


Minimally invasive technique for the reconstruction of the cervix in cervical atresia

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Abstract Cervical atresia is a challenging anomaly with an invasive management. We describe a case of cervical atresia who had multiple surgeries before this case was treated by using a minimal invasive technique by inserting gastrostomy tube with guide wire through the vagina and inflate the gastrostomy balloon inside the uterus to create a patent cervical tunnel, under ultrasound guidance. The patient recovered and was observed for 10 months after the procedure and developed a regular cycle with no cyclical pain.

Keywords Cervical atresia · Gastrostomy tube · Cervix · Cervical tunnel

Introduction

Congenital cervical atresia is a Müllerian ducts anomaly of the female reproductive tract that is challenging to treat; it includes agenesis and dysgenesis of the cervix [1]. The

incidence of Müllerian ducts anomalies in the general female population is estimated to be 0.001 to 10 % [2]. Complete vaginal agenesis with an absent uterus and cervix occurs in 1 in 4000 to 1 in 10,000 female births [2]. Cervical atresia was managed with hysterectomy; however, several surgical procedures have been proposed to preserve a healthy sexual life with the possibility of successful fertility outcomes in female patients [3–7]. These procedures include laparoscopic surgeries, skin graft, and use of Foley’s catheter and silicone stents [3–9]. These methods include both vaginal and laparoscopic invasive procedure. Hence, there is a need for less invasive techniques for the management of cervical atresia.

In this report, we describe a new, less invasive technique. This technique involves a vaginal procedure performed under ultrasound (US) guidance with the use of a gastrostomy tube to create a patent cervical tunnel. Ethical approval was obtained from the Institutional Review Board.

Case report

Our patient is a 28-year-old woman with a congenital Müllerian malformation characterized by a stenotic, atretic, and fibrotic cervix. At her first hospital visit at the age of 19 years, she presented with primary amenorrhea and regular monthly lower abdominal pain. The US reports provided by her main hospital showed that the vagina is short and the cervix was not visualized or palpable. We did not receive her hormonal profile. She was married at the age of 20 years in 2004 and was followed up in an in vitro fertilization unit at another hospital for pregnancy attempts. She had undergone laparotomy to treat the cervical atresia when she presented with a distended uterus with blood accumulate from monthly cycles, and two approaches with the use of Foley’s catheter to create a tunnel; however, the details of these procedures were not available. However, both failed. In

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Fig. 1 The uterus distended with hematometra

