



Pneumovaginal endoscopic surgery to vaginal septum resection: a case report and literature review

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Background: Longitudinal vaginal septa can cause symptoms such as dyspareunia and dysmenorrhea, and surgical treatments can sometimes be indicated. Septal excisions can be performed via direct speculotomy, using laparoscopic instruments through a speculum, or using hysteroscopic instruments. Here, we present a novel technique to perform vaginal septal excisions using pneumovaginal endoscopic surgery. Since current knowledge regarding pneumovaginal endoscopic surgery is very limited and based on a small number of scientific reports, any additional evidence is useful to prove the feasibility and safety of this surgical approach. In addition, vaginal septal excision using pneumovaginal endoscopic surgery has been reported only once. Our case, in association with a literature review on all cases of vaginal conditions treated with this surgical approach, could help to increase scientific knowledge on this topic.

Case Description: A 24-year-old nulliparous woman presented with chronic dyspareunia due to a longitudinal complete vaginal septum associated with a uterocervical malformation type U3C2V1, according to the ESHRE/ESGE classification. The patient was placed in a dorsal lithotomy position under general anesthesia. Using a single-port device, a pneumovagina was created at a pressure of 6 mmHg. The vaginal septum was resected using an endoscopic sealer/divider device. The resection line on the posterior vaginal wall was endoscopically sutured using a 2/0 absorbable thread to approach the margins and to reduce the risk of synechiae formation. The operating time was 20 minutes. No perioperative complications were observed, and the patient was discharged the same day. During the 6-month follow-up, the patient reported a rapid and complete resolution of dyspareunia without complications.

Conclusions: Pneumovaginal endoscopic surgery provides a valuable alternative to conventional vaginal surgery for septum resections. This technique offers an improved view of the anatomic structures with greater exposure to the section plans and a more comfortable and ergonomic operating position, allowing for easy, safe, and precise resections.

Keywords: Pneumovaginal endoscopic surgery; vaginoscopy; transvaginal natural orifice transluminal endoscopic surgery; vaginal septum; case report

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Introduction

Background

A longitudinal vaginal septum results from an incomplete fusion of the Mullerian ducts and is often associated with uterine anomalies. Several types of longitudinal vaginal septa exist based on the degree of completeness of vaginal division (partial or complete), the symmetry, the position (with left or right dominant side), the association with the cervix (merged or isolated forms), and concomitant vaginal openings (regular or narrow) (1). Longitudinal vaginal septa can cause dyspareunia, difficult tampon insertion, persistent vaginal bleeding despite tampon placement, and dysmenorrhea in the case of obstructed hemivagina. Surgical treatments can indicate improved symptoms and can generally include septal excisions through direct speculotomy, using laparoscopic instruments through a speculum (without pneumovagina), or using hysteroscopic instruments (1). Pneumovaginal endoscopic surgery is a new surgical approach especially used to treat vaginal conditions such as erosions of synthetic mesh used for pelvic organ prolapse or vaginal leiomyoma. Here, we present a case of vaginal septal excision using a pneumovaginal endoscopic approach.

Highlight box

Key findings

- Pneumovaginal endoscopic surgery provides a valuable alternative to conventional vaginal surgery for septum resections. This technique offers an improved view of the anatomic structures with greater exposure to the section planes and a more comfortable and ergonomic operating position, allowing for easy, safe, and precise resections.

What is known and what is new?

- Vaginal septal excisions can be performed via direct speculotomy, using laparoscopic instruments through a speculum, or using hysteroscopic instruments. Report here about what does this manuscript add.
- Pneumovaginal endoscopic surgery can be a valuable alternative to perform vaginal septal excisions.

What is the implication, and what should change now?

- Although conventional vaginal access could be a valid option to treat vaginal conditions in most patients, the pneumovaginal endoscopic approach could represent a useful alternative, especially in the case of difficult vaginal exposure.

