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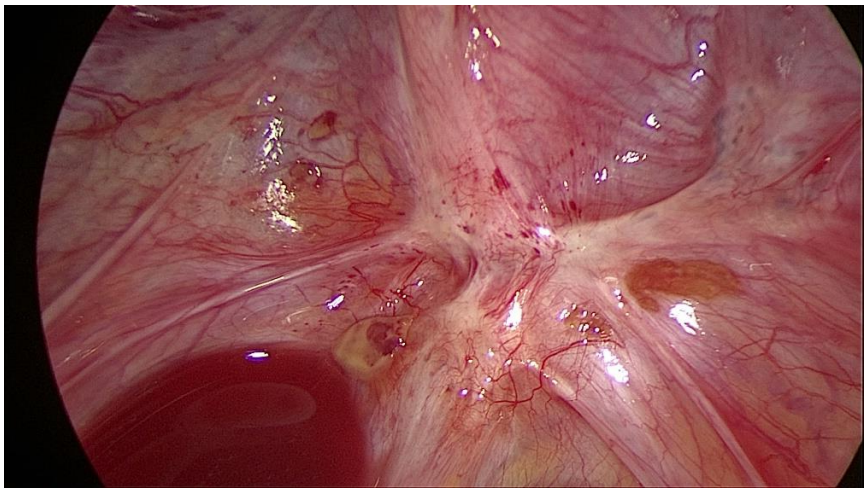

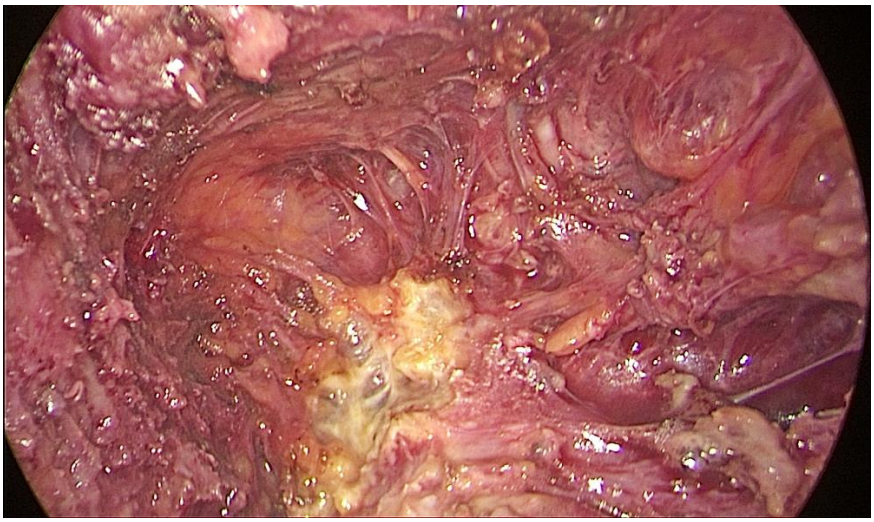

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Where is the role of ISGE supporting medical development?

Medical societies play a role in improving healthcare in emerging and developing countries by influencing multiple aspects of medical practice, education, policy, and infrastructure. Unfortunately, the biggest obstacle is often corruption and a lack of willingness to change in the governing structures. International players often take advantage of the latter to do good business in countries with poor populations. Corruption opens the doors for investors. The proceeds regularly flow abroad and into the pockets of those who open the doors. This is not new, but unfortunately very little is changing, even if new industrial powers have appeared on the scene. Donations are either well-intentioned or serve the self-deception of the donors. Without local sustainability and the production of the necessary affordable medical products, a broader supply in the medium term is hardly conceivable. However, this must be wanted and supported by governments. This would be an opportunity for the medical industry to prove that serious support is wanted. Even if this means foregoing profits for a longer period of time. So far, the will to do so has hardly been measurable. We as doctors can be ambassadors and idea generators and use contacts to industry.

A professional society like ISGE can hardly influence these problems, and often has to deal with local corruption itself. However, we can tirelessly try to provide knowledge transfer and practical training, even if this seems like a drop of water in the ocean.

This should not frustrate us and we should not make ourselves too small. Constant training, raising your voice and pointing out problems do not change the world in its entirety, but bit by bit. ISGE sees itself as a global network in which everyone can learn from each other. Diversity helps to understand and acknowledge the world and its very different conditions. Every point of view counts, there are many truths.

In this issue you will also find case reports and reviews that cover various aspects of our field from different regions of the world. We are pleased that we are constantly receiving submissions from many parts of the world that we can publish. Read the new issue and maybe you will become a member of the ISGE family.

All the best

Guenter Noé

Editor in chief

Index: Issue 3 Volume 5 TheTrocar: September 2024

The frontpage shows:

parametrial DIE in utero-sacral ligament before and after dissection

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Fertiloscopy: A Primordial Tool for Diagnosis and Treatment of Infertility

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Abstract

In 1996, we described Fertiloscopy as a minimally invasive diagnostic and therapeutic technique to evaluate and treat, in certain circumstances, female infertility. This technique combines hydrolaparoscopy, tubal patency test, salpingoscopy, sometimes microsalpingoscopy, and hysteroscopy to provide a thorough assessment of the female reproductive organs with minimal invasiveness.

Fertiloscopy offers several advantages, including enhanced visualization of pelvic structures, the ability to perform some therapeutic interventions during the same procedure, reduced recovery time, and the potential for outpatient treatment under local anesthesia. or general sedation. While laparoscopy remains the gold standard in certain clinical situations fertiloscopy presents a viable option for many patients, particularly those with no obvious pathology

Keywords: Fertiloscopy, diagnostic gynecologic, laparoscopy, infertility

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Introduction:

Infertility affects millions of couples worldwide, often leading them to seek medical assistance to conceive. Infertility workups traditionally involve a range of diagnostic procedures, with laparoscopy long being considered the gold standard for evaluating and managing pelvic conditions.

However, the advent of fertiloscopy has introduced a minimally invasive, transvaginal approach that offers both diagnostic and therapeutic benefits. Despite its advantages, fertiloscopy remains underutilized, often overshadowed by other techniques. This article explores the evolution, indications, techniques, outcomes, and the current status of fertiloscopy in the management of infertility.

Historical Background

The roots of fertiloscopy can be traced back to the development of culdoscopy in 1948 by Decker and Cherry, which involved visualizing pelvic organs through the posterior vaginal fornix. While innovative, culdoscopy was eventually supplanted by laparoscopy due to the need to use the genu pectoral position for the patient at culdoscopy and the reporting of some cases of pelvic infection and the limited view of the pelvic structures (1,2). However, the idea of using a transvaginal route for pelvic exploration resurfaced in the late 20th century with the development of Transvaginal Hydrolaparoscopy (THL) by Gordts and colleagues in the 1990s. THL involved using saline to create a working space within the peritoneal cavity, providing enhanced visualization with minimal invasiveness (3). Building on these concepts, we have introduced the concept of fertiloscopy in 1996 as a combination of hydrolaparoscopy, salpingoscopy, microsalpingoscopy, and hysteroscopy, offering a thorough evaluation of the pelvic structures with reduced invasiveness and specific advantages such as the evaluation of the tubal mucosa by salpingoscopy compared to traditional laparoscopy.

Indications for Fertiloscopy

Fertiloscopy is particularly suited for patients with unexplained infertility where no obvious pelvic pathology is detected through non-invasive methods such as ultrasound or hysterosalpingography. It is probably the best tool for evaluating the patency and functionality of the fallopian tubes, as well as for detecting subtle forms of endometriosis, subtle abnormalities or adhesions that might not be visible through other imaging techniques. By providing both a diagnostic assessment and the potential for some therapeutic intervention at the same time, fertiloscopy is an effective option for patients who prefer to avoid the invasiveness of laparoscopy. Technique and Equipment (Fig.1,2)

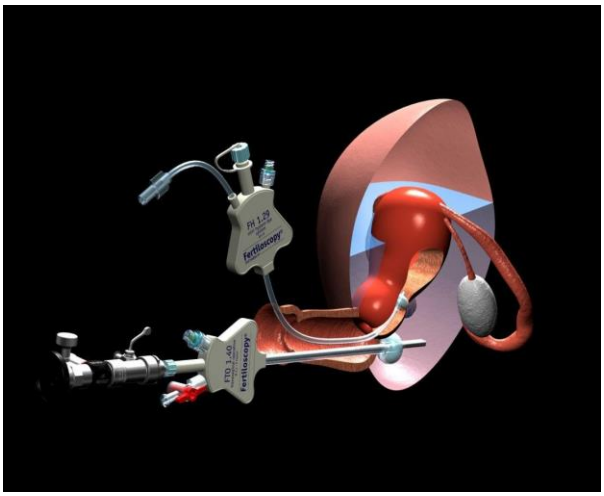

Fig.1: principle of Fertiloscopy

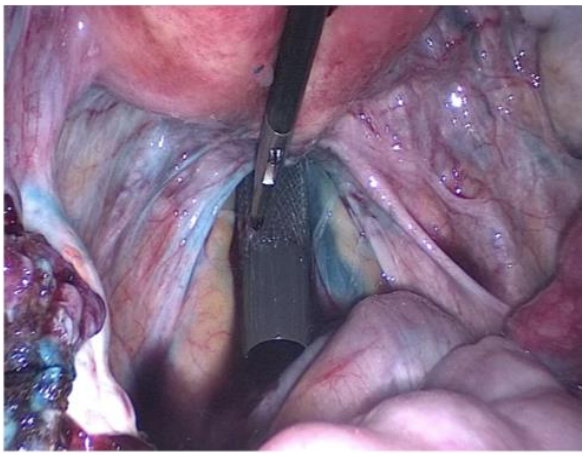

Fig.2: View by laparoscopy of the position on the transvaginal insertion of the optic in the pouch of Douglas

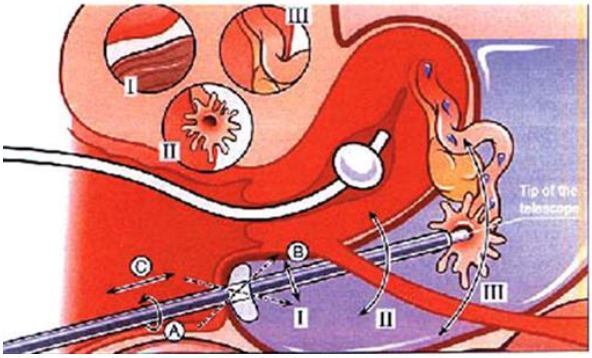

Fig 3: Priciple of fertiloscopy

We have described the technique in several publications (5,13) The principles are the following: Fertiloscopy is performed under local anesthesia or light general anesthesia similar to the one used for egg collection during IVF and is typically an outpatient or office procedure. The procedure begins with a diagnostic hysteroscopy to assess the uterine cavity for any abnormalities (6). Following this, a Veress needle is inserted in the pouch of Douglas and 150, 2OO cc ringers' lactate are instilled thus creating a working space; then an hysteroscope of 2,9 mm in diameter with a 30° final lens is inserted through the posterior vaginal fornix (Fig.2) to access the peritoneal cavity, a method reminiscent of the original culdoscopy but enhanced by modern endoscopic technology. We designed a special disposable trocar to access the pouch of Douglas that we called the Fertiloscope® (Fertility Focus, UK). Fitted with a balloon at its extremity to prevent the risk to slip out of the peritoneal cavity during the procedure. Also, a 5 French operative channel allows to introduce some operative instruments such as scissors, biopsy forceps or bipolar electrode.

Unfortunately, this equipment is currently not available. Therefore, the technical alternative is represented by the use of a spring-loaded needle and a special trans vaginal reusable trocar (Karl Storz SE & Co KG Tuttlingen, Germany) which is the equivalent minus the balloon but the technique is very similar

A key component of fertiloscopy is the integration of hydrolaparoscopy with a tubal patency test using methylene blue and salpingoscopy. Salpingoscopy involves the insertion of the same optic into the fallopian tubes to assess the tubal mucosa. One of the main technical advantages is the ability to perform salpingoscopy to evaluate the quality of tubal mucosa (Fig: 4,5,6,). Compared to laparoscopy where two endoscopes, two cold light supplies and two irrigation systems are needed, the same endoscope is used in fertiloscopy and in more than 95% of cases it is possible to enter at least in one tube (6) (Fig: 5,6,7).