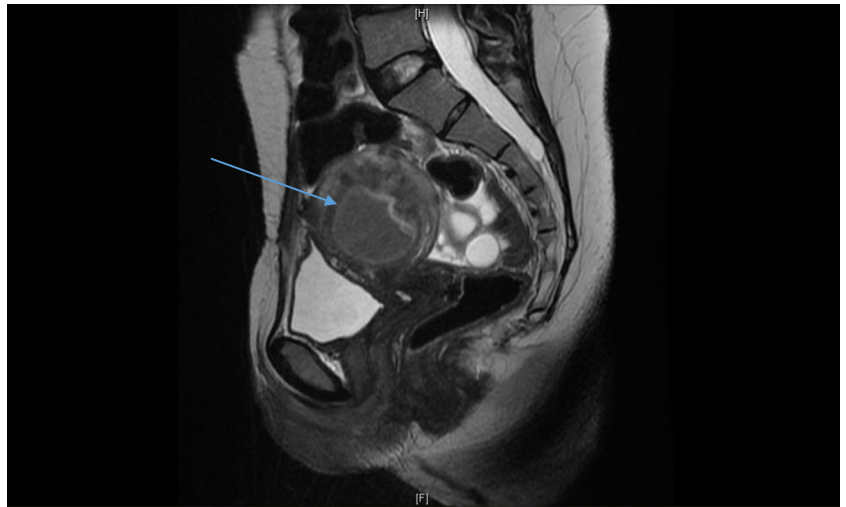
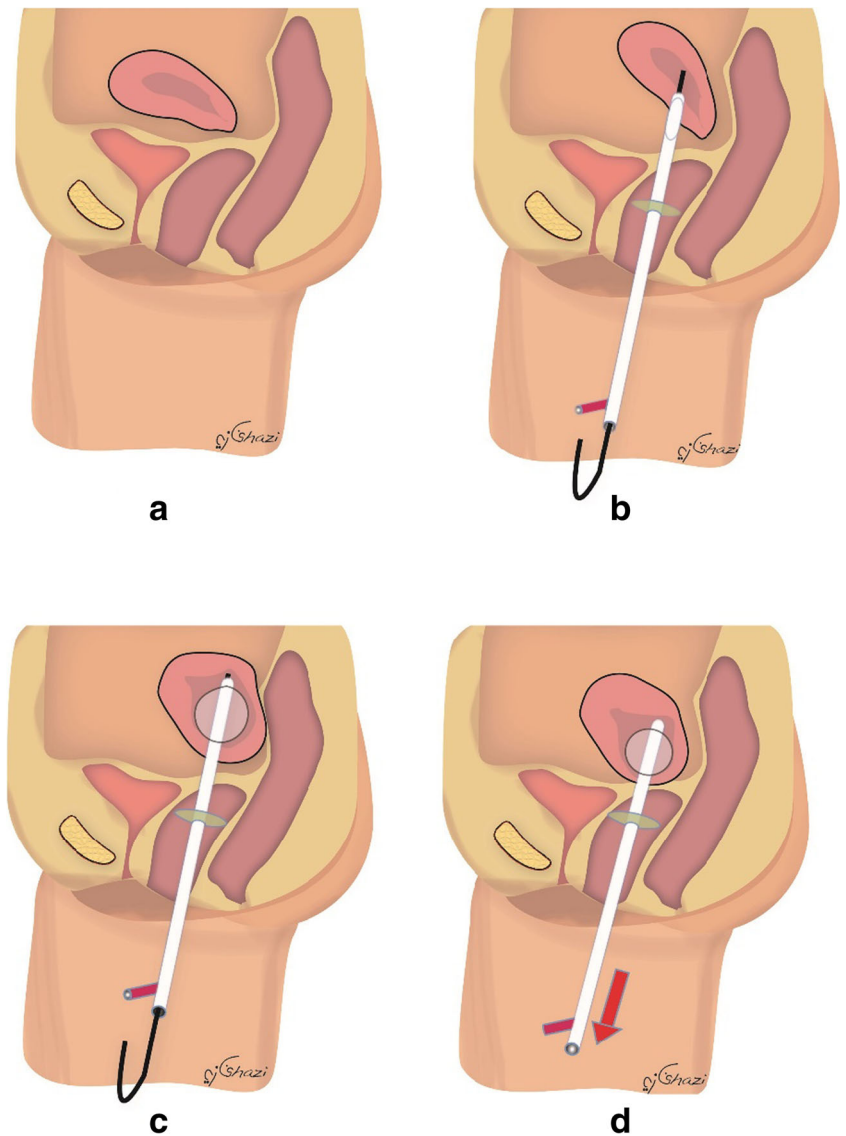