Rationale and knowledge gap

Since current knowledge regarding pneumovaginal endoscopic surgery is very limited and based on a small number of scientific reports, any additional evidence is useful to prove the feasibility and safety of this surgical approach. In addition, vaginal septal excision using pneumovaginal endoscopic surgery has been reported only once. Our case, in association with a literature review on all cases of vaginal conditions treated with this surgical approach, could help to increase scientific knowledge on this topic.

Objective

The aim of this study was to present a novel technique to perform vaginal septal excisions using pneumovaginal endoscopic surgery using original video footage and to report an updated literature review on all cases of vaginal conditions treated with this surgical approach. We present this case in accordance with the CARE reporting checklist (available at <https://gpm.amegroups.com/article/view/10.21037/gpm-22-46/rc>).

Case presentation

A 24-year-old nulliparous woman presented with chronic dyspareunia due to a longitudinal vaginal septum (*Figure 1A*) associated with uterocervical malformation type U3C2V1 according to the ESHRE/ESGE classification (2) (confirmed with magnetic resonance imaging). The septum appeared complete, symmetric, and merged with the space in between the cervixes with a normal vaginal opening. On February 13, 2020, we performed a total septal excision using a pneumovaginal endoscopic approach. This surgical approach was chosen to overcome the problem posed by the deep and narrow vagina of this nulliparous patient, which made it difficult to access the deeper portion of the septum.

All procedures performed in this study were in accordance with the ethical standards of the national research committee and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images and video. A copy of the written consent is available for review by the editorial office of this journal.

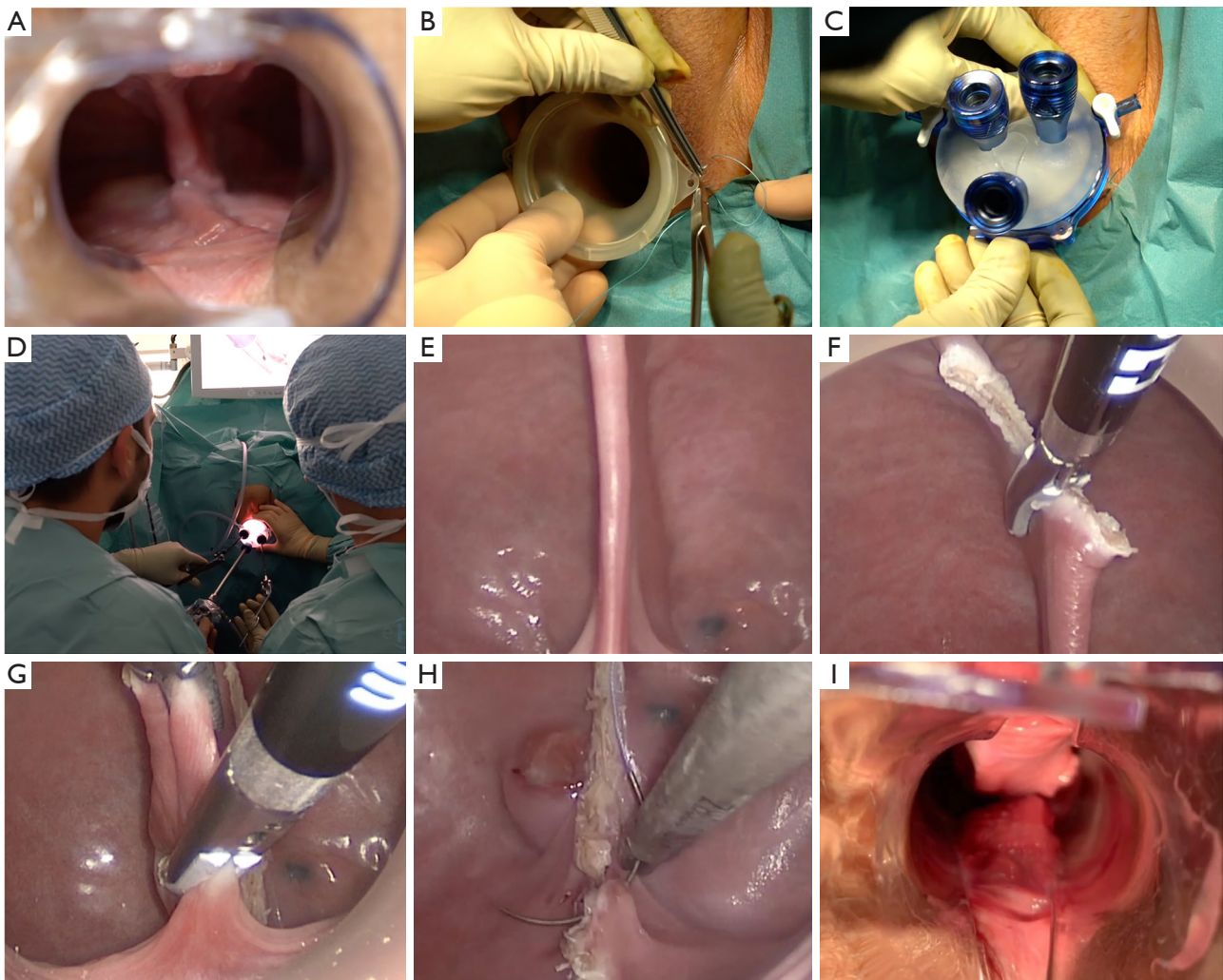
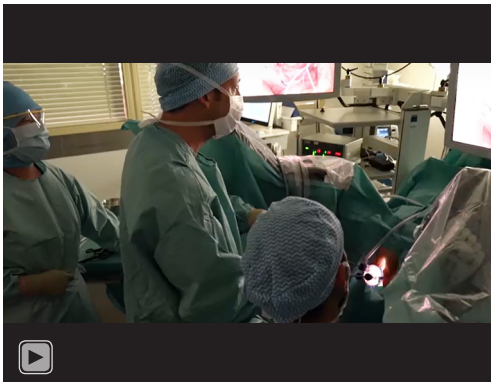