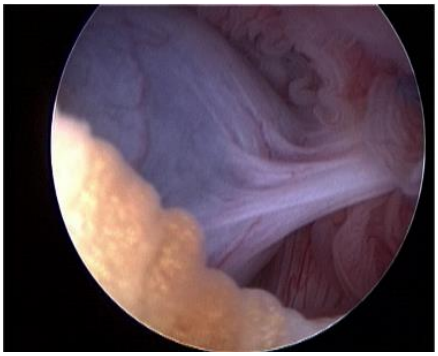

Fig.4: fimbrial para tubal cyst

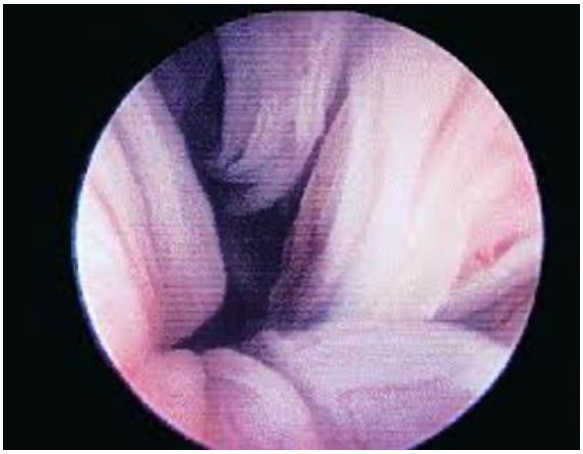

Fig.5: salpingoscopy: ampulalary view

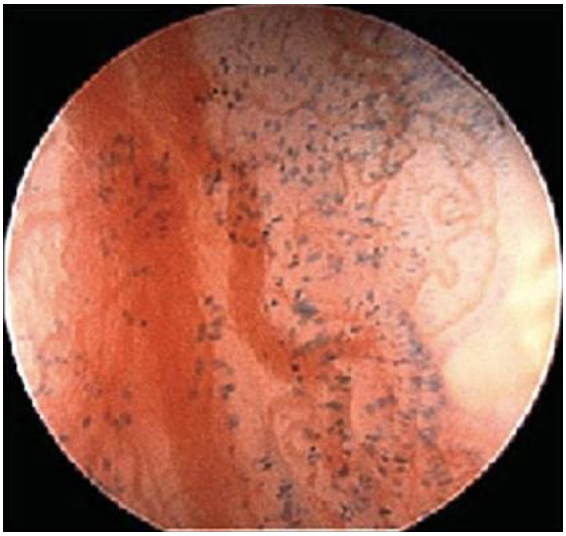

Fig.6: tubal cells, dye stained (m-blue)

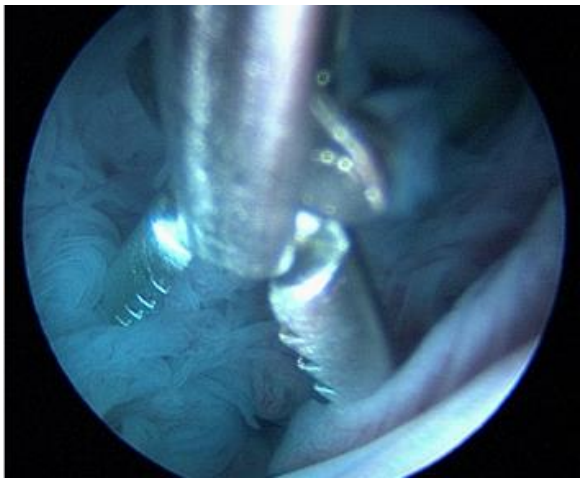

Fig.:7 French instrument biopsy/ adhesiolysis

This is further enhanced by microsalpingoscopy, described by Marana that allows for a more detailed evaluation of the quality of the mucosa by evaluating the proportion or tubal cell dye stained by the blue (4). The more the cells are dye stained, the more damaged the tubal mucosa is. We have to underline the fact that this microsalpingoscopy technique necessitates the use of the Hamou 2 hysteroscope (Karl Storz SE & Co KG Tuttlingen Germany). These types of scopes have a unique capacity to provide a magnification up to 100 allowing an in "vivo histology" of the tubal cells. Use of the saline solution during the procedure creates a working space that enhances the visualization of the pelvic organs, including the fallopian tubes, ovaries, and surrounding peritoneum in a physiological manner i.e. without the need to use any probe. Therefore, we see tubes and ovaries in their normal environment, even ovulation has been documented several times during fertiloscopy or THL (3).

After the procedure, the instruments are carefully removed, and the small vaginal incision closes naturally, reducing the risk of postoperative complications and facilitating a quick recovery (7).

If a pathology necessitates a further operative laparoscopy, it can be done immediately if the patient gave her consent or in a second time giving the time to explain the situation to the patients and giving time for her to decide which therapeutic options, she prefer usually a choice between tubal surgery and IVF. It is this latter approach that we favor.

Contra-indications:

It is necessary to perform a vaginal examination prior to the procedure to detect any pathology of the pouch of Douglas and especially deep endometriosis of the cul de sac which would not allow to enter safely in the peritoneal cavity. Another contra indication is the presence of acute salpingitis. However, when the risk to encounter adhesions is high for example in patients having had peritonitis, it is always possible to perform a fertiloscopy since there is almost all the time a small space in the pouch of Douglas free of adhesions, and thus it is possible to evaluate if laparoscopy is worth to be performed or if IVF has to be directly proposed.

Complications

Fertiloscopy is generally considered a safe procedure, but like any surgical technique, it is not without risks. The primary complication associated with fertiloscopy is rectal injury during the introduction of the trocar. This complication occurs in approximately 0.6% to 1% of cases, particularly in the initial phase of a surgeon's learning curve. As Gordts and Watrelot have noted, the risk of rectal injury decreases significantly after the first 20 to 30 procedures (9).

When a rectal injury occurs, the procedure should be halted and the patient should be placed on a 5-day course of antibiotics. Given that the injury is typically small, around 5 mm, and under the peritoneum thus without risk of contaminating the peritoneal cavity, no further surgical intervention is necessary.

Operative Fertiloscopy:

Ovarian Drilling

One of the therapeutic procedures performed during fertiloscopy is ovarian drilling, particularly in patients with clomiphene-resistant polycystic ovary syndrome (PCOS). Ovarian drilling involves making small punctures in the ovarian surface, which can help restore normal ovulation in women with PCOS who have not responded to medical treatment.

During fertiloscopy, ovarian drilling can be performed under direct visualization with minimal trauma to the ovaries. (7,8,13). This approach has been shown to be effective in inducing ovulation and improving fertility outcomes in women with PCOS. The minimally invasive nature of fertiloscopy makes it an ideal platform for such procedures, combining the benefits of diagnostic assessment with the ability to address the underlying causes of infertility in a single session.

3.Personal results (Tab: 1,2)

Between 1996 and 2016, a series of 4,000 fertiloscopies have been performed by our team, providing quite extensive clinical experience and data on the efficacy and safety of this technique. This large-scale study allowed for the evaluation of fertiloscopy in various indications related to female infertility. Results are summarized (tab 1,2). It includes data on the number of cases diagnosed with pelvic adhesions, minimal endometriosis, and tubal abnormalities as well as the number of therapeutic procedures performed, such as adhesiolysis, treatment of minimal endometriosis, and ovarian drilling. The associated percentages illustrate the prevalence of the pathologies encountered and the success rate of the interventions carried out during these fertiloscopies. This table highlights the broad application of fertiloscopy in the management of female infertility and the effectiveness of this technique as a diagnostic and sometimes therapeutic tool.

In our series, 50,8% of fertiloscopies were normal leading the patients to be referred to ART

In the other cases (49,2%) we were able to treat the abnormalities by means of fertiloscopy (adhesiolysis, coagulation of minimal endometriotic ovarian lesions, ablation of paratubal cyst - 44,6% of cases N=745). In the remaining cases (55,3% - N=925), operative laparoscopy was necessary for either hydrosalpinx or mild or severe endometriosis (Tab: 1).

	N	%
1. Lost of sight(live demonstrations)	235	5,8%
2. Fertiloscopies : normal	1678	50,2%
3. Fertiloscopies :abnormal	1670	49,8%

	N-%	Fertiloscopic treatment	Laparoscopic treatment(secondary
hydrosalpinx	64(1,6%)	0	64
phimosis	335(8,4%)	0	335
Endometriosis I-II	198 (4,9%)	156	42
Endometriosis III-IV	49(1,2%)	0	49
adhesions	334(8,4%)	201	133
Subtle tubal abnormalities	690(17,2%)	388	302
Total	1670/ 4000 **41,7%**	Total=745 **44,6%**	Total=925 **55,3%**

Table 1: results of 4000 fertiloscopies (French Académie of Surgery March 2016

	N	Cpr(cumulative pregnancy rate)
Ovarian drilling	380	220(**57,6%**)
Second OD after pregnancy	37	19(**51,3%**)

Table 2: results of ovarian drilling

4.Discussion: Advantages and Disadvantages of fertiloscopy The Role of Fertiloscopy in Infertility Workups

Fertiloscopy occupies a prominent position in the spectrum of infertility diagnostics and treatment. It offers a minimally invasive alternative to laparoscopy, particularly for patients without obvious pelvic pathology

<u>Advantages of Fertiloscopy:</u>

1.Minimally Invasive Approach: Fertiloscopy is less invasive than laparoscopy, as it avoids abdominal incisions and can be performed under local anesthesia. This reduction in surgical trauma leads to faster recovery times, less postoperative pain, and a reduced

risk of complications such as infections and adhesions (8, 9).

2.Enhanced Visualization: The combination of hydrolaparoscopy with salpingoscopy and microsalpingoscopy in fertiloscopy enhances the visualization of the pelvic organs in their natural position. This allows for the detection of subtle pathologies like peritoneal adhesions, minimal endometriosis, and tubal anomalies that might be missed with other techniques (10,11). Moreover, salpingoscopy is much easier to perform by fertiloscopy than by laparoscopy

3.Simultaneous Diagnostic and Therapeutic Capability: Fertiloscopy allows for both the diagnosis and immediate treatment of identified (but limited) pathologies, such as adhesiolysis for minor adhesions, treatment of minimal endometriosis, correction of minor tubal anomalies, and ovarian drilling for clomiphene-resistant PCOS. This reduces the need for additional operative laparoscopy

4.Outpatient Procedure with Quick Recovery: As an outpatient procedure, fertiloscopy typically requires only a short recovery period, allowing patients to return to normal activities much sooner compared to those who undergo laparoscopy (13,14).

5.Cost-Effective: Due to its minimally invasive nature and the possibility of being performed under local anesthesia, fertiloscopy can be more cost-effective than laparoscopy, reducing the overall healthcare costs associated with infertility treatment (17).

Disadvantages of Fertiloscopy:

1.Technical Challenges: Fertiloscopy requires specialized training and experience, particularly due to its unique combination of techniques and the transvaginal approach. Surgeons need to be adept at managing the confined working space and using miniature instruments effectively (18).

2.Limited Visualization Compared to Laparoscopy: While fertiloscopy provides excellent visualization of the pelvic organs, it does not offer the same comprehensive view of the entire abdominal cavity as laparoscopy. This limitation means that fertiloscopy may not be suitable for patients who rare suspect of pathology or with abnormal hysterosalpingography where laparoscopy will be needed (19)

3.Specific Complications: Although rare, complications such as bowel or bladder injury and pelvic infections can occur due to the transvaginal access route. Proper patient selection and surgeon expertise are crucial to minimizing these risks (9).

4.Limited Availability: Currently, fertiloscopy is not as widely available as laparoscopy, particularly outside of Europe. This limited access can restrict its use to specialized centers, making it less accessible to a broader patient population.

5.Comparison with Laparoscopy

Laparoscopy has been the “gold standard” of infertility diagnosis and treatment for decades, providing a detailed exploration of the pelvic and abdominal cavities. It allows for the direct assessment and treatment of conditions such as endometriosis, pelvic adhesions, and tubal blockages, which are major contributors to infertility.

However, the emergence of fertiloscopy has introduced a new option for patients, particularly those who might benefit from a less invasive approach. A pivotal development in comparing these two techniques was the publication of the first prospective, double-blind, randomized study that directly compared fertiloscopy and laparoscopy in the management of infertility

(12). This study was groundbreaking as it provided the first rigorous scientific comparison of two surgical techniques for infertility, challenging the long-held supremacy of laparoscopy.

Is Laparoscopy Still the Gold Standard?

The above study found that fertiloscopy offered comparable diagnostic accuracy to laparoscopy in identifying pelvic pathologies such as endometriosis and adhesions, which are critical in the evaluation of infertility (12). Furthermore, fertiloscopy presented several benefits, including a minimally invasive approach, reduced recovery time, and the ability to perform the procedure under local anesthesia—qualities that are particularly beneficial for patients who are reluctant to undergo more invasive procedures or have contraindications to general anesthesia.

Despite these advantages, laparoscopy retains several strengths that continue to justify its status as the gold standard in certain clinical situations. Laparoscopy provides a more comprehensive view of the abdominal cavity, making it suitable for patients with complex or extensive pathology such as endometriosis that may not be fully assessed through fertiloscopy. Moreover, laparoscopy's established role in the surgical management of infertility, including its ability to perform more extensive surgical interventions, remains unparalleled by fertiloscopy in certain cases.

Discussion of the study and Its Implications:

The prospective double-blind study underscored the importance of individualized patient care in infertility treatment. It highlighted that while fertiloscopy and laparoscopy each have their unique strengths, the choice between the two should be guided by the specific clinical situation and patient preferences. For instance, fertiloscopy might be preferable for patients with no obvious pathology, whereas laparoscopy would be more appropriate for those requiring a thorough abdominal exploration or when a surgical intervention is anticipated.

The findings suggest that fertiloscopy could serve as an initial diagnostic tool, reserving laparoscopy for cases where more extensive surgical intervention is needed or when the results obtained by fertiloscopy are inconclusive. This approach could optimize patient outcomes by reducing unnecessary surgical exposure while ensuring comprehensive care for more complex cases.

