a mass measuring 12 × 10 cm in the pelvic region associated with the proximal vagina (Fig. 1). Hematologic values were normal. After the examinations, our patient was prepared for surgery.

### 1.1. Operative technique

The patient was placed in the lithotomy position, and surgical preparations were carried out. A gynecologic examination showed normal labia majora and minora, whereas there was only a single orifice that appeared to represent the urinary meatus. The operation was continued by blunt and sharp dissections following the urethra from the distal portion of the urinary meatus and through the vertical plane. The proximal portion of the urethra was considerably wide, and there were adhesions to the adjacent tissues. No vaginal tissue was identified between the urethra, bladder, and rectum. Proximally, there was a round, stiff, fixed structure approximately 12 cm in size. The mass was opened between stay sutures, and a brownish thick fluid with black content was aspirated and drained. The cystic mass was irrigated with isotonic saline solution. The examination was continued with the aid of a vaginal speculum. The inside of

the mass was lined with mucosa, and there was an opening similar to the cervix in the proximal aspect. This structure was thought to be the posterior fornix of the vagina, having a reactionally thickened wall. It was determined that the mass was compressing the rectum, bladder neck, and bladder. Abdominal laparoscopy revealed a normally-sized uterus, along with salpinges and ovaries of normal size and location. Brownish foci of discoloration similar to endometriosis were observed posterior to the uterus and around the ovaries. Moreover, we determined an area of large and lumenized tissue, extending from beneath the uterus to the pelvic floor, which proved to be the cystic structure that had been drained by us from below. As the area thought to be the cervix was moved, the uterus moved as well. The structure that we detected was mobilized from the distal aspect. The tissues posterior to the bladder were brought closer. The blind-ending proximal vagina was anastomosed to the area that should host the opening by 3/0 vicryl. The anastomosis was tight, and the opening was maintained by placing a silicon tube stent within it. The incision was closed with 3/0 vicryl (Fig. 2).

## 2. Discussion

The management of patients with genital anomalies is a complex problem requiring individual surgical approaches, depending on the anatomical conditions. The goals remain the correction of visible anatomical anomalies, the creation of an appearance that corresponds to the patient's gender, and the restoration of function that will enable the individual to lead a normal life, including sexual function and, if possible, reproduction. Indeed, this implies that patient satisfaction should be among the goals. Many controversies about the management of genital anomalies center on this problem.

Müllerian duct anomalies are known for their complexity. Generally, they are encountered as a component of a Mayer-



**Fig. 2** Vaginal opening after operation.

Rokitansky anomaly. The latter involves vaginal agenesis, variable remnants of uterine tissue, and normal ovaries [1]. Rarely, isolated vaginal agenesis may be observed [7]. Moreover, the isolated absence of the vagina is known as a urogenital sinus anomaly.

There are various vaginoplasty techniques. The fundamental aim of these procedures is to form functional and comfortable vaginal tissue of adequate length and secretory character, which requires limited dilatation.

The surgical method should be chosen based on the patient and the type of anomaly. Various methods have been used, including the McIndoe technique, the spontaneous epithelialization technique (Dupuytren), local muscle and skin flaps, free flaps, and ileal and colovaginoplasties [8,9]. Although numerous methods have been described since the first surgical intervention for the correction of vaginal agenesis, the Abbé–McIndoe technique is still the most popular and preferred method. Using a combination of blunt digital and scissor dissection, a cavity is formed digitally to admit two fingers. The vagina is enlarged to 11–13 cm in depth. A urethral catheter and a finger in the rectum aid in preventing inadvertent injury to adjacent structures. Absolute hemostasis is obtained by the use of electrocautery and packing. A new technique was developed by Vecchietti, which combines surgical and conservative methods, and involves epithelialization from the outer skin layer [10]. Those methods may have disadvantages, including the need for prolonged vaginal dilatation sessions, which may cause psychological embarrassment for patients. Those dilatations may lead to the formation of fistulas extending from the vagina to other organs, and epidermoid carcinoma has been described [11,12]. Moreover, although stenosis is rarely observed in bowel vaginoplasties performed using grafts of the colon and ileum, the risks of continuous discharge, prolapsus, operative procedure(s) requiring a prolonged operative period, bleeding, and infection are elevated [13,14], while the risk of intestinal complications, including ileus due to fibrous adhesions (bridle ileus) and anastomotic leaks, is increased. In addition, colonic vaginoplasty elevates the risk of neoplasia in the vagina [15].

My patient had isolated distal vaginal agenesis. While the ovaries, uterus, and proximal one-third of the vagina were present, the distal two-thirds of the vagina were not developed. As our patient entered her menstrual period, the menses drained into the blind-ending proximal vagina and caused considerable vaginal swelling. Thus, the posterior fornix was extended to the upper pole of the uterus.

The best replacement material for an organ is the patient's own tissue, which is capable of complete functionality. Therefore, if possible, the replacement organ should be fabricated from replaced tissue. Thus, we mobilized the dilated vaginal tissue and extended it to the introitus.

In this case, dilatation of the proximal vagina by approximately 10–12 cm facilitated our procedure. We encountered no problems, except for the tightness of the anastomosis.

Laparoscopy is a very useful method for visualization of intraabdominal organs, and it can also provide assistance during dissection. It was effective in our case, particularly in terms of the visualization of the organs. We used laparoscopy for the early detection of likely intraabdominal complications during distal dissection, and for the determination of the most appropriate vaginoplasty technique. Colovaginoplasty cases can be carried out laparoscopically. We used laparoscopy for visualization and planning.

In conclusion, pull-through vaginoplasty can be effective in combination with laparoscopy in certain cases. Laparoscopy proves to be useful particularly in determining the appropriate technique and with regard to outlining the anatomy of the internal organs. Therefore, it is of great benefit in vaginal agenesis cases.

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