Fig. 2 Steps of inserting the gastrostomy tube



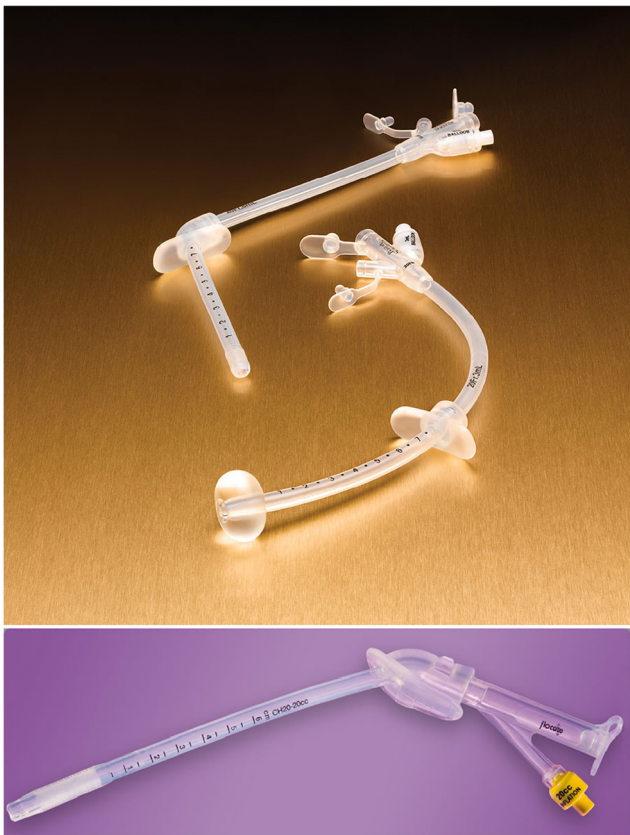
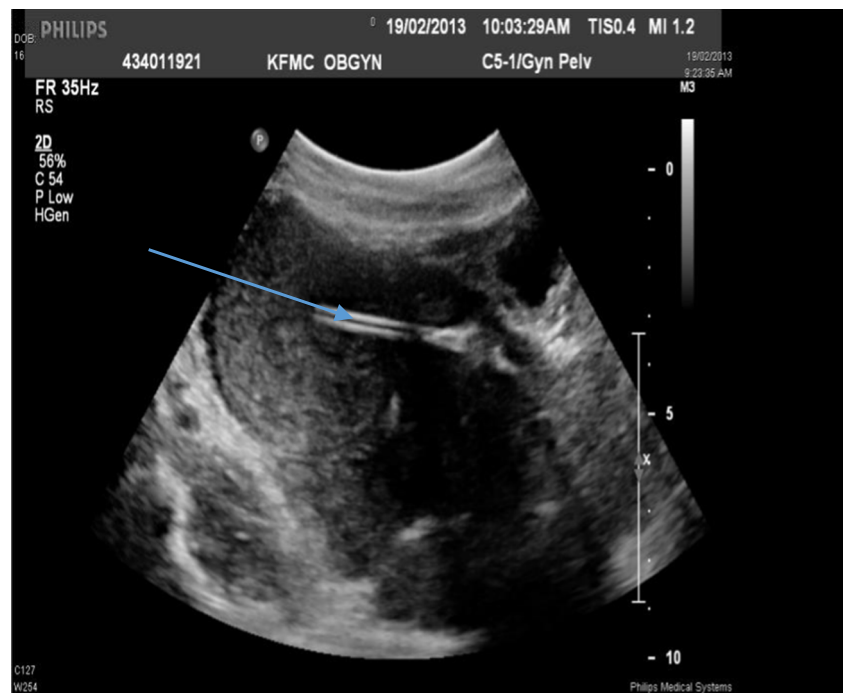


Fig. 3 Gastrostomy catheter tube

2008, an unspecified in vitro fertilization procedure was attempted but failed. Then, in 2012, a successful pregnancy

Fig. 4 Gastrostomy tube inside the uterus



attempt was achieved with a transmyometrium needle catheter. The patient delivered a baby through a cesarean section.

When the patient presented to our hospital, her vitals were stable on assessment. She had consulted for fertility management and conception, with a complaint of cyclic lower abdominal pain. Her abdomen was soft and lax without tenderness, and her blood test showed a follicle-stimulating hormone level of 2.4 mIU/L (reference range, 0.270–4.200 IU/L) and a luteinizing hormone level of 3.6 IU/L (reference range, 5–25 IU/L).

Magnetic resonance imaging (MRI) a hypoplastic fibrotic cervix, with probable atresia and subsequent dilatation of the endometrial cavity with blood present superior to the atresia. A junctional zone with irregular thickening was noted with multiple foci of hyperintensities representing endometrial deposits. The US gel was injected into the vagina by using Foley's catheter, and the MRI showed the vagina to have no septation and fornices. An atretic small fibrotic cervix with hematometra was found. Uterine adenomyosis was also observed (Figs. 1 and 2a).

The patient's chief complaint was cyclic abdominal pain, for which she was treated with periodic gonadotropin-releasing hormone agonist therapy for several years. She stopped the suppressive therapy because she wanted to become pregnant again. As she was in severe pain, she was referred to us for further management.

We informed the patient that we would attempt to restore the cervical patency, and that we believe the tube is better as we can introduce through the guide wire. The advantage of leaving it for longer time applies to any kinds of catheters. The option to do a cervical reconstruction removing the fibrotic tissue and using a split thickness skin graft was considered but

Fig. 5 Gastrostomy tube inside the uterus and after inflate the balloon for fixation



we counseled the patient for more conservative management and management option could succeed, if this fails, the next option will be cervical reconstruction removing the fibrotic tissue and using a split thickness skin graft. Surgical management was proposed, and consent was taken from the patient.