6.Why Fertiloscopy Might Become More Widespread

Several factors support the notion that fertiloscopy could become a more widely used technique in the diagnosis and treatment of infertility:

1.Advancements in Minimally Invasive Techniques: As surgical techniques continue to evolve towards less invasive options, there is an increasing preference for procedures that reduce patient recovery time, minimize surgical risks, and that are cost-effective. Fertiloscopy fits well within this trend, offering a balanced approach between effective diagnosis and treatment with minimal invasiveness.

2.Increasing Demand for Outpatient Procedures: Healthcare systems and patients alike are leaning towards outpatient interventions that allow for faster recovery and reduced hospital stays. Fertiloscopy's ability to be performed on an outpatient basis aligns with this growing demand, potentially making it a preferred option for patients and healthcare providers

3.Expanded Access to Training: As more practitioners become trained in fertiloscopy and its benefits become more widely recognized, it is likely that the technique will become more accessible. This increased availability could help in establishing fertiloscopy as a standard procedure in more medical centers.

4.Supportive Clinical Evidence: Studies like the prospective double-blind comparison between fertiloscopy and laparoscopy provide robust evidence supporting fertiloscopy's efficacy. As more studies corroborate these findings, the technique's acceptance and adoption are likely to grow (12).

5.Patient Preferences: Patients increasingly prefer less invasive procedures with quicker recovery times and fewer postoperative complications. Fertiloscopy, with its minimal invasiveness and effectiveness, is well-positioned to meet these patient preferences, driving its adoption in clinical practice

Conclusion:

Fertiloscopy is positioned as a key tool in the diagnosis and treatment of infertility, particularly for patients for whom a less invasive approach is desirable. Compared to laparoscopy, fertiloscopy offers several advantages, including reduced invasiveness, quicker recovery, and the ability to be performed under local anesthesia. However, its limitations, such as restricted visualization and limited availability, mean that it is not suitable for all patients. The decision between fertiloscopy and laparoscopy should be tailored to the individual patient's clinical needs, ensuring that each patient receives the most appropriate, effective, and least invasive care possible.

The first prospective, double-blind study comparing fertiloscopy and laparoscopy has provided crucial insights into the respective roles of these techniques, suggesting that the two techniques should be viewed not as competitors, but as complementary tools in the reproductive surgeon's arsenal. As clinical evidence and practitioner experience with fertiloscopy continue to grow, it is likely that this technique will become more widely adopted, offering an effective and patient-friendly option in the management of infertility.

However, despite its early promise and popularity in the 2000s, fertiloscopy has not experienced the widespread adoption that was initially anticipated. In recent years, it has become somewhat overlooked, with reproductive specialists increasingly favoring direct IVF treatments when infertility presents without an obvious cause. It is unfortunate that a more thorough assessment, particularly through vaginal endoscopy, is not pursued more often before resorting to IVF. Fertiloscopy offers a minimally invasive option that can provide valuable diagnostic insights and therapeutic interventions, which might improve the chances of natural conception before moving to more invasive and costly fertility treatments like IVF.

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Advancements and Applications of the Resectoscope in Gynecological Surgery: A Comprehensive Review

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Abstract

The treatment of intracavitary pathologies has experienced great progress with the introduction of resectoscopy. In this review, we describe the advances and applications of this technique.

Key words: resectoscopy, uterine pathology, endoscopy

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Introduction:

In the realm of gynecology, surgical interventions play a pivotal role in managing a myriad of conditions ranging from abnormal uterine bleeding to uterine fibroids and polyps. Among the arsenal of instruments available to gynecologists, the resectoscope stands out as a versatile and indispensable tool for performing minimally invasive procedures within the uterine cavity. This comprehensive review delves into the origins, components, clinical applications, advancements, and future directions of the resectoscope in gynecology.

Origins and Evolution:

The resectoscope's origins can be traced back to the mid-20th century, paralleling its emergence in urological surgery. Pioneers in

endoscopic innovations such as Antonin Jean Desormeaux, Gustave Trouvé and Maximilian Carl-Friedrich Nitze laid the groundwork for the development of sophisticated instrumentation capable of visualizing and manipulating the uterine cavity (1). Early iterations of the resectoscope featured rigid designs and limited functionality, necessitating advancements in optics, materials, and instrumentation.

The integration of fiberoptic technology in the 1960s marked a significant milestone in the evolution of the resectoscope, enabling real-time visualization of the uterine cavity and precise tissue manipulation. Subsequent innovations in electrode design, irrigation systems, and electrosurgical energy further refined the resectoscope's capabilities, transforming it into a cornerstone instrument for gynecological surgery (2).

Continued research and innovation in gynecological surgery have further refined the resectoscope's design and capabilities, allowing for safer and more effective treatment of various gynecological conditions while reducing the need for invasive procedures. For instance, the “mini-resectoscope” is poised to play a leading role in hysteroscopic surgery for many pathologies, both in inpatient and outpatient settings (3,4).

Components and Functionality:

The resectoscope comprises several essential components, each contributing to its functionality and efficacy in gynecological procedures (5).

Sheath: The outer sheath provides structural integrity and houses the working elements of the resectoscope. Constructed from durable materials such as stainless steel or polyethylene, the sheath facilitates smooth insertion into the cervical canal and optimal positioning within the uterine cavity (Fig 1).

Fig.1: Outer sheath, inner sheath and the obturator of 18.5Fr Resectoscope

Optical System: Central to the resectoscope is its optical system, incorporating lenses and a light source (LED/ XENON) for direct visualization of the uterine cavity. High-resolution imaging enables gynecologists to identify anatomical landmarks, assess lesion morphology, and guide surgical interventions with precision.

Working Elements: The resectoscope features a variety of working elements, including cutting loops, electrodes, and tissue removal devices (Fig 2). These instruments enable gynecologists to perform endometrial resection, myomectomy, polypectomy, and septal resection while minimizing tissue trauma and preserving uterine function.

Fig. 2: Working element- loop electrode of a mini resectoscope

Irrigation System: Continuous irrigation is essential during resectoscopic procedures to maintain optimal visualization and prevent thermal injury. The resectoscope integrates irrigation ports through which saline or glycine solution is circulated, ensuring clear visualization and efficient tissue dissection

(Fig 3). As fluid overload is a main concern with the irrigation systems, newer hysteroscopy pumps have been invented to monitor real-time rate of fluid intravasation (6).

Electrosurgical Generator: Electrosurgical energy is utilized to achieve hemostasis, tissue ablation, and lesion excision during resectoscopic procedures. By modulating power settings and electrode configurations, gynecologists can tailor interventions to patient-specific needs while minimizing the risk of intraoperative complications (7).

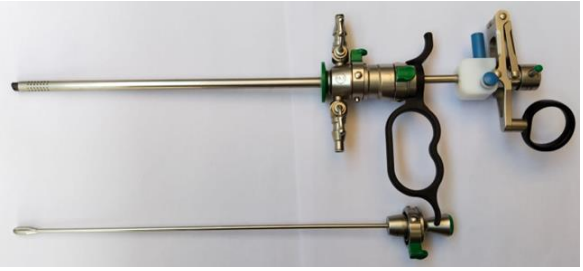

Fig 3- 18.5 Fr Resectoscope - the complete apparatus

Types of resectoscopes:

Monopolar Resectoscopes:

Monopolar resectoscopes consist of a single electrode that is used for cutting and coagulation. The electrode is connected to a power source, and electric current flows from the electrode through the tissue to a grounding pad placed on the patient's body.

During surgery, the surgeon uses the monopolar resectoscope to cut and remove tissue, while simultaneously cauterizing blood vessels to minimize bleeding.

This type of resectoscope is effective for procedures such as endometrial ablation and removal of uterine fibroids.

Bipolar Resectoscopes:

Bipolar resectoscopes feature two electrodes that are close together, allowing for the passage of electric current only between them. This reduces the risk of damage to surrounding tissue compared to monopolar resectoscopes. The electric current passes directly between the two electrodes, effectively cutting and coagulating tissue in the surgical field without the need for a grounding pad (8). Bipolar resectoscopes are particularly suitable for delicate procedures within the uterus, such as removing polyps or treating abnormal uterine bleeding (9).

Hysteroscopic Resectoscopes:

Hysteroscopic resectoscopes are designed specifically for accessing and operating within the uterine cavity (10). There are two types of hysteroscopic resectoscopes- conventional Resectoscope and Mini Resectoscope,

The conventional hysteroscopic resectoscope is a surgical instrument used in hysteroscopy procedures to remove abnormal growths or tissue from the uterus. It typically consists of a long, slender tube with a camera and light source at one end, allowing the surgeon to visualize the inside of the uterus, and a wire loop or other cutting tool at the other end for excising tissue. A conventional hysteroscopic resectoscope typically has a diameter ranging from 15 Fr to 26 Fr.

Mini Resectoscopes

The notable absence of inner and outer sheaths in the Princess Resectoscope underscores its innovative design, diverging from conventional resectoscopes. This streamlined configuration eliminates the need for sheath manipulation, mitigating potential mechanical intricacies inherent in traditional models. By eschewing this dual-sheath structure, the Princess Resectoscope

optimizes procedural fluidity, facilitating enhanced maneuverability within the uterine cavity. This technical refinement not only streamlines surgical navigation but also contributes to heightened precision and procedural efficacy, ultimately elevating patient outcomes.

A mini hysteroscopic resectoscope usually has a diameter ranging from 16Fr-22Fr (Fig 4).

Figure 4 - Mini Resectoscope

Clinical Applications:

The versatility of the resectoscope extends across a spectrum of gynecological conditions, offering minimally invasive solutions for patients with uterine pathologies and menstrual disorders:

Endometrial Ablation/ Transcervical resection of endometrium (TCRE): Endometrial ablation using the resectoscope represents a definitive treatment for menorrhagia, or excessive menstrual bleeding, refractory to conservative management. Through thermal or mechanical ablation techniques, gynecologists achieve endometrial destruction, alleviating menstrual symptoms and improving quality of life (11).

Transcervical resection of the endometrium (TCRE) is a surgical procedure used to treat abnormal uterine bleeding caused by conditions such as endometrial hyperplasia or submucosal fibroids. It involves the removal of the endometrial lining of the uterus using a specialized instrument called a resectoscope. Here's a detailed overview of the TCRE procedure using a resectoscope (12).

Preparation:

Before the procedure, the patient may undergo a thorough evaluation, including a pelvic exam, ultrasound, and endometrial biopsy, to determine the underlying cause of abnormal uterine bleeding.

The patient may receive general or regional anesthesia, depending on the surgeon's preference and the patient's medical history.

Positioning:

The patient is typically positioned on a gynecological table in a lithotomy position, similar to that used during a pelvic exam or childbirth. Stirrups support the patient's legs, allowing optimal access to the vaginal canal and cervix.

Vaginoscopy: The hysteroscopy is inserted through the vagina initially to look for vaginal pathologies.

Cervical Dilation:

The cervix is dilated using a series of dilators or with the assistance of medications to facilitate the passage of the resectoscope into the uterine cavity. Though this step is crucial for ensuring adequate access to the endometrial lining it might not be required in all the procedures.

Insertion of the Resectoscope:

The resectoscope is a specialized instrument consisting of a long, slender tube with a light source, camera, and an electrical cutting and coagulation system.

The surgeon inserts the resectoscope through the dilated cervix and advances it into the

uterine cavity under direct visualization using the camera.

Visualization and Resection:

Once the resectoscope is in position, the surgeon begins to visualize the inside of the uterus on a monitor connected to the camera.

Using the cutting and coagulation electrodes on the resectoscope, the surgeon removes the endometrial tissue layer by layer. The electrical current supplied to the electrodes helps to cut through the tissue while simultaneously cauterizing blood vessels to minimize bleeding. The surgeon carefully maneuvers the resectoscope to ensure complete removal of the abnormal endometrial tissue while avoiding damage to the surrounding healthy tissue.

Irrigation:

Throughout the procedure, a fluid (usually a sterile saline solution in case of bipolar resection) is continuously circulated through the resectoscope to maintain a clear field of vision, wash away debris, and prevent overheating of the instrument.

Monitoring and Completion:

The surgeon closely monitors the progress of the procedure and ensures that the entire endometrial lining is adequately resected. Once the resection is complete, the resectoscope is carefully removed from the uterus, and any remaining tissue fragments or debris may be flushed out with irrigation fluid or may require removal using ovum forceps in cases of larger chunks.

Recovery:

After the procedure, the patient is monitored in a recovery area to ensure stability and to manage any discomfort or bleeding. Most patients can return home the same day or after a short observation period, although some may require overnight hospitalization depending on individual factors.

TCRE using a resectoscope is an effective treatment option for women with abnormal uterine bleeding, offering the advantages of minimal invasiveness, rapid recovery in many cases and preservation of fertility in few cases of superficial TCRE where the basal layer of the endometrium remains intact and undisturbed.

Myomectomy: In cases of symptomatic uterine fibroids, the resectoscope facilitates transcervical myomectomy, a minimally invasive alternative to traditional abdominal surgery. By dissecting and excising fibroid tissue within the uterine cavity, gynecologists preserve uterine integrity and fertility while minimizing postoperative morbidity. Hysteroscopic myomectomy is a minimally invasive surgical procedure aimed at removing uterine fibroids while preserving the uterus. Several techniques are employed in this procedure, including slicing, hydromassage, and variations such as the Metzón and Hamid techniques.