Figure 1 Step-by-step procedure for vaginal septum resection by pneumovaginal endoscopic surgery. Speculoscopic view showing a complete longitudinal vaginal septum (A). The GelPOINT Path Transanal Access Platform was inserted in the vagina and stabilized with two stitches on the vulva. Three trocars were used to access the vaginal cavity with standard laparoscopic instruments (B,C). The surgeon and the assistant were seated between the patient's legs ergonomically (D). A pneumovagina was created at a pressure of 6 mmHg, and the vaginal septum was observed with a laparoscopic optic (E). The septum was resected using an endoscopic sealer/divider device (F,G). A new vaginal cavity with two cervixes was observed. The resection line on the posterior vaginal wall was endoscopically sutured using a 2/0 absorbable thread to approach the margins (H). The speculoscopic 6 weeks after surgery shows a normal-sized vagina with complete vaginal wall healing (I).

Surgical technique

The patient was placed in a dorsal lithotomy position under general anesthesia. Using a GelPOINT Path Transanal Access Platform (Applied Medical, Rancho Santa Margarita, CA, USA), a pneumovagina was created at a pressure of 6 mmHg (Figure 1B,1C). The surgeon and assistant were seated between the patient's legs (Figure 1D). The vaginal

septum and cervixes were exposed (Figure 1E). The vaginal septum was resected using an endoscopic sealer/divider device cutting close to both the anterior (Figure 1F) and the posterior vaginal wall (Figure 1G). The resection line on the posterior vaginal wall was endoscopically sutured using a 2/0 absorbable thread to approach the margins and to reduce the risk of synechiae formation (Figure 1H). The intervention lasted 20 minutes, and we observed no



Video 1 Pneumovaginal endoscopic surgery: a new approach to vaginal septum resection. In this video, we demonstrate the step-by-step procedure for vaginal septum resection by pneumovaginal endoscopic surgery.

intraoperative complications. This surgical technique is demonstrated in *Video 1*.

