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Management of false passage complication during operative hysteroscopy

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Abstract

Background: False passage is a possible complication during operative hysteroscopy and can lead to termination of the intended procedure. The aim of this study is to describe two techniques to overcome the complication of false passage during operative hysteroscopy.

Results: This is a retrospective case series of 9 patients who had a false passage during operative hysteroscopy for Müllerian anomaly or endometrial polyps. The diagnosis was immediately made by visualization of a lattice network of myometrial fibers without normal landmarks of the endometrial cavity and tubal ostia. Once a false passage was suspected, an attempt was made to overcome this complication and complete the intended operative hysteroscopy. The hysteroscope was slowly withdrawn to identify both the false passage and the opening towards the internal cervical os. The hysteroscope was tilted towards the opening to the internal cervical os, and it was carefully advanced under direct vision into the endometrial cavity. In two patients, this technique failed because the opening to the internal cervical os was small, so the bridge of tissue between the internal os and false passage was partially divided using hysteroscopic scissors or a straight resectoscope loop, allowing for entry into the endometrial cavity. The intended procedures were completed successfully in all patients. No intraoperative or postoperative complications occurred as a result of the two techniques.

Conclusions: The techniques described in this study, to overcome false passage during operative hysteroscopy, appear to be safe, effective, and easy to perform. They enable the surgeon to complete the intended procedure.

Keywords: Complications of operative hysteroscopy, False passage, Techniques to overcome false passage

Background

Hysteroscopy is one of the most common gynecologic procedures today and a cornerstone of modern-day endoscopy [1]. Since the procedure is so common, it is imperative to reduce intraoperative complications such as uterine perforation. The criss-cross arrangement of the muscle fibers exposed in a false passage, as opposed to the normal appearance of the uterine cavity, may lead to a false impression of intrauterine scar tissue. In addition, even if the correct diagnosis is made, the intended procedure is unnecessarily terminated for failure to advance the hysteroscope into the uterine cavity and for fear of uterine perforation. Although false passage can happen during any hysteroscopy, clinical scenarios where this complication is anticipated are in patients with cervical stenosis or abnormal uterine position such as acute anteflexion, anteversion, or retroversion. In addition, both nulliparous and multiparous women with multiple cesarean sections are at increased risk. Furthermore, post-menopausal women and patients with Asherman's syndrome and cervical uterine fibroids are also more susceptible to this complication [2, 3]. False passage during hysteroscopy usually occurs during cervical dilation prior to the introduction of the hysteroscope.

False passage can be suspected during difficult cervical dilation when the normal feeling of the dilator going past the internal cervical os is not present. However, the

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diagnosis of a false passage is confirmed after the hysteroscope is advanced into the cervical canal and the normal anatomic landmarks of the uterine cavity, namely the bilateral tubal ostia, and endometrial gland openings are not visualized [4]. Rather, there is a visualization of pink-colored, circular muscle fibers in a lattice arrangement (Fig. 1) [4].

There is limited data in the literature that describe how to avoid and overcome the problem of false passage [2, 5, 6]. Some authors described preemptive ultrasound guidance during difficult hysteroscopy to reduce the incidence of false passage creation [7, 8]. Zhu et al. describe identifications of the false passage by withdrawing the hysteroscope and then blunt dissection of the internal cervical os using forceps [2]. The aim of this study is to describe two techniques that can overcome this complication, and increase the ability of the surgeon to successfully complete the intended procedure.

Methods

This retrospective study (2012–2020) received an exemption from the oversight of the Institutional Review Board at Hurley Medical Center, Flint, Michigan. The study includes nine patients who were evaluated for infertility at our clinic. All patients had a routine evaluation of the endometrial cavity with a transvaginal 2D/3D ultrasound scan (TV 2D/3D US) and saline-sonohysterogram (SIH). Table 1 illustrates the demographic data and background information. Once a diagnosis of Müllerian anomaly or endometrial polyps was made, the plan was to proceed with a diagnostic hysteroscopy to confirm the diagnosis, followed by operative hysteroscopy at the same session. In this series, all hysteroscopies were performed using an 8.5-mm ACMI Hystero-Resectoscope (Division of Olympus; Maple Grove, MN, USA). This is the preferred hysteroscope by the authors of this study to perform operative hysteroscopy for Müllerian anomaly or endometrial polyps [9]. Compared to other hysteroscopes that can be used for the same purpose, such as the Olympus hysteroscope, the ACMI hysteroscope allows for the hysteroscopic lens to be introduced through the obturator piece, and in turn, the advancement of the hysteroscope can be done under direct vision. Hysteroscopy was performed at a surgery center in seven cases, while in two cases the surgery was hospital based, as laparoscopy was performed at the same session. Normal saline was used as a distension medium for initial diagnostic hysteroscopy. This was replaced with Glycine 1.5% if operative interventions require the use of monopolar current. No preoperative or postoperative antibiotic was used. The procedures were performed under modified general anesthesia with monitored anesthesia care in 7 patients. Medications commonly used included propofol, Versed, and fentanyl. General endotracheal anesthesia was used in two patients who underwent laparoscopy and hysteroscopy.