Slicing method: This technique involves using a loop electrode attached to a hysteroscopic resectoscope to slice the fibroid into smaller fragments for removal. The loop electrode is energized with an electrical current, which simultaneously cuts and cauterizes the tissue. The surgeon maneuvers the resectoscope to penetrate the fibroid and create slices, gradually reducing its size until it can be removed through the hysteroscope. This method allows for precise removal of fibroids while minimizing damage to surrounding healthy tissue (13).

Hydromassage: Hydromassage utilizes a combination of fluid irrigation and mechanical cutting to break down and remove fibroid tissue. After accessing the uterine cavity with the hysteroscope and

resectoscope, a distention fluid, typically saline solution at bipolar resectoscopy, is introduced to distend the cavity and is alternated with closing the inlet of the fluid whilst aspiration continues. In this way the uterine myometrium contracts and tries to expulse the myoma towards the uterine cavity and facilitate visualization. A specialized device, such as a morcellator, is then inserted through the resectoscope. The morcellator features rotating or reciprocing blades that break the fibroid into smaller fragments. Simultaneously, suction is applied to remove the fragmented tissue from the uterine cavity. This technique is particularly useful for removing larger fibroids or fibroids with irregular shapes (14).

Metzón technique: Named after Dr. Gustavo Metzón, this technique involves using a hysteroscopic resectoscope equipped with a bipolar electrode. The fibroid is dissected and removed using bipolar energy, allowing for simultaneous cutting and coagulation of tissue. The bipolar electrode generates an electrical current that flows only between its tips, minimizing the risk of injury to surrounding structures.

Hamid technique: Named after Dr. Tahar Ben Hamid, the Hamid technique involves using a hysteroscopic resectoscope equipped with a monopolar electrode. The fibroid is dissected and removed using monopolar energy, allowing for precise cutting and coagulation of tissue. A non-conductive distension medium such as glycine solution is required to complete the electrical circuit and deliver energy to the tissue.

Overall, hysteroscopic myomectomy offers several advantages over traditional open surgery, including shorter recovery times, reduced risk of complications, and preservation of fertility. The choice of technique depends on factors such as the size, location, and characteristics of the fibroids, as well as the surgeon's experience and preference. These advanced techniques allow for the effective treatment of uterine fibroids while minimizing patient discomfort and promoting faster recovery.

Septal Resection: Uterine septa, congenital anomalies characterized by intrauterine partitioning, may predispose to recurrent pregnancy loss and obstetric complications. Utilizing the resectoscope, gynecologists perform septal resection, restoring uterine morphology and enhancing fertility potential for women desiring pregnancy. The resection process requires meticulous attention to detail to ensure the preservation of healthy uterine tissue and to minimize the risk of complications such as excessive bleeding or perforation of the uterine wall.

Polypectomy: Endometrial polyps, benign growths arising from the endometrium, may cause abnormal uterine bleeding and infertility. With the resectoscope, gynecologists can perform polypectomy, removing polyps and restoring the endometrial cavity to optimize reproductive outcomes and alleviate symptomatic burden.

Excision of scar ectopic: Excision of caesarean scar ectopic pregnancy using Resectoscope is an alternative to laparoscopy in certain selected cases and have proved to be an equally effective method.

Isthmocoele repair: Correction of isthmocele using a resectoscope involves accessing the uterine cavity, visualizing the isthmocele, and carefully resecting the tissue forming the defect. This minimally invasive procedure aims to alleviate symptoms such as abnormal bleeding and pelvic pain, with the potential to improve fertility outcomes.

Evacuation of RPOC: In cases of chronic retained products of conception (RPOC), where conventional treatments like

medication or dilation and curettage (D&C) have been ineffective, evacuation using a resectoscope offers a minimally invasive alternative. The resectoscope allows for precise visualization and removal of the persistent tissue, reducing the risk of complications and improving patient outcomes, particularly in cases where RPOC have been present for an extended period.

Clinical Considerations and Advancements:

While resectoscopic surgery offers numerous benefits, careful patient selection, procedural expertise, and meticulous technique are paramount to optimizing surgical outcomes and minimizing complications. Intraoperative monitoring, fluid management, and adherence to evidence-based protocols mitigate risks such as fluid overload, thermal injury, and uterine perforation.

Recent advancements in resectoscopic technology have expanded the horizons of gynecological surgery, offering enhanced precision, safety, and patient satisfaction. Innovations such as bipolar energy, 3D imaging, and hysteroscopic morcellation have streamlined surgical workflows, reduced operative times, and broadened the scope of resectoscopic interventions.

Gynecological resectoscopes offer several advantages in the diagnosis and treatment of various intrauterine pathologies and conditions. Here are some of the key advantages:

Minimally Invasive: Resectoscopic procedures are minimally invasive compared to traditional open surgeries. They involve inserting a slender instrument through the cervix into the uterus, minimizing the need for large incisions and reducing trauma to surrounding tissues.

Preservation of Uterine Anatomy: Resectoscopic procedures allow surgeons to preserve the structural integrity of the uterus while addressing intrauterine abnormalities such as polyps, fibroids, or adhesions. This is particularly beneficial for women who wish to maintain their fertility or avoid more invasive surgical interventions.

High Precision and Accuracy: Resectoscopes provide high-definition visualization of the uterine cavity, allowing surgeons to accurately diagnose and target specific areas of pathology. The instruments attached to the resectoscope enable precise excision, ablation, or removal of abnormal tissue while minimizing damage to healthy surrounding tissue.

Versatility: Gynecological resectoscopes are versatile instruments that can be used for a variety of diagnostic and therapeutic procedures within the uterus. They are suitable for hysteroscopic examinations, endometrial biopsies, removal of polyps and fibroids, treatment of abnormal uterine bleeding, and management of intrauterine adhesions.

Reduced Recovery Time: Resectoscopic procedures typically result in shorter recovery times and less postoperative pain compared to traditional open surgeries. Many patients can return to their normal activities within a few days after the procedure, leading to improved overall patient satisfaction and quality of life.

Outpatient or Same-Day Surgery: In many cases, resectoscopic procedures can be performed on an outpatient basis or as same-day surgery, eliminating the need for overnight hospitalization and reducing healthcare costs.

Minimal Scarring: Because resectoscopic procedures involve small incisions or no

external incisions at all, they result in minimal scarring compared to open surgeries. This can have aesthetic benefits for patients and reduce the risk of complications associated with wound healing.

Effective Treatment Outcomes: Resectoscopic procedures have been shown to be highly effective in treating various gynecological conditions, including abnormal uterine bleeding, uterine polyps, submucosal fibroids, and intrauterine adhesions. They offer durable and long-lasting results with low rates of recurrence in many cases. Tools for gynecologists in the diagnosis and

Disadvantages:

While the resectoscope is a valuable tool in gynecology, it also comes with certain disadvantages and limitations. Here are some of the disadvantages associated with the use of resectoscopes in gynecology (15,16):

Invasive Nature: The insertion of a resectoscope into the uterus requires, although not always, cervical dilation, which can cause discomfort and potential complications such as cervical trauma or uterine perforation, especially in patients with cervical stenosis or anatomical abnormalities.

Risk of Complications: Like any surgical procedure, resectoscopy carries inherent risks, including bleeding, infection, injury to surrounding organs, and fluid overload from irrigation. These risks are generally low but can occur, particularly in complex or lengthy procedures.

Fluid overload is one of the most dreaded complications.

Fluid overload during hysteroscopy occurs when there is excessive absorption or retention of the irrigation fluid used to distend the uterine cavity for visualization. Here's an overview of fluid overload in hysteroscopy, including its complications, signs, symptoms, diagnosis, and management:

Complications:

Fluid overload can lead to hyponatremia, electrolyte imbalances, fluid overload syndrome, and in severe cases, pulmonary edema or cardiovascular collapse (17).

Other complications may include uterine perforation,

Signs and Symptoms:

Signs of fluid overload may include hypertension, tachycardia, dyspnea, and peripheral edema. Symptoms can range from mild discomfort to severe respiratory distress, depending on the extent of fluid absorption.

Diagnosis: Diagnosis is primarily clinical, based on signs and symptoms observed during or after the procedure. Laboratory tests may reveal electrolyte imbalances, particularly hyponatremia.

Management:

Immediate cessation of the procedure and removal of the hysteroscope to prevent further fluid absorption (18). Supportive measures such as oxygen supplementation and intravenous fluids may be administered as needed. Monitoring of vital signs, electrolyte levels, and fluid balance to assess the severity of the condition. In severe cases, diuretics may be administered to promote fluid excretion, and inotropic agents may be considered to support cardiovascular function. If pulmonary edema develops, respiratory support and close monitoring in an intensive care setting may be necessary.

Prevention is key: using appropriate irrigation fluid volumes, maintaining proper monitoring during the procedure, and promptly addressing any signs of fluid overload can help prevent complications.

Overall, prompt recognition and management of fluid overload are essential in hysteroscopy to minimize the risk of complications and ensure patient safety. Close monitoring of patients undergoing hysteroscopy, along with adherence to established safety protocols, can help mitigate the risk of fluid overload and its associated complications.

Limited Accessibility: Resectoscopy may not be suitable for all patients or all types of uterine abnormalities. For example, large or deeply embedded fibroids may be challenging to remove using a resectoscope, necessitating alternative surgical approaches.

Potential for Residual Tissue: Complete removal of abnormal tissue during resectoscopy may be challenging, leading to the potential for residual tissue or incomplete treatment of underlying conditions. This could necessitate additional procedures or interventions in some cases.

Postoperative Symptoms: Patients may experience postoperative symptoms such as cramping, vaginal bleeding, and discharge following resectoscopic procedures. While these symptoms are usually temporary and resolve with time, they can cause discomfort and anxiety for some patients.

Limited Visualization: Despite advancements in technology, the visualization provided by resectoscopes may be limited in certain cases, especially in the presence of significant bleeding or obscured anatomy. Inadequate visualization can compromise the surgeon's ability to perform precise and effective interventions.

Skill and Training Requirements: Performing resectoscopic procedures requires specialized training and expertise. Surgeons must be proficient in hysteroscopic techniques, instrument manipulation, and management of intraoperative complications to ensure optimal outcomes and minimize risks to patients.

Cost and Resource Intensity: Acquiring and maintaining resectoscopic equipment, as well as providing appropriate infrastructure and support staff, can be resource-intensive for healthcare facilities. Additionally, the cost of resectoscopic procedures may be higher compared to alternative treatment modalities.

Conclusion

Despite these disadvantages, resectoscopy remains an important tool in the armamentarium of gynecological surgeons for the diagnosis and treatment of various intrauterine pathologies. As technology continues to advance and surgical techniques evolve, efforts are ongoing to address these limitations and improve patient outcomes in gynecological resectoscopic procedures.

Future Directions:

Looking ahead, the future of resectoscopic surgery in gynecology is characterized by innovation, collaboration, and patient-centered care. Integration of artificial intelligence algorithms for image analysis, predictive modeling, and surgical planning holds potential to enhance diagnostic accuracy, treatment efficacy, and procedural efficiency.

Moreover, the paradigm of personalized medicine underscores the importance of tailored treatment strategies, shared

decision-making, and holistic approaches to women's health. From the emergence of targeted drug therapies to the refinement of fertility-sparing interventions, the resectoscope remains at the forefront of transformative advancements in gynecological surgery.

In conclusion, the resectoscope epitomizes the intersection of technology, innovation, and clinical excellence within the field of gynecology. From its humble origins to its contemporary applications, the resectoscope continues to redefine the boundaries of minimally invasive surgery, empowering gynecologists and improving the lives of women worldwide. As we navigate the complexities of 21st-century healthcare, the legacy of the resectoscope endures as a beacon of hope, progress, and healing for generations to come.

Conclusion:

Overall, the advantages of gynecological resectoscopes make them valuable management of intrauterine disorders, offering patients minimally invasive treatment options with excellent outcomes.

Furthermore, the integration of adjunctive therapies such as intrauterine devices (IUDs), pharmacological agents, and regenerative techniques holds promise for optimizing postoperative outcomes and minimizing disease recurrence. From levonorgestrel-releasing IUDs for endometrial protection to platelet-rich plasma (PRP) for endometrial regeneration, the armamentarium of resectoscopic interventions continues to evolve in tandem with scientific advances and clinical insights

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Laparoscopic hysterectomy with ventro-fixed uterus in a patient with history of three Cesarean sections: tips and tricks

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Abstract

Hysterectomy is one of the most performed procedures for gynecological conditions worldwide. Due to the increased rate of Cesarean section, many patients undergoing subsequent surgeries like hysterectomy have a history of this procedure. Cesarean section usually induces the adherence of the bladder onto the uterus and dissecting it away becomes more difficult and exposes to injuries. In this paper, the authors report a case of a ventrofixed uterus, discuss risk factors, and underline some tips and tricks to perform laparoscopic hysterectomy in such patients.

Patients with repeated pelvic surgeries including multiple Cesarean sections, infectious complication after pelvic surgery, low pelvic pain after prior Cesarean section and infertility should be cautiously considered as being at particular risk for ventrofixed uterus. Clinical examination can help in determining the position and the mobility of the uterus considering the anterior abdominal wall. Imaging in very informative using ultrasonography and Magnetic Resonance Imaging (MRI). During surgery, anatomy guides the surgeon, and the preoperative information will help in preventing injury mainly to the bladder. The operating time is long but can be shortened when the surgeon plans the surgery in accordance with the preoperative information. Surgeons should be aware of the risk of ventrofixed uterus and how to conduct the workup and surgery for hysterectomy in such patients using some tips and tricks developed in this paper. This could help better counsel the patient and reduce the complication rate which is associated.

Key words: Cesarean section, laparoscopy, hysterectomy, surgery, gynecologic surgical procedures

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Introduction:

Hysterectomy is one of the most performed procedures for gynecological conditions worldwide (1,2). When the vaginal route is not possible, the laparoscopic approach is preferred to the abdominal one for benign diseases (3). Due to the increased rate of Cesarean section (CS), many patients undergoing subsequent surgeries like hysterectomy have history of this procedure (4). This exposes to pelvic adhesions which can complicate the surgery in terms of prolonging the operating time and increasing the risk of intraoperative organs' injuries.

CS usually induces the adherence of the bladder on the uterus and dissecting it away becomes more difficult and exposes to injury. In fact, the most challenging part during hysterectomy in patients with previous CS is the bladder dissection due to these adhesions. It has been reported there to be a higher risk of urinary complications in patient with history of CS compared to those without this history (5). When the whole of the anterior wall of the uterus has dense adhesions to the anterior abdominal wall, the scenario is even more complicated and if no attention is paid to some tips and tricks, the uncertainty during surgery, prolonging the surgical time, and the risk of injury to the bladder is even the highest. Adherend uterus to the anterior abdominal wall (ventrofixed uterus) has been reported in 14,9 to 17,9 % of hysterectomies for benign indications associated with previous CS (4,6). When a surgeon is mindful of the risk surrounding a surgical procedure, he is prone to recognize any complication. Thus, even a difficult surgical condition can be well anticipated, and the surgeon can better counsel the patient and arrange for preoperative and, if required, intraoperative urological assistance (7).

In this paper, the authors report a case of ventrofixed uterus, discuss risk factors, and underline some tips and tricks to performing laparoscopic hysterectomy in such patients.

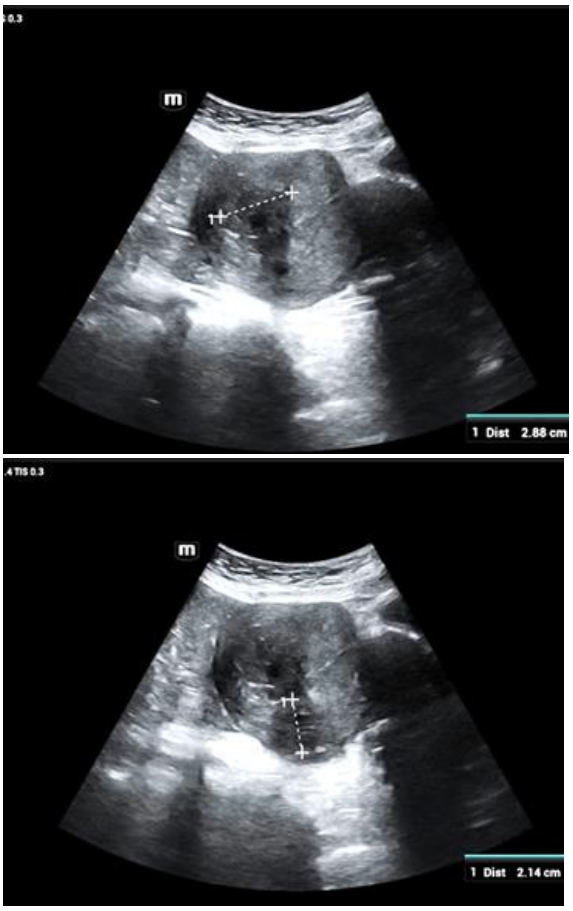
Case

A 41-year-old, para three, gravida three has been referred for better management of uterine fibroids complicated with heavy menstrual bleeding. She had three CS with transversal parietal incisions, the last one, three years ago, was associated with tubal ligation. There were no details about reperitonization of the lower segment or the presence of adhesions at repetitive previous CS.

She complained of heavy menstrual bleeding over the last two years getting increasingly heavier. She was taking iron treatment for a long period and because of her conviction, she was afraid of transfusion. A PAP smear performed one year earlier was within normal limits.

At admission, she was in good shape, normal vital signs, with palpebral conjunctiva moderately coloured. At pelvic examination,

the cervix was short and highly located, the uterus was bulky with limited mobility but grossly regular on its surface. The diagnosis of uterine fibroid with haemorrhagic complication was retained with suspicion of an intrauterine fibroid. Transabdominal ultrasound showed two fibroids, one on the anterior wall, grade 2 of 2.8x2.4x2.7 cm (Fig 1.A) with a myometrial safety margin to the serosa of 0.87 cm and the other one, on the posterior wall grade 5 measuring 2.2x2.0x2.5 cm (Fig 1.B). There was no isthmocele. In addition, the uterus was attached to the anterior abdominal wall with no space between the two structures and a negative sliding sign. A 2.05 cm distance was measured between the superior limit of the bladder and the inferior limit of the adherend portion of the uterus to the anterior abdominal wall (Figure 1.C).



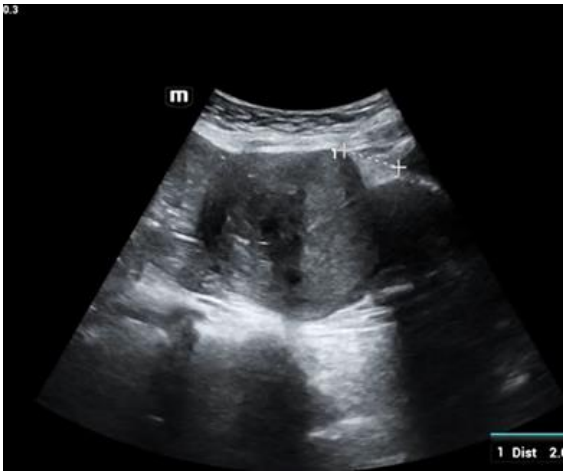


Fig.1: A. Fibroid FIGO grade 2, B. Fibroid FIGO grade 5, C. Distance between the superior limit of the bladder and the inferior limit of the adhered portion of the uterus, bladder moderately filled

After counselling about hysteroscopic removal of grade 2 fibroid and the option of laparoscopic hysterectomy, the patient preferred the last option given the fact that she had no future fertility projects.

The preoperative haemoglobin was 10 gr % and the rest of the testing was normal, thereby the procedure was scheduled. Four trocars were placed: a 10 mm optic trocar at 4 cm above the umbilicus, two 5 mm left lateral and one 5 mm right lateral. The abdominal CO_2 pressure was kept at 15 mm Hg. As findings, the uterus was densely adhered to the anterior abdominal wall (Figure 2) with the ovaries and the tubes normal.

The pouch of Douglas was free of adhesions. As ultrasound showed that the bladder was 2,05 cm lower down compared to the lowest inferior adherend part of the uterus, its dissection from the anterior abdominal wall was conducted without particularity leaving the fat above on the anterior abdominal wall and continuing close to the uterine wall (Figure 2).

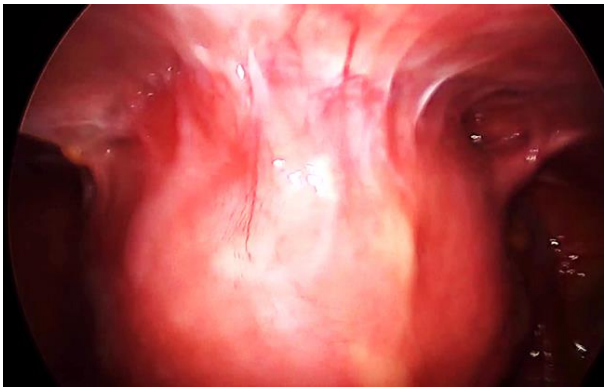


Fig. 2a: Uterus adhered to the anterior abdominal wall.

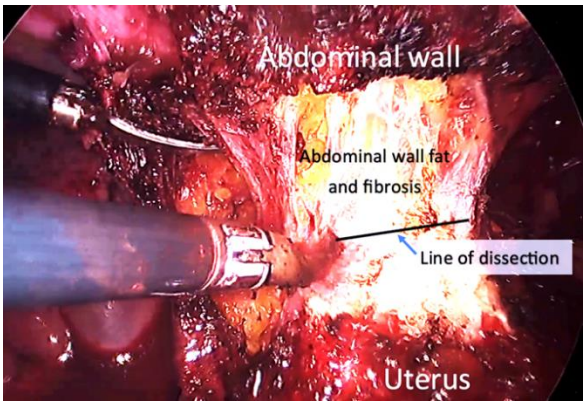


Fig. 2b: Dissection of the uterus adherend to the anterior abdominal wall. Dissection is carried out on the line between the fat and the uterine wall

This dissection evolved concomitantly with the separation of the adnexa and the opening of the broad ligament. The bladder was partially filled with normal saline to optimize its recognition during dissection. Hysterectomy was performed using a lateral approach opening the left paravesical space (Figure 3), that allowed to enter the vesicovaginal space from the left and to dissect into this space. At that point, the left uterine artery was easily coagulated and cut and as the adhesions were situated only in the anterior aspect of the pelvis, there was no need to first isolate the ureter to secure it.

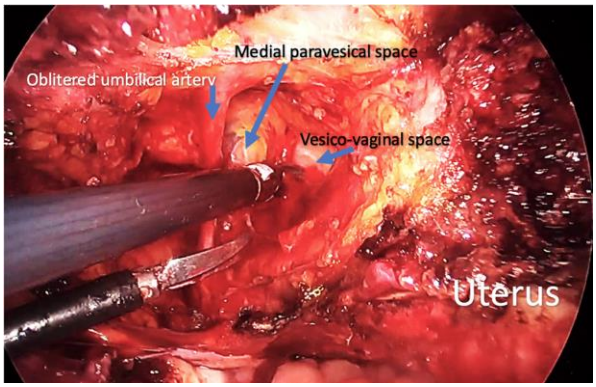


Fig. 3: Dissection of the bladder. Obliterated umbilical artery, left medial paravesical space and vesicovaginal space are shown.

The bladder was further dissected away using the vesicovaginal space and evolving up to the right side. The procedure on the right side was uneventful as the bladder was already dissected. A colpotomy was made using monopolar energy with a L-shaped hook. All along the procedure, the manipulation of the uterus was done by a 5 mm myoma screw from the abdomen placed alternatively close to the uterine horns. At the time of colpotomy, a vaginal cup was used to delineate the vaginal wall. After its detachment, the uterus was removed vaginally. The whole dissection was conducted using a bipolar forceps and scissors. Both tubes were removed. Closure of vagina was done using a Vicryl 1 with continuous suture involving both uterosacral ligaments. The total blood loss was 20 ml and the uterus weighted 327,3 gr.

Risk factors/Mechanism of ventrofixed uterus in patient with history of Cesarian section.

The patterns of adhesions following CS vary widely from none to very dense adhesions with various associated factors (8). The most widely accepted surgery leading to a ventrofixed uterus is a CS even if other pelvic surgeries can be complicated by this condition (9). The risk of post Cesarean

adhesions increases with the number of previous CS as reported in many studies, but ventrofixed uterus has been described even after only one CS indicating the existence of other factors (4, 9, 10). Among surgical factors that influence the development and extent of postoperative adhesions, the one- or two-layer closure of the uterus and closure or no closure of peritoneum have been debated (11). It has been reported that single layer closure of uterine incision was associated with more adhesions to the bladder than double layer closure. Likewise, there has been evidence that non-closure of the peritoneum during CS is associated with more adhesions compared to closure (12). In fact, it is possible that the absence of peritoneal closure on the uterus leaves uterine incisional windows, with the raw area remaining uncovered and facing the peritoneum at the level of the abdominal wound and that is ideal condition to favor adhesion formation (8, 13). Furthermore, an excess bleeding/ooze may lead to enhance adhesion formation and create collections, secondary colonized by pathogens with localized peritonitis and subsequent fibrosis (14). Another origin of this localized peritonitis could be a post Cesarean endometritis that contaminates the pelvic cavity and concentrates on the anterior aspect.

Preparing patients and tailoring the surgery/hysterectomy

Before surgery

When preparing patients for hysterectomy or any other surgery, the surgeon should pay attention on the surgical history including the post-operative events and related late complications. Thus, patients with repeated pelvic surgeries including multiple CS, infectious complication after pelvic surgery, low pelvic pain after prior CS and infertility should be cautiously considered as being at particular risk for ventrofixed uterus (6,9).

Clinically, the cervicofundal sign described by Shesh et al. is very helpful (8). The findings are described by speculum and bimanual examination: the posterior vaginal wall is pulled upward and stretched in its upper half, if the cervix cannot be clearly visualized even after the use of an anterior vaginal wall retractor and/or vulsellum, it is high and almost behind, or close to, the pubic symphysis. Most of the time, the uterus is difficultly palpated due to the highly placed fundus and because its mobility decreases or disappears. A particular attention should be paid in cases of uterine fibroid that may induce confusing because fibroids do limit the mobility of the uterus as well. Furthermore, preferably under anesthesia just before starting surgery, the traction on the cervix or the insertion of a probe into the uterus to mobilize it backward, will dimple in or tuck in the anterior abdominal wall (6).

In practice, when the patient has a previous CS, it is better to foresee that there could be a ventrofixed, uterus adherend to the anterior wall. Ultrasound with filled bladder can help. According to the described altered ultrasound findings by Shesh et al. the cervix is elongated, easy to identify, even a full or overdistended bladder does not appear between the fundus and anterior abdominal wall, and the uterus may tend to show retroflexion with filled bladder because this later pushes the elongated cervix, but the corpus remains immobile (9).

Furthermore, ultrasound can show a fat tissue plan, if it exists, between the inferior limit of the adherend uterus and the superior limit of the bladder. This fat tissue layer can be measured to guide dissection during surgery. One should assess the bladder all along its superior limit even laterally because sometime on the median part the bladder is

sufficiently down, but the lateral aspect can be attached higher. Mobilization of the uterus with the vaginal probe shows a negative sliding sign between the uterus and the anterior abdominal wall.

These evidence points of adhesions can be detected by high-resolution ultrasonography and functional MRI; both can further detect limited movement relative to one or more organs joined into the adhesions (9). However, with high-resolution ultrasonography, MRI is not compulsory, as it is more expensive and not always available in many regions of the world.

During surgery

Beyond the symptoms that can be disturbing for patients like lower chronic abdominal pain, infertility, the ventrofixed uterus may lead to uncertainty for the surgeon tackling the condition during surgery facing a prolonged operating time and the high bladder injury rate (5). It is then helpful to be aware of what can be done to reduce the rate of organs' injury during surgery.

1.Location to introduce the Veress needle and/or the first trocar should appropriate to avoid adhesions, and the uterine fundus located high in the abdomen and to allow better visualization at the starting point of the surgery. Most of the time, but depending on the size of the uterus, the fundus is located at the halfway between the umbilicus and the pubic symphysis (9). The insertion point must then be either preferably higher at 4 to 5 cm supraumbilical or on a left lateral point. However, attention must be paid for the placement of the instrument trocars, because after dissecting the uterus from the anterior abdominal wall, it will drop in the pelvic cavity and if trocars have been placed too high, instruments will struggle to reach the vaginal level especially the needle holders. Sometimes, some trocars must be replaced lower.

2.To better highlight the boundaries of the bladder, some surgeons use the cystosufflation technic (using CO_2 in the bladder) or they moderately fill the bladder either with saline solution or with saline with methylene blue. The methylene blue has the advantage to delineate the bladder and to immediately show injury when it occurs. When the bladder is dissected away, it can be emptied to facilitate further steps of the surgery especially the closure of the vagina.

3.Using retroperitoneal spaces to dissect the uterus from the abdominal wall. For every difficult surgery in the pelvis, retroperitoneal spaces are of paramount usefulness. In the case of uterus adherend to the anterior abdominal wall, the paravesical spaces are often free and can be exploited for dissecting from the lateral aspect to the middle. Most of the time, one paravesical space suffices to make the bladder dissection easy even on the opposite site. At the level where the uterus is tightly adherend to the anterior wall, the surgeon will enter the retroperitoneal space of the abdominal wall. He must remember that fat belongs to the abdominal wall and guide his dissection leaving the fat above. During dissection, it is important to keep in mind the distance between the superior limit of the bladder and the inferior limit of the adherend uterus as described by ultrasound.

4.The lateral approach to dissect the bladder. Most of the time, access to uterine vessels is no longer difficult once the paravesical spaces are dissected. They can easily be coagulated and cut. From that step, in case of adhesions between the bladder and the cesarean scar, the surgeon can develop the lateral approach to dissect the vesicovaginal space, low enough, at a point where the bladder is not adherend to the uterus. There is always a virgin anatomical area with

alveolar tissue belonging to the bladder. This area is the gateway to the virgin vesico cervical fascia over the vaginal fornix. This area can also be delineated by pushing the vaginal fornices by vaginal manipulation (swabs on a forceps). Then from bellow, the dissection of the bladder will be pursued upward and helped by the moderately filled bladder, the fibrosis between the bladder and the uterine wall will be sharply cut.

5.Filling of the bladder at the end of the procedure to check for bladder injury in case of doubt is mandatory because should bladder injury occur, recognition and immediate repair provides a very good prognosis.

Conclusion:

Adhesions during surgery are associated with increased morbidity due to prolonged operating time and organs injuries. Their exact location is almost non predictable but for adhesions secondary to CS, the involvement of the bladder is common and increases the complexity of the procedure. Surgeons should be aware of the risk of the ventrofixed uterus and how to conduct the workup and surgery for hysterectomy in such patients using some tips and tricks developed in this paper. This could help to better counsel the patient and reduce the complication rate.

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Laparoscopic partial bladder resection: a challenging case of bladder endometriosis (Video)

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Abstract

Background: Bladder endometriosis is the presence of endometrial glands and stroma in the detrusor muscle. The base and dome of the bladder are the areas most often impacted. Gynecologists can perform surgical treatment for bladder endometriosis. However, the closer the endometriosis nodule is to the orifice of the ureter, the more difficult the surgery.
Objectives: The aim of this video article is to show whether a ureter can be preserved when the endometriosis nodule lies close to the ureter orifice.
Materials and Method: A case of 29-year-old woman with bladder endometriosis on the base and right bladder wall is presented.
Result: No complications occurred. The urinary symptoms disappeared immediately. The patient was discharged in good health.
Conclusion: This video article shows that a ureter can be preserved even when the endometriosis nodule lies close to the orifice of the ureter, provided there is neither hydronephrosis nor ureter obstruction.

Keywords: Bladder Endometriosis, DIE, Endometriosis, Female Pelvic Anatomy, Hematuria

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Introduction

Bladder endometriosis is the presence of endometrial glands and stroma in the detrusor muscle. The base and dome of the bladder are the most often impacted areas (1). However, in most cases, the bladder mucosa is unaffected (2). The urinary tract is one of the most frequently impacted extragenital organ systems by endometriosis. The prevalence of endometriosis in all women is 0.3-12%, while it is 19-53% in women with DIE (3-5). Gynecologists can perform surgical treatment for bladder endometriosis. However, the closer the endometriosis nodule is to the orifice of the ureter, the more difficult the surgery. Laparoscopic partial cystectomy seems to be an appropriate method for improving urinary symptoms (6-9). This surgical approach requires excellent laparoscopic skills (10). The aim of this video article is to show whether a ureter can be preserved when the endometriosis nodule lies close to the orifice of the ureter.

Patient and Method

A 29-year-old woman attended the endometriosis center because of severe dysuria and hematuria. The vaginal and ultrasound examination revealed deep infiltrating endometriosis of the bladder base and wall on the right side and right pelvis wall. There was neither hydronephrosis nor ureter dilatation. Since the patient had a current fertility desire, hormone therapy was not an option for her. A surgical approach was discussed. The patient was informed about the radicality and potential complications of the procedure. The surgery was performed under general anesthesia. The bladder dome was unsuspicious, unlike most cases of bladder endometriosis. An endometriotic nodule was detected between the right bladder wall and the right pelvic wall. To reach this nodule, an enhanced dissection was required. After the opening of the vesico-vaginal, Yabuki, medial para vesical, and Okabayashi spaces, the nodule could be presented. The endometriotic nodule was completely removed, taking into account the right ureter. The ureter remained safe. The incision was closed with a Vicryl 2-0 thread. After the procedure, the patient had a bladder catheter for 10 days.

Results

No complications occurred. The urinary symptoms disappeared immediately. The patient was discharged in good health.

Discussion

Bladder endometriosis is a rare condition. However, for patients with dysuria and hematuria, it should be considered, especially if a urinary infection is absent (11). Hormone therapy may be suboptimal for bladder endometriosis and associated symptoms. On the other hand, hormone therapy only achieves temporary symptom suppression and does not completely cure the endometriotic nodule. For this reason, nodule excision may be required (10). A complete resection of the endometriotic nodule is associated with excellent long-term results in terms of symptom relief and

recurrence. In these cases, a partial cystectomy is an effective procedure (12). Typically, a ureter reimplantation is recommended if the distance between the nodule and the ureter orifice is less than 2 cm [10]. However, if there is no ureter obstruction or hydronephrosis, one can attempt a ureter-preserving approach. In this video case report, the laparoscopic approach to ureter preservation in cases of unfavorable bladder endometriosis location is demonstrated. In contrast to resection of bladder endometriosis on the dome, in the present case, a wide dissection and good knowledge of female pelvis anatomy are required. It is recommended to avoid a ureter reimplantation in every case, if possible.

Conclusion

This video article shows that a ureter can be preserved even when the endometriotic nodule lies close to the orifice of the ureter, provided there is neither hydronephrosis nor ureter obstruction. However, excellent laparoscopic skills and knowledge of female pelvis anatomy are mandatory.

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Hybrid Approach for Intestinal Obstruction Secondary to Deep Endometriosis: case report

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Abstract:

In this study, our objective is to report the case of intestinal obstruction secondary to endometriosis in a 45-year-old patient, who presented with a clinical history of chronic evolution of abdominal distension, constipation and pelvic pain.

Pelvic magnetic resonance imaging (MRI) reported an extensive lesion in the anterior wall of the rectum measuring approximately 80 mm and located 9 cm from the anal verge, compromising 40 to 50% of the circumference, infiltrating up to the submucosa, compatible with deep endometriosis. Colonoscopy identified a stenosing lesion with an infiltrating appearance in the distal sigmoid, with biopsy reporting absence of endometriosis.

The approach was initially a minilaparotomy to first manage the bowel obstruction and reduce the abdominal volume. Then a laparoscopic approach was performed for segmental intestinal resection and anastomosis. The patient was discharged on the first postoperative day with full surgical recovery, with favorable evolution.

Key words: Intestinal endometriosis; Segmental intestinal resection; Bowel obstruction; Deep endometriosis, Laparoscopy.

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Study Objective: To describe the laparoscopic technique of segmental resection for the repair of intestinal obstruction due to deep endometriosis.

Design: Case report **Setting:** Private Hospital in Curitiba, Brazil

Introduction:

Endometriosis is currently one of the most prevalent and studied diseases in gynecology and is defined as the presence of endometrial glandular or stromal cells outside of the uterine cavity. It affects between 10% and 15% of women of reproductive age. In the deep infiltrating forms of the disease, the endometriosis penetrates below the surface of the peritoneum invading more than 5 mm in depth (1). Intestinal involvement is defined by infiltration of the muscularis and is estimated to occur in approximately 10% of endometriosis cases, of which 90% affect the rectum and/or the sigmoid. Other segments are less frequently affected, such as the appendix in 2.8%, ileum and cecum in 7% of the cases and the jejunum and small intestine in 3% of the cases (2). In severe cases, lumen stenosis caused by mass formation can lead to intestinal obstruction, which only accounts for 0.1% _ 0.7% and hematochezia is rare because lesions rarely invade the mucosa (3). Rectal and sigmoid endometriosis are associated with severe progressive symptoms, such as abdominal and pelvic pain, diarrhea, constipation, rectal bleeding and very rarely, to bowel occlusion (4).

Case Report

A 45-year-old G2/P2 woman with a clinical history of a chronic evolution of abdominal distension, constipation and pelvic pain. Surgical history includes bariatric reduction gastroplasty, cholecystectomy and total hysterectomy due to adenomyosis. On physical examination, she presented with abdominal distension, tympanic abdomen with accelerated intestinal sounds and no palpable masses were found. (Fig.1)

Fig.1: Patient in operating room with significant abdominal distention

Laboratory tests were carried out with a finding of serum cancer antigen (CA) 125 concentration of 68.4 UI/ml, and the rest of the exams within normal parameters. Pelvic MRI showed an absent uterus, right ovary with a 33x36x27 mm and a 16x17x7mm hemorrhagic cysts, left ovary with a 45x39x30 mm hemorrhagic cysts, and a 15x11x11 mm and a 10x5x4 mm endometriomas. Further an extensive lesion in the anterior wall of the rectum about 9 cm from anal verge with 80 mm of intestinal extension, involving 40 to 50% of intestinal circumference, infiltrating up to submucosa compatible with deep endometriosis was described. (Fig.2) At colonoscopy, a stenosing lesion with an infiltrative appearance was identified in the distal sigmoid, with biopsy reporting absence of endometriosis. (Fig.3)

Fig.2: Pelvic magnetic resonance imaging with extensive lesion in the anterior wall

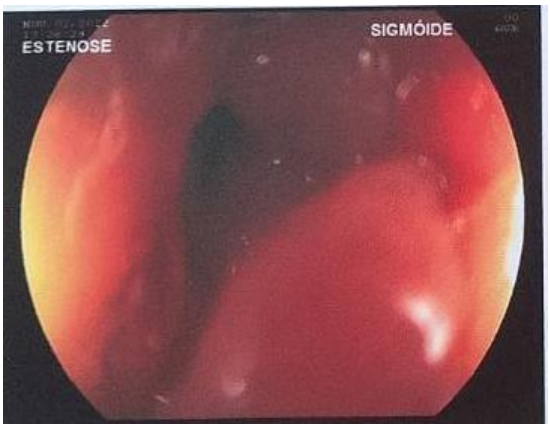

Fig.3: Colonoscopy showing the infiltrative endometriotic lesion in the distal sigmoid

Interventions:

The patient was placed in supine position and the surgery was carried out under general anesthesia. Initially, a minilaparotomy was performed with a 5 cm suprapubic incision, umlaut in planes, the sigmoid loop was identified, making a cut to introduce the 14 Fr fouchet tube (gastric drainage tube). Electrical aspiration was performed to first manage the obstruction and reduce the abdominal volume. Intestinal decompression was performed with significant improvement.