Postoperative follow-up

The patient was discharged the same day after surgery. She needed no postoperative medicaments. During the 6-month follow-up, the patient reported a rapid and complete resolution of dyspareunia without complications and with complete vaginal wall healing (*Figure 1I*).

Discussion

Key findings

We described a case of complete longitudinal vaginal septum treated using a pneumovaginal endoscopic approach. Our findings, in association with the reported literature review, suggest that this surgical technique is feasible and effective for treating some vaginal conditions, including vaginal septa.

Strengths and limitations

The main limitation of this study is that it is a single case report, and no conclusions can be drawn from this type of study. Nevertheless, our case, associated with the following literature review on all cases of vaginal conditions treated with pneumovaginal endoscopic surgery, could improve the knowledge on this topic.

Comparison with similar researches

Transvaginal natural orifice transluminal endoscopic surgery (vNOTES) is an emerging minimally invasive approach used to treat several intrabdominal gynecological conditions (3). Similarly, we used an analogous approach to treat a condition limited to the vaginal cavity. Creating a pneumovagina with a single-port device allows laparoscopic techniques in performing some vaginal surgeries. This technique offers an improved view of the anatomic structures with greater exposure to the section plans and a more comfortable and ergonomic operating position. These characteristics are most important in the case of difficult access, such as for deep vaginas, tumors of the anterior wall, and a restricted vaginal canal, for which good surgical field exposure is often challenging.

We reviewed the English, French, Italian, and Spanish literature published on the PubMed database on all cases using pneumovaginal endoscopic approaches to treat vaginal conditions (*Table 1*) (4-11). Including our patient, there are 17 reported cases of pneumovaginal endoscopic surgery performed to treat vaginal erosions of synthetic mesh used for pelvic organ prolapse, vaginal septum, vaginal leiomyoma, and vaginal wall recurrences of uterine, cervical, and ovarian cancers. In addition, a similar approach could be used to access the Douglas pouch under continuous view to reduce the risk of iatrogenic pelvic organ damages during peritoneal cavity access in the case of vNOTES approaches for patients with suspected pelvic adhesions (12). Menopausal status and parity seem not to influence the feasibility of pneumovaginal endoscopic surgeries, with several reported cases of pre- and postmenopausal women, as well as nulliparous and multiparous women (4-11). To create a pneumovagina, three leading single-port platforms have been used; the SILS™ port (4,5), the GelPOINT® V-Path Transvaginal Access Platform (6,10), and the GelPOINT® Path Transanal Access Platform (7,9,11). Standard laparoscopic instruments and optics are used to perform the interventions, with the possibility of using electrocautery instruments or performing endoscopic sutures. No intra- and postoperative complications have been observed, and patients recover rapidly after surgery. Although no case has been reported, as for vNOTES, pneumovaginal endoscopic surgery does not represent a contraindication to pregnancy and vaginal delivery (13). No specific risks or disadvantages seem to be associated with this surgical approach to vaginal septum resections.

Table 1 Summary of reports on vaginal conditions treated with pneumovaginal endoscopic surgery