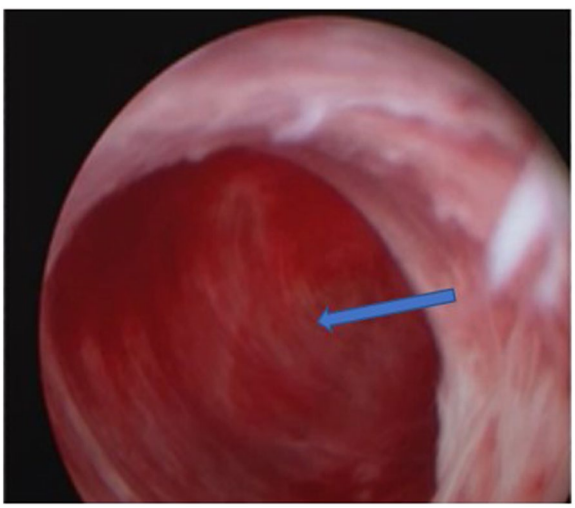

Fig. 1 A false passage in the posterior wall of the cervical canal (blue arrow) with the characteristic appearance of the pink-colored, circular muscle fibers in a lattice arrangement without the normal anatomic landmarks of the uterine cavity namely bilateral tubal ostia

For each patient in this case series, the complication of false passage during hysteroscopy was immediately diagnosed, and an attempt was made to overcome such a complication. The authors of this report exercised a balance between the desire to complete the intended procedure and the potential risk of uterine perforation and its sequelae. The first step in the management of this complication was to remove the hysteroscope. The second step involved correctly positioning the patient with buttocks well at the edge of the operating table, which would allow maximum manipulation of the dilators or the hysteroscope. A single toothed tenaculum was then applied on the anterior lip of the external cervical os. However, if the uterus was retroverted in position, a single toothed tenaculum was placed on the posterior lip of the external cervical os, or a 2-0 Vicryl figure of 8 suture on the posterior lip of the external cervical os, to be used for traction. In addition, the weight speculum was replaced with a Deaver retractor, which also allowed further manipulation of the dilators or the hysteroscope. In some instances, even the Deaver retractor was removed once the dilator or the hysteroscope was introduced through the external cervical os to allow for a full range of motion. If a nonelectrolyte solution such as Glycine 1.5% was being used, it was replaced by an electrolyte solution such as normal saline.

The first and the simplest method to overcome the false passage in this series is referred to as the "tilt technique."

Table 1 Demographic data and background information

Case #	Age (years)	BMI (kg/m^2)	Infertility (Y/N)	Type of infertility	Infertility duration (years)	Recurrent pregnancy loss (Y/N)	Miscarriage #	Infertility factors	Uterine factors (type)	Previous gynecologic surgery (Y/N)
1	38	27	N	N/A	N/A	Y	3	Uterine, female reproductive age	Subseptate	N
2	32	26	Y	Primary	7	N/A	N/A	Uterine	2-cm sessile subserous posterior leiomyoma at the region of the internal os	N
3	42	25	Y	Primary	1.5	N/A	N/A	Tubal, stage 4 endometriosis, female reproductive age	Endometrial polyps, significant arcuate uterus	Y Laparoscopic lysis of adhesions, hysteroscopic polypectomy
4	35	30	Y	Secondary	3	Y	2	Male, ovulatory disorder, uterine	Significant arcuate uterine anomaly	Y D&C
5	33	31.5	Y	Primary	2	N/A	N/A	Male, uterine	Endometrial polyp	N
6	25	30.2	N	N/A	N/A	Y	2	Uterine	Significant arcuate uterine anomaly	N
7	38	28	Y	Secondary	1.5	N/A	0	Male, uterine, female reproductive age	Endometrial polyps	Y Cervical leep TOP
8	26	43	N/A	N/A	N/A	N/A	N/A	Stage 4 endometriosis	Very subtle arcuate uterus of no clinical significance	N
9	30	43	Y	Primary	5	N/A	N/A	Male, tubal, uterine	Significant arcuate uterus	N