In the second stage, laparoscopy was started, with the patient placed in the lithotomy position with the arms along the body and the lower limbs abducted. Pneumoperitoneum was achieved by a Veress needle placed in the umbilicus and laparoscopic trocars were placed according to the French technique in the following way: one 10 mm trocar in the umbilicus for the zero-degree laparoscope and three 5 mm trocars under direct vision one in the right fossa slightly superior of the line between the spinae iliacae , one in the midline between the umbilicus and symphysis pubis approximately 8 cm below the umbilical trocar, and one in the left fossa slightly superior of the line between the spinae iliacae ,

Gynecological Time:

Step 1: Cavity inspection.

Absent uterus left ovary adhered to intestinal lesion and distended intestinal loops are observed.

Step 2: Identification of endometriotic lesions.

Endometriosis implants are identified in the anterior vaginal fornix, ovarian fossae, rectovaginal septum and rectum. The rectal endometriotic nodule measures approximately 6 cm with significant retraction of the mesocolon and extending to the lateral pelvic wall near the hypogastric nerves.

Step 3: Ureteral Identification.

The ureters were identified bilaterally and dissected with ultrasound energy using an harmonic scalpel along their entire course from the iliac vessels, ovarian fossa, uterosacral ligament, and pararectal spaces, preserving the hypogastric nerves.

Step 4: Resection of endometriotic lesions.

Resection starts from the posterior vaginal fornix, the endometriotic lesion was separated from the retrocervical and rectovaginal area using the reverse Rendezvous technique, leaving the disease adherend to the anterior face of the rectum at this time. Removal of the compromised vaginal stump and suture of the vaginal vault with poliglecaprone n°0 for continuous stitches and polydioxanone n°0 for separated stitches.

Bowel Time:

Step 5: Approach to the pararectal spaces.

Using the ureter as anatomical mark, the medial and lateral pararectal spaces are dissected. As the hypogastric nerve is well identified, the dissection of hypogastric branches follows until its confluence with the branches of the sacral roots. The dissection is performed bilaterally.

Step 6: Rectosigmoidectomy.

The vascular and nerve sparing technique is elected to achieve a proper mesentery dissection, as the rectosigmoid segment is prepared and detached for the resection of the segment compromised by the endometriosis nodule.

A 12 mm suprapubic trocar is placed to introduce a 45 mm linear endostapler for bowel resection, which is achieved with two charges of stapling, developing the rectal stump. (Fig.4)

Step 7: Protected colon exteriorization.

By the suprapubic incision the colon is exteriorized and the lateral wall of the proximal stump is opened for the placement of the 33 mm circular endostapler for a latero-terminal anastomosis. The segmental resection and the stump closure is carried out using the linear stapler. It was decided to use a latero-terminal anastomosis because the sigmoid diameter was around 10 cm due to the obstruction and three charges of 45mm stapler were necessary to complete the section and to close the sigmoid. The staple line was reinforced with polydioxanone 3-0 seromuscular suture and the suprapubic incision is closed. The stump with the anvil is pushed back into the abdomen.

Step 8: Latero-terminal colorectal anastomosis.

The circular stapler is inserted trans anally and its trocar perforates the rectum stump and is attached to the anvil placed in the sigmoid stump, achieving a tension-free latero-terminal anastomosis. A staple line reinforcement is made with 3-0 polydioxanone cross mattress suture at each lateral angle of the anastomosis. At the end, the patency of the anastomosis is tested by insufflating the rectal stump with air, without air leak sign. due to the extreme dilatation of the sigmoid and the high risk of fistulas in this situation a tubulo-laminar drain was placed in the pelvis and exteriorized at the right iliac fossa. However, it is important to emphasize that the team usually does not use drains in colorectal resection for endometriosis. (Fig.5)

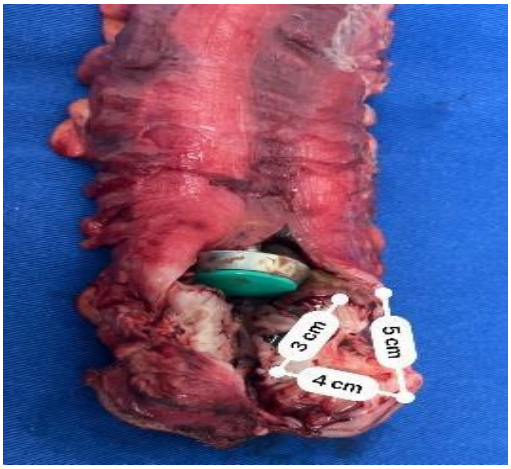

Fig.4: Large intestine bowel resection piece

Fig.5: Tubulo-laminar drainage at the right iliac fossa

Measurements and main results:

The interval between minilaparotomy and the start of laparoscopy was 30 min.

The procedure lasted 180 minutes and the estimated blood loss was 100 ml. During hospitalization she remained with a Foley catheter. The patient followed an exclusively liquid diet for six hours after the procedure. The patient had an uneventful intraoperative and postoperative course and was discharged on the first postoperative day with tubulo-laminar drainage for seven days. She was able to resume work 15 days after surgery. At her 4-week follow-up, she reported resolution of her symptoms. Pathological examination of the specimen revealed a large intestine 18.5 cm long and 10 cm in diameter, with an endometriotic lesion surrounding the colorectal wall (pericolic, perirectal to submucosal), with lesion-free proximal and distal bowel resection margins.

Discussion

Patients with obstructive symptoms from intestinal deep endometriosis should undergo surgical resection. When endometriotic lesions involve the rectum and/or sigmoid colon beyond the internal muscular layer and more than 40% of the circumference the recommendation is segmented intestinal resection (5). It has been described in the literature that the construction of an anastomosis under tension or with poor blood supply increases the risk of anastomosis leakage that can cause postoperative infection and sepsis. However, for terminal- terminal, colo colic anastomosis with functional staples this view has been questioned by scrutiny.

A diverting shield ostomy does not prevent leakage as such, but it should decrease the life-threatening complications of an anastomotic leak (6). When comparing laparoscopic colonic resection with laparotomy in patients with intestinal deep endometriosis, both options lead to similar symptomatic improvement after surgery, but those who underwent laparoscopic treatment had significantly lower rates of surgical complications (7). As of February 2021, there have been 11 reported in PubMed cases of acute colonic obstruction due to endometriosis are described with nine Hartmann's procedure or direct anastomosis with defunctioning stoma were performed, open or laparoscopic (8). Two cases of stent placement in an intestinal colonic obstruction caused by endometriosis, as a bridge to laparoscopy surgery with successful results have been reported (9)

The reported clinical case shows that the chronic evolution of the pathology caused an important increase in the diameter of the small and large intestine in the rectosigmoid region. The patient did not present total intestinal obstruction; however, the abdomen was highly distended.

Unlike most case reports colonic obstruction due to endometriosis resolved Hartmann's

procedure or direct anastomosis with defunctioning stoma, our approach was minimally invasive, with successful results

Conclusion

Minimally invasive approach to intestinal obstruction due to intestinal deep endometriosis is feasible if the dilated colon can be decompressed before entering the abdominal cavity.

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Leiomyoma of Space of Retzius - A Challenging Laparoscopic Approach: Case Report

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Abstract

Leiomyomas are benign mesenchymal tumours which originate usually from smooth muscle cells, hence can arise at any site where smooth muscle cells exist. In females, most commonly seen in uterus, extra uterine leiomyomas are rare and seldom found in the space of Retzius. The authors report a rare case of a large retropubic leiomyoma in a 45-year-old lady who presented with urinary symptoms and abnormal uterine bleeding. Clinical examination and imaging showed a uterine leiomyoma with a doubtful urethral leiomyoma. It was approached laparoscopically and excision of the mass was performed in toto along with a total laparoscopic hysterectomy. Very few cases have been reported in the literature so far. Histopathology showed a benign leiomyoma similar to the uterine counterpart.

Key words: Giant Leiomyomas, Laparoscopy, Fibroadenoma, Space of Retzius, Myoma

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Introduction:

Uterine leiomyomas are the most common benign neoplasm of the female genital tract. It affects 25% to 30% of women in reproductive age group. However, extra uterine leiomyomas are a rare entity and can arise at nearly any anatomical site and hence these become a diagnostic challenge. Histologically those are benign smooth muscle tumours similar to the uterine counterparts and usually arise at the genitourinary tract like vulva, vagina, urethra, bladder and rarely in the

retroperitoneum. The incidence of leiomyoma among all retro peritoneal tumours is only 1.2% (1) Retroperitoneal leiomyomas are commonly found in the posterior retroperitoneum rather than in the anterior retroperitoneum including the Retzius space (2). The space of Retzius is an anatomical virtual space bounded anteriorly by the pubic bone and posteriorly by the bladder. In the literature only few leiomyomas have been reported at the space of Retzius. A leiomyoma in this location remains asymptomatic until it becomes large enough to cause urinary symptoms and pelvic pain.

Case report:

A 45-year-old female presented to the center with complaints of heavy menstrual bleeding and urinary symptoms including increased frequency and incomplete evacuation of the bladder over the last four months. She was a known case of histopathological proven fibroadenoma of the right breast and a fibroid uterus but lost to follow up. General and systemic examination were within normal limits. On bimanual pelvic examination the uterus was irregularly enlarged and corresponded to a 16 weeks gravid uterus, mobile with free fornices. A mobile mass of size eight by eight (8x 8) cm was felt through the anterior vaginal wall in the retropubic region, and the vaginal mucosa was felt free moving over the mass. MRI pelvis revealed a T2 hypointense lesion measuring 7.5x5.8x6.8cm seen anterior to the vagina beneath the bladder base compressing the vagina. The lesion was seen separate from the anterior wall of cervix, but the anterior wall of the urethra could not be identified separately (Fig 1).

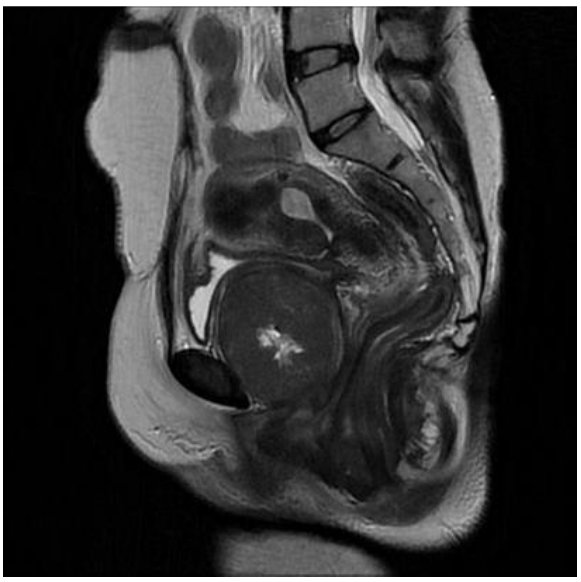

Fig.1: MRI imaging showing leiomyoma anterior to the cervix and anterior vaginal wall

Minimal internal cystic degeneration was seen and the uterus was enlarged with multiple myomas the largest being 3.3cmx2.8cmx2.3cm. Total laparoscopic hysterectomy with excision of the mass and bilateral ureteric stenting was planned. Intraoperatively the above-described mass could not be approached after reflecting the bladder off the uterus and was found to be anterior to the bladder in the retropubic region. Hence it was approached through the space of Retzius and was found to be an encapsulated tumor arising in this area with no connection to the adjacent organs, no feeding vessel was found and the mass was removed in its entirety (Fig 2).

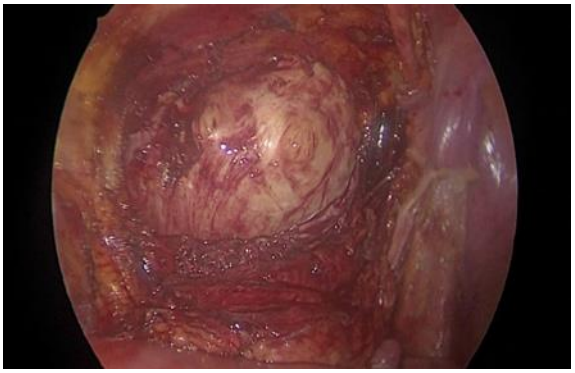

Fig. 2: Intraoperative picture showing large leiomyoma in retro-public space (Space of Retzius)

The removal of the mass was followed by a total laparoscopic hysterectomy with bilateral salpingectomy. The specimen was retrieved in a later phase by en-bag morcellation. Post operatively the patient recovered well. Histopathology revealed typical features of benign leiomyoma (Fig 3).

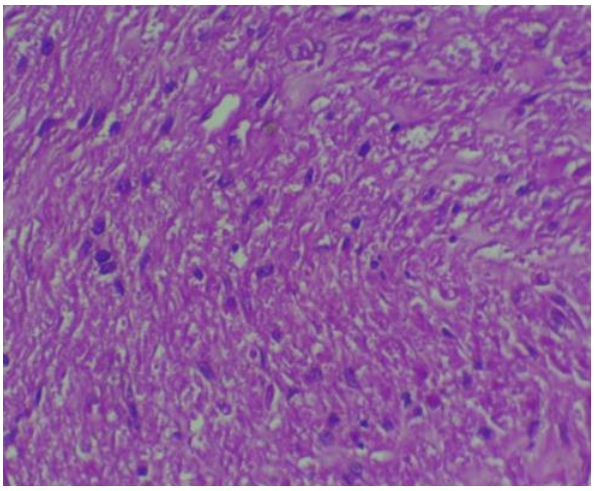

Fig. 3: Histopathology showing leiomyoma cellular pattern similar to uterine leiomyoma

Discussion:

Extra uterine leiomyomas are a rare entity with complex pathogenesis and the diagnosis and management of which can be challenging. Even though leiomyomas are classically described to be arising from uterine smooth muscle, they can arise as a result of clonal proliferation of such cells at any anatomical sites. In addition, unusual growth patterns are seen, benign metastasizing leiomyoma, intravenous leiomyomatosis, disseminated peritoneal leiomyomatosis, parasitic leiomyoma and retro peritoneal growth. Only 15 % to 20% of all retroperitoneal tumours are benign, fewer than half are sarcomas and the remaining are primary lymphomas or other malignancies. Leiomyomas of retroperitoneum accounts to only for 1.2% of detected leiomyomas 73% occur in the pelvis minor and less than 1% in the broad ligament (1). The space of Retzius is a part of the extra peritoneal space located between the transversalis facia of the abdominal wall and the parietal peritoneum, bounded by the pubic bone anteriorly and the urinary bladder posteriorly. The floor of this space is delineated by the pubo vesical ligament and Santorini's retropubic venous plexus. It is also referred to as retropubic, antero vesical space, cave of Retzius: the Retzius space. It is also a surgical landmark for gynaecological surgeries like sling operations for urinary incontinence, Burch colposuspension and non gynaecological surgeries like hernia repair. True tumours in the Retzius space are seldom found. Only 10 cases of leiomyoma have been reported in females in the literature (3-6). Of which one was tackled laparoscopically (7) and one was a robotic assisted laparoscopic excision (8). Other rare tumours which arise in space of Retzius are cellular angiofibroma, cystic lymphangioma, spindle cell tumor and non-neoplastic conditions like abscess and hematomas.

Although the most important differential diagnosis of leiomyoma in retroperitoneal space is leiomyosarcoma, no case has been reported yet in the space of Retzius. Table 1 lists the reported leiomyoma in literature.

Authors	Sex	Age	Chief complaint	Tumours Size/Weight
Reisenaur et al.	Female	54	Voiding difficulty	5cm mass
Shutterecker et al.	Female	56	Voiding difficulty	4cm
	Female	55		2cm
Gradanos et al	Female	34	Mass per abdomen	17x13x7cm
Pepe et al.	Female	49	Voiding symptoms	10cm
Niwa et al	Female	54	Microscopic hematuria	9.4x5.3x7.4cm
SikoraSzczęśniak et al.	Female	50	Heavy menstrual bleeding	14x 10cm
Shweta et al.	Female	22	Infertility and voiding symptoms	7x5.8x6cm
Rojas-Luengas et al.	Female	36		556 grams
Bellelis et al.	Female	39	Voiding difficulty	3x3.6x3.1cm

(Tab 1). Listing the complaints and tumor size/weight in literature.

Various theories have been postulated by different researchers on the etiology of leiomyomas arising in retroperitoneal space. Kho et al. suggested a iatrogenic etiology as they observed 83% of them with leiomyomas both extra peritoneally and intra peritoneally had a history of abdominal surgeries and 67% of them had undergone laparoscopic myomectomies with morcellation (9). Other authors stated that extraperitoneal leiomyomas arise from the remnants of Mullerian or Wolffian ducts or from the smooth muscles of vascular walls (10). In 40% of cases, leiomyomas co-exist with uterine myomas or can be related to past hysterectomies (2).

A clinical challenge will be to precisely locate the tumor in the retroperitoneal space and to differentiate it from malignant neoplasms. Even though 100% accuracy is deniable, MRI / CT Pelvis can locate and rule out malignancy to a great extent. Preoperative transdermal biopsy and histopathology can help in obtaining accurate diagnosis; however, it could expose the patients to malignant cells if not benign. In the presented case, the pre operative diagnosis was doubtful of vaginal leiomyoma or urethral leiomyoma as the location was thought to be between the vagina and the urethra, and it was coexistent with uterine leiomyomas. Even though an MRI was taken pre operatively, the origin could not be precisely made out. Since it was co existent with uterine myomas and imaging showed no suspicion of malignancy, a laparoscopy was decided on. A leiomyoma from the retropubic space was removed in toto as it had no attachment eighter to the uterus nor to the bladder followed by a hysterectomy with bilateral salpingectomy. Histopathological examination revealed a benign leiomyoma from the space of Retzius and enlarged uterus with leiomyomas.

Conclusion:

In case of patients presenting with urinary symptoms, differential diagnosis including tumours in the extraperitoneal space should also be considered including in the space of Retzius. Especially when the patient is

presenting with uterine leiomyomas. Imagining diagnostics including MRI helps in locating and ruling out features of malignancy and to have a structured surgical plan. A leiomyoma in the space of Retzius has to be surgically removed completely and with good knowledge of the anatomy, this can be safely done laparoscopically.

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Asymptomatic Auto Amputation of Ovarian Endometrioma: a rare case report

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Abstract

Asymptomatic auto amputation of the ovary is an extremely rare event that may be due to torsion or inflammation and usually is diagnosed incidentally. A unique case of a freely detached auto amputated left ovary is reported. A 27-year-old female with primary infertility with endometrioma was recovered for Laparoscopic cystectomy. A freely detached auto-amputated left ovary was encountered. During surgery, the findings were that the left ovary was seen lying on the dome of the bladder and partially retroperitoneal in the space of Retzius. The left ovary was not identified in its normal anatomical position in relation to the infundibulo pelvic ligament and utero-ovarian ligament.

Key words: Auto amputation, Endometrioma, Cystectomy, Ovary, Torsion

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Introduction:

Auto amputation of the ovary is very rare. The main pathological event of auto amputation is torsion of a normal ovary or an ovarian cyst followed by infarction of the ligament and necrosis or less commonly infection (1–5). While most of the cases of ovarian torsion present with acute abdomen, it may be asymptomatic or delayed in diagnosis till infarction occurs with chronic torsion and later amputation. It may be diagnosed incidentally during a surgery as in our case or during an ultrasound examination (6–8).

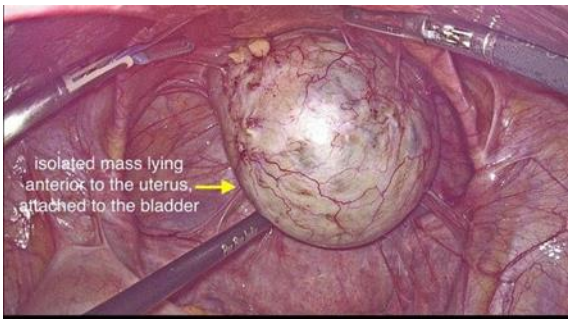
The uniqueness of the present case is that there is no reported incidence in the

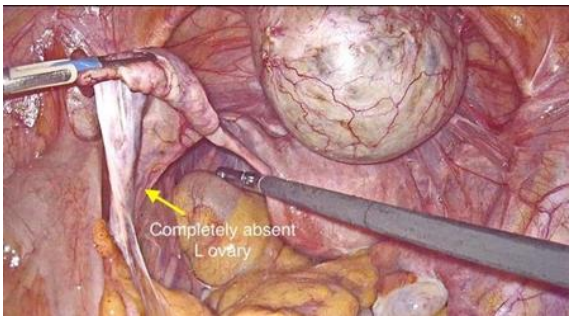
literature of an auto-amputation of an endometrioma.

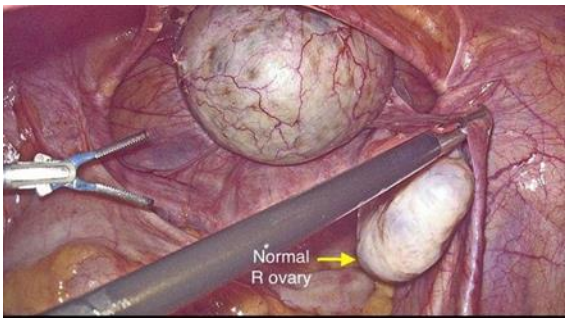
Case Report:

A 27-year-old nulligravida presented at the clinic with inability to conceive for two years. Her menstrual cycle was regular with 5-6 days flow but she had dysmenorrhea. Her past medical history was not significant. On pelvic examination, the uterus was normal in size. There was no tenderness in either adnexal region. Workup for primary infertility was done. Her AMH was 3.94. All blood and hormonal investigations were within normal limits. An ultrasonographic examination suggested the presence of 7.0

× 5.6× 6.7 cm size echogenic, large cystic mass in the left adnexal region suggestive of ovarian endometrioma. Cancer antigen (CA) 125 was performed; 33.5U/mL. An MRI scan was carried out and demonstrated a well-defined thick-walled hemorrhagic left ovarian cyst measuring approximately 4.6 × 6.7 × 5.9 cm anterior to uterus. The decision was taken to perform a hystero laparoscopy for infertility evaluation and cystectomy of the left ovarian endometrioma. At Laparoscopy, a huge, smooth, globular mass of approximately 7-8 cm in size situated anterior to uterus in region of bladder and partially retroperitoneal in the space of Retzius was noticed. There was no ligamentous or direct connection with the pelvic organs, including the uterus and adnexae, and there was no apparent blood supply to the tumor by the utero-ovarian nor the infundibulo pelvic ligament. The mass did not appear necrotic as blood supply was probably taken up from surrounding structures. On further examination, it was noticed that the left ovary was not found in its normal anatomic position i.e. in relation to infundibulo pelvic ligament and utero-ovarian ligament. The uterus and the right adnexa appeared normal. The Retzius space was opened and the mass dissected out of the extraperitoneal space and from the dome of the urinary bladder by blunt and sharp dissection. The mass was removed totally intact without any spillage. It was then put in an endobag, decompressed without any peritoneal spillage. It did contain a chocolate-colored fluid material suggesting of endometrioma. The mass was retrieved in the endobag and the specimen send for histopathological examination. Histopathological features are consistent with endometriotic cyst.







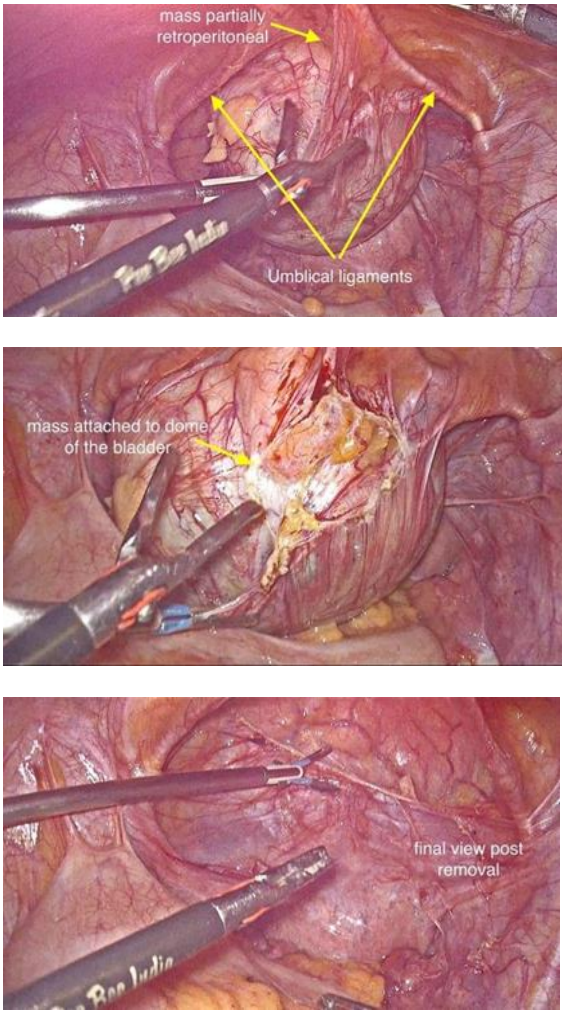


Fig.1 Laparoscopic situs

Discussion:

Endometriosis is a relatively common gynaecological condition affecting 6-10% of women in the reproductive age group (9,10). It is the presence of endometrium-like tissue, outside the uterine cavity and is usually characterized by chronic pelvic pain and infertility. Risk factors for endometriosis include nulliparity, previous pelvic surgeries, imperforated hymen, cervical stenosis and gynaetresia (11). Several theories have been proposed to explain the pathogenesis of the condition with the most popular theory being the retrograde menstruation. Others are the theory of coelomic metaplasia, the immunologic theory, the Müllerianosis and transplantation theory. Another form of endometriosis is as a pelvic mass with the formation of an endometrioma (11). Endometriomas, commonly referred to as "chocolate cysts" are a common form of endometriosis seen