Reference	Study size (n)	Age (years)	Parity	Vaginal condition	Symptoms	Interventions	Surgical system	Operation time (min)	Complications	Discharge time
Billone <i>et al.</i> , 2015	5	–	–	Mesh erosion through the vagina as a complication of synthetic mesh used for pelvic organ prolapse repair	–	Mesh excision and vaginal wall repair	SILS™ port	–	No	The same day
Mohr <i>et al.</i> , 2017	1	60	–	Mesh erosion with abscess formation at vaginal apex 22 months after laparoscopic sacrocolpopexy	Foul-smelling discharge for 1 year	Mesh excision and abscess drainage	SILS™ port	–	No	–
Schaub <i>et al.</i> , 2018	1	59	–	Mesh erosion with abscess formation	Foul-smelling discharge	Mesh excision and abscess drainage	GelPOINT® V-Path Transvaginal Access Platform	60	No	–
Heredia <i>et al.</i> , 2020	2	35	–	Incomplete longitudinal septum in the proximal 2/3 of the vagina associated with bicornuate unicollis uterus	Dyspareunia	Complete septum resection	GelPOINT® Path Transanal Access Platform	5	No	4 hours
		36	Nulliparous	3-cm leiomyoma in the proximal vaginal third	Dyspareunia	Myomectomy	GelPOINT® Path Transanal Access Platform	35	No	12 hours
Liu <i>et al.</i> , 2021	1	35	Nulliparous	Leiomyoma in the proximal anterior vaginal wall (3.0 cm × 3.4 cm)	Asymptomatic	Myomectomy and vaginal wall repair	Transvaginal multichannel single-port	20	No	5 hours
Kita <i>et al.</i> , 2021	1	39	Nulliparous	Left vaginal wall recurrence of an ovarian granulosa cell tumor (3.5 cm), 23 years after primary surgery	–	Tumor resection	GelPOINT® Path Transanal Access Platform	88	No	3 days
Allary <i>et al.</i> , 2021	1	42	2	4-cm leiomyoma in the posterior vaginal wall	Chronic pelvic pain	Myomectomy and vaginal wall repair	GelPOINT® V-Path Transvaginal Access Platform	–	No	1 day
Yokoe <i>et al.</i> , 2023	4	74	–	Vaginal wall recurrence of an endometrial cancer	None	Tumor resection*	GelPOINT® Path Transanal Access Platform	218	No	–
		53	–	Vaginal wall recurrence of a cervical cancer	None	Tumor resection*	GelPOINT® Path Transanal Access Platform	292	No	–
		51	–	Vaginal wall recurrence of an ovarian cancer	Genital bleeding	Tumor resection*	GelPOINT® Path Transanal Access Platform	121	No	–
		79	–	Vaginal wall recurrence of an endometrial cancer	Genital bleeding	Tumor resection*	GelPOINT® Path Transanal Access Platform	165	No	–
Our case	1	24	Nulliparous	Complete longitudinal vaginal septum associated with bicornuate bicollis uterus	Dyspareunia	Complete septum resection and vaginal wall repair	GelPOINT® Path Transanal Access Platform	20	No	The same day

–: not reported. *, bi-directional approach (laparoscopic and vaginoscopic).

However, more studies are required to confirm its safety on a larger number of patients.

Explanations of findings

These results suggest that pneumovaginal endoscopic surgery is a feasible and safe approach to treating some vaginal conditions, with rapid recovery and no specific short- and long-term complications. In our case, we obtained easy access and exposure to the vaginal cavity, with favorable conditions to perform septal resection and endoscopic sutures. Although conventional vaginal access could be a valid option to treat vaginal conditions in most patients, this pneumovaginal endoscopic approach could represent a useful alternative in the case of difficult vaginal exposure (e.g., obesity, narrow vaginal canal, deep vagina).

Implications and actions needed

This study suggests the feasibility of using pneumovaginal endoscopic surgery to treating some vaginal conditions, including vaginal septum. However, before expanding this approach outside study settings, strong evidence of its feasibility, practical benefits, and long-term outcomes are needed.

Conclusions

We conclude that pneumovaginal endoscopic surgery could be a valid alternative to the conventional approach to treat some vaginal conditions. This approach appears safe and feasible. Nevertheless, these data come from case reports or small case series, and further studies are needed to evaluate this approach's safety and indications in a more significant number of patients.

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Footnote

Reporting Checklist: The authors have completed the CARE reporting checklist. Available at <https://gpm.amegroups.com/article/view/10.21037/gpm-22-46/rc>

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <https://gpm.amegroups.com/article/view/10.21037/gpm-22-46/coif>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the national research committee and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images and video. A copy of the written consent is available for review by the editorial office of this journal.

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