Once the above-mentioned steps were performed, the ACMI hysteroscope with its introducer was introduced through the external cervical os and it was slowly advanced into the false passage under direct vision. The hysteroscope was then slowly withdrawn backwards until the opening leading to the internal cervical os was visualized and its position in relation to the false passage was determined (Fig. 2a, b). The hysteroscope was then tilted towards the opening leading to the internal cervical os and was slowly advanced under direct vision until it was introduced into the endometrial cavity. If difficulty was encountered in advancing the hysteroscope through the internal cervical os (Fig. 3a–d), Hegar dilators were carefully used with a tilt technique towards the opening of the internal cervical os to dilate it. This was followed by advancing the hysteroscope into the endometrial cavity under direct vision using the tilt technique described above.

If the tilt technique was unsuccessful, another technique that is referred to as "division of the bridge of tissue technique" was used. This technique entailed dividing the bridge of tissue between the false passage and the true internal cervical os using either a hysteroscopic scissor or a straight loop resectoscope with monopolar current.

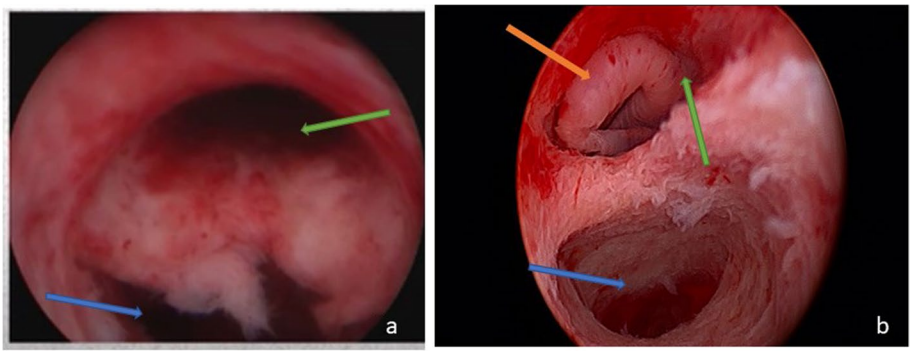

Fig. 2 **a**, **b** A false passage located posterior (blue arrow) to the opening leading to the internal cervical os (green arrow). **b** An endometrial polyp in the lower uterine segment (orange arrow)

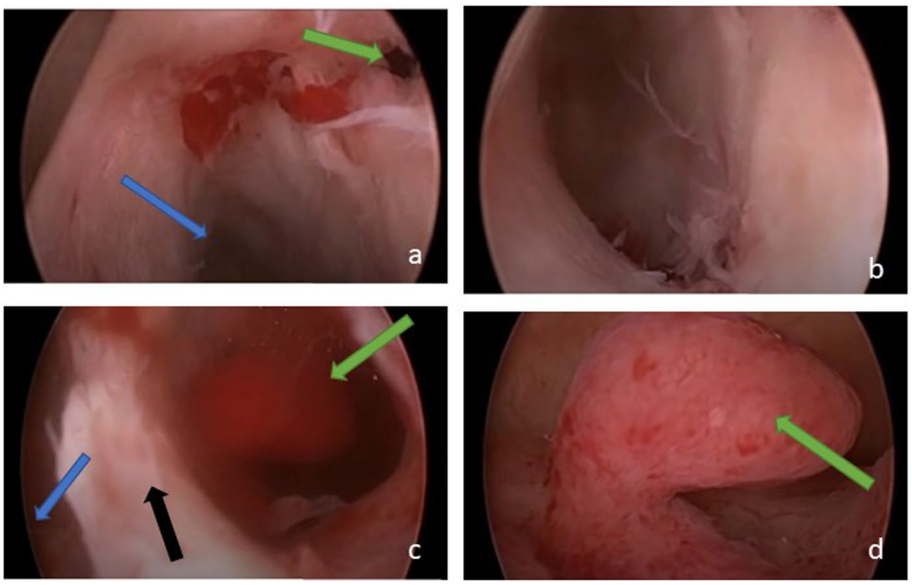

Fig. 3 **a** A false passage in a posterior-right lateral location (blue arrow) and a small opening of the cervical canal leading to the endometrial cavity that was not dilated by Hegar's dilator (green arrow). **b** The extent of the false passage. **c** Part of the false passage (blue arrow), the bridge of tissue (black arrow) between the false passage and the partially dilated opening leading to the endometrial cavity (green arrow) after careful cervical dilation along the correct passage of the internal cervical os. **d** An endometrial polyp (green arrow) once the endometrial cavity was entered

Dividing this bridge of tissue under direct vision enabled the surgeon to enlarge the entrance to the endometrial cavity and to negotiate an easy entry into the true endometrial cavity. It is worth noting that, in order to avoid a potential future complication of cervical incompetence, less than 1cm of the bridge of tissue was divided in order to avoid the potential future complication of a cervical incompetence.

Once the false passage complication was overcome, the intended operative hysteroscopy was completed. The definition of a subseptate uterus was according to ASRM classification, while the definition of a significant arcuate uterus was used if the apex of the mid-fundal protrusion was > 90° and its length was > 10mm [10–12]. Hysteroscopic division of the subseptate uterus or significant arcuate uterus was performed using a straight resectoscope loop with monopolar cautery as described before [9]. In addition, hysteroscopic polypectomy was performed using a right-angled resectoscope loop as described before [13]. All the patients had an uneventful recovery and were discharged home the same day. Routinely, a transvaginal 2D ultrasound scan was performed following completion of the surgical procedure to confirm the correct intracavitary placement of pediatric Foley's catheter (only after division of a subseptate uterus or a significant arcuate uterus) [14].

Results

In 2 patients, the hysteroscopy was performed at a hospital setting because laparoscopy was also indicated. In the remaining 7 patients, hysteroscopy was performed at a surgery center. In all patients, the management of the false passage complication during hysteroscopy was successful, and the intended operative hysteroscopy was completed with no intraoperative or postoperative complications. Table 2 illustrates the clinical and operative summary of the 9 cases in our study. In all patients, the uterus was in an anteverted position in both pelvic examination and TV 2D US. In addition, the uterus was acutely anteflexed on TV 2D US in 2 patients (case #2 and #6) (Table 2). The findings on TV 2D US and/or TV 3D US were confirmed at the time of hysteroscopy (Table 2). In 5 patients, there were possible causes that may have contributed to the occurrence of the false passage (Table 2). The location of the false passage was posterior in 8 cases (Fig. 2), while in one case the location of the false passage was right lateral (case #3) (Table 2). The tilt technique was successful in overcoming the false passage complication in 7 patients (Table 2). However, in 2 patients (case #6 and #7), the tilt technique was not successful, and therefore, the division of the bridge of tissue technique was performed (Table 2).

The intended hysteroscopic procedure was completed in all cases. In 1 patient (case #8), only diagnostic hysteroscopy was performed as no intrauterine pathology was found (Table 2). In 2 patients (case #5, case #7), a hysteroscopic polypectomy was performed (Table 2). In 2 patients (case #3 and case #6), hysteroscopic polypectomy and hysteroscopic division of a significant arcuate uterus were performed (Table 2). In one patient (case #9), hysteroscopic division of significant arcuate uterus was performed (Table 2). In 3 patients (case #1, case #2, and case #4), hysteroscopic division of the subseptate uterus was performed (Table 2). In one case (case #3), hysteroscopic tubal sterilization was also performed using the Adiana procedure (Table 2). There were no intraoperative or postoperative complications.

Discussion

Operative hysteroscopy is a relatively safe and effective procedure, but given its frequent occurrence, one must be aware of potential complications and minimize the risk to the patients [15]. Although the incidence of major complications such as uterine perforation is reported to be 1.42% in most hysteroscopic reviews [16], there is very little data in the literature on the incidence, diagnosis, and management of false passage that can be encountered during hysteroscopic surgery [8]. If unrecognized, false passage can lead to uterine perforation at the level of the cervix or the lower uterine segment. Almost 50% of hysteroscopic complications are related to difficulty with cervical entry [16]. False passage can be easily misdiagnosed as adhesions in the uterine cavity. This often leads to abandonment of the procedure. Even if correctly recognized, surgeons sometimes prefer abandonment of the procedure for a fear of uterine perforation [15] and/or for fear of complications of excessive fluid deficit and its subsequent consequences of fluid overload and electrolyte disturbances.

This case series should increase the awareness of the complication of false passage during operative hysteroscopy among hysteroscopic surgeons, as false passage appears to be under-reported in the literature. Our study illustrates the importance of immediate diagnosis of false passage. The step-by-step description of the approaches and the techniques used to overcome such complication are easy to adopt by practitioners. Using the approaches and the techniques described in this case series enabled us to successfully manage the false passage complication, and in turn, complete the intended operative hysteroscopic procedures in all the patients in the study. Kumar and Kumar 2006 describe a similar technique of withdrawal of the hysteroscope to identify both the false passage and internal cervical os and then reinsertion of the hysteroscope into the true internal cervical

Table 2 Clinical and operative summary

Case #	Uterine position	Imaging study findings	Possible causes of false passage	Surgical findings	False passage location	Technique to overcome false passage	Hysteroscopic procedure
1	Anteverted	TV 3D US: subseptate uterus	None	Confirmed US findings	Posterior	Tilt technique	Hysteroscopic division of the subseptate uterus
2	Anteverted and acutely anteflexed	TV 2D and 3D US: Small uterine leiomyoma distorting cervical canal	Acutely anteflexed position of the uterus Distortion of the cervical canal by small fibroid at the region of the internal cervical os	Confirmed US findings Subseptate uterus Leiomyoma distorting cervical canal on laparoscopy	Posterior	Tilt technique	Hysteroscopic division of the subseptate uterus
3	Anteverted	TV 2D US: Endometrial polyps Adenomyosis, bilateral endometrioma, left hydrosalpinx	Stage 4 endometriosis Distortion of pelvic anatomy	Confirmed US findings Significant arcuate uterine anomaly	Right lateral	Tilt technique	Hysteroscopic polypectomy, hysteroscopic division of a significant arcuate uterus and tubal sterilization using the Adiana procedure
4	Anteverted	TV 3D US: Subseptate uterus	None	Confirmed US findings	Posterior	Tilt technique	Hysteroscopic division of Subseptate uterus
5	Anteverted	TV 2D US: Endometrial polyps	None	Confirmed US findings	Posterior	Tilt technique	Hysteroscopic polypectomy
6	Anteverted and acutely anteflexed	TV 2D US: Anteflexed position of the uterus TV 3D US: Significant arcuate uterus, endometrial	Acutely anteflexed position of the uterus	Confirmed US findings	Posterior	Division of the bridge of tissue technique (hysteroscopic scissor)	Hysteroscopic polypectomy, hysteroscopic division of a significant arcuate uterus
7	Anteverted	TV 2D US: Endometrial polys	Cervical stenosis	Confirmed US findings	Posterior	Division of the bridge of tissue technique (straight resectoscope loop)	Hysteroscopic polypectomy
8	Anteverted	TV 2D US: Adenomyosis Bilateral large endometrioma	Stage 4 endometriosis with distortion of pelvic anatomy	Confirmed US findings Extensive pelvic adhesions on laparoscopy	Posterior	Tilt technique	Only diagnostic hysteroscopy
9	Anteverted	TV 3D US: Arcuate uterine anomaly	None	Confirmed US findings	Posterior	Tilt technique	Hysteroscopic division of a significant arcuate uterus

os [4]. The authors of this case series also propose, in theory, another method to overcome the false passage; this method would require the availability of a smaller operative hysteroscope, which can be advanced through the opening of the internal os without the need for any further maneuver or attempts at dilating the internal cervical os. If the intended operative procedure could not be completed with a smaller operative hysteroscope, or such a small operative hysteroscope is not available, the operator can use the division of the bridge of tissue technique using a hysteroscopic scissor to be able to advance a larger operative hysteroscope or resectoscope into the endometrial cavity.

Although this study describes two techniques for the management of false passage, other techniques can also be used depending on the situation and on a case-by-case basis. Zhu et al. describe a technique of gradual dissection to enlarge the opening to the internal cervical os, using 7 French double-action forceps under hysteroscopic visualization, until the endometrial cavity was recognized [2]. In addition, some investigators described a technique of how cervical stenosis and a false passage can be overcome by dilating cervical stenosis with a vessel dilator passed over a guide wire, after hysteroscopic hydro-dilation provides adequate distention and visualization of both the false passage and endocervical canal [6].

As with any other surgical procedures, it is imperative to indicate that during hysteroscopy every effort should be made to avoid complications such as a false passage. Such prevention should be started during history taking and pelvic examination. Previous history of cesarean section, advanced stages of endometriosis, or history of pelvic inflammatory disease should raise the index of suspicion of possible pelvic adhesions that may alter the angle between the cervical canal and the body of the uterus. Simple vigilance can be sufficient to reduce the likelihood of false passage. Routine bimanual examination and correlation with prior TV 2D US should be done to determine whether the uterus is in a retroverted position or in an acute anteflexed anteverted position. The presence of uterine fibroids and their locations should be observed, as such tumors may alter the position of the uterus, and in turn, may increase the chance of false passage. In a cohort study, Kresowik et al. suggest that the use of transabdominal US guidance during difficult hysteroscopy can reduce the incidence of false passage and subsequent uterine perforation (1.9%) as compared to no ultrasound scan guidance (5.3%) [7]. In addition, Wortman et al. suggest that sonographic guidance during difficult cases of reoperative hysteroscopic surgery for the management of delayed complications after global endometrial ablation failures can reduce the incidence of uterine perforation [17]. Song et al. describe the typical ultrasound appearance of the false cavity as eccentric in position, in contrast to the endometrial echo which is centrally placed [8].

Garcia describes few tools and techniques that may help to overcome the difficulty that may be encountered during cervical dilatation or performing a hysteroscopy in patients with a problematic cervix or distorted anatomy [18]. Positioning the patient with their buttocks even with the lower break of the table can allow maximum manipulation of the uterine dilators and the hysteroscope. Replacing a weighted speculum with a Deaver retractor during cervical dilation may help in increasing the range of manipulation. Single toothed tenaculum should be used on the anterior or post lip of the cervix to straighten the cervico-uterine angle and facilitate easy negotiation of the cervical canal. If creation of a false passage is anticipated, as with difficult introduction of the uterine sound, or in the presence of cervical stenosis, or a problematic cervix, the use of a smaller diameter office operative hysteroscope to negotiate the internal os can be attempted. In addition, the use of sonographic guidance as suggested by Wortman et al. and Song et al. may also be helpful to overcome the difficulty to perform a hysteroscopy [8, 17]. Furthermore, the use of a small diameter rigid or flexible hysteroscope, if available, prior to dilation may avoid most cases of false passage.

Routine preoperative use of misoprostol prior to hysteroscopy has been advocated by some gynecologists to facilitate cervical dilatation and avoid cervical tear, false passage, and uterine perforation [19]. In a Cochrane review, Al-Fozan et al. analyze 19 randomized controlled trials (RCT) [1870 participants] and report on the preoperative use of misoprostol to reduce the rate of complications, including false passage during hysteroscopy [19]. In this review, the authors conclude that misoprostol was superior to placebo in facilitating cervical dilatation with fewer women requiring mechanical dilatation [19]. These authors also report that the use of misoprostol prior to hysteroscopy was associated with less likely intraoperative complications such as cervical lacerations and false passage [19].

However, in the experience of the authors of this study, the use of misoprostol can be associated with severe uterine cramps in some patients. In addition, the use of misoprostol has also been associated with vaginal bleeding, which can mask the view during hysteroscopy. Such findings have been reported by other investigators [19]. Therefore, the use of misoprostol by our group is limited to selected cases.

Conclusion

Awareness, right approaches, and the use of the above-described techniques can help in preventing and managing the complication of false passage during hysteroscopy, and in turn, in avoiding unnecessary termination of the procedure and the potential complication of uterine perforation. In addition, the use of a small operative hysteroscope may reduce the incidence and risks associated with false passage.

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Consent for publication
All authors of the study consent for publication.

Competing interests
The authors declare that they have no competing interests.

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