The examination under general anesthesia revealed a small dimple in the upper vagina (Fig. 2a). We used a metal guide that was inserted through a gastrostomy catheter tube (Boston Scientific Endovive standard PEG Kit-sing 20F; 6.7 mm) under US guidance (Figs. 2b and 3) to perforate the upper vagina through the atretic cervix into the endometrial cavity. Once the metal tube was inside the endometrium, the gastrostomy catheter tube was fed through the metal tube and the catheter was left inside the endometrial cavity (Fig. 2c). The catheter was inflated with 15 mL normal saline and confirmed to be inside

the endometrium with US (Fig. 4). The metal guide was pulled out, and then the tube was fixed and connected to a collection bag (Figs. 2d and 4). The procedure was performed under general anesthesia and was uncomplicated, and the patient tolerated the surgery very well (Fig. 5). Doxycycline (100 mg, twice daily) was administered for 10 days.

The patient was discharged the next day after the procedure and was followed in the clinic monthly.

On trans-vaginal ultrasound done 3 months after the reconstruction, showing a uterus that is within the normal limits in size ($6.7 \times 4.4 \times 5.8$ cm) and texture (Fig. 6), the endo-cervix was found to be 2.2 cm in length and 4.5 mm in thickness. A slight irregularity of the inner margins of the endo-cervix noted. And the endometrial thickness was 4 mm with a small volume of fluid (blood) seen within the cavity. The catheter

Fig. 6 Cervix tunnel was appear in ultrasound



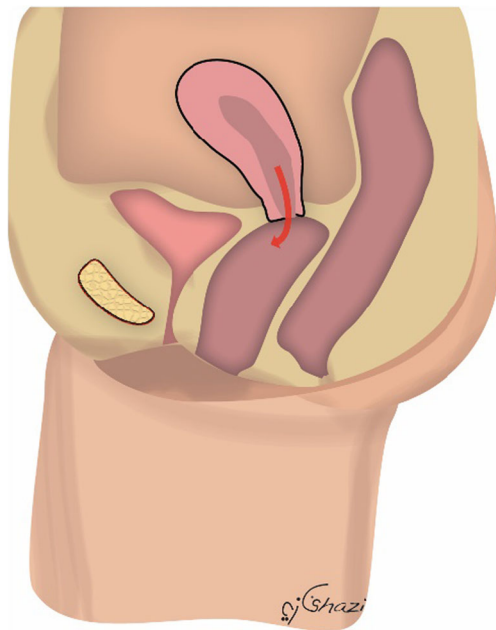


Fig. 7 The cervical tunnel was created after removed the catheter

was removed after 3 months. After 10 months of follow-up observation, the patient had regular menstruation (Fig. 7) and no cyclical pain. A repeat trans-vaginal ultrasound was performed 8 months after the surgery that revealed the same findings as regards the length and thickness of the endocervix with smooth inner margins. The patient is seeking fertility for pregnancy and referred back to her hospital which she comes from.

Discussion

Congenital vaginal agenesis is reported to occur in 1 in 5000 phenotypic females [6]. About 8 % of women with vaginal agenesis have a uterus; however, half or more of them have uterine or cervical abnormalities [6]. The incidence of vaginal and cervical agenesis with a functioning endometrium has not been determined because of its rarity [6]. The absence of the vagina and cervix makes preservation of fertility difficult [6]. Pregnancy after the surgical correction of congenital atresia of the cervix was reported in 1973; however, there might have been some residual cervical tissue in the patient [6].

Our patient had a stenotic atrophic cervix for which previous surgical corrections attempts with Foley's catheter had failed. In cases of cervical atresia, we use a gastrostomy tube fed on a guidewire that can be placed inside the uterine cavity, under US guidance. We think that this atresia probably due to adhesion formation. We believe that this technique has fewer complications than other procedures described in the literature.

We described a new method that has never been reported to our knowledge. The advantage of this approach is that it is a

less invasive method of placing the catheter than the previous techniques of catheter insertion during a laparotomy or laparoscopy.

Conclusion

The use of a gastrostomy tube for placing the catheter is a less invasive technique for the treatment of cervical atresia that may be preferable to other methods.

Authors' contributions A Alobaid: protocol management, data collection

G Althubaiti: protocol management, data collection and analysis

A Al-Lehibi: protocol management

L Aldakhil: review of the manuscript

R Ali: data collection, data analysis, writing the manuscript.

Compliance with ethical standards

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Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. IRB approval was obtained under log# 16-038.

Informed consent Informed consent was obtained from all individual participants included in the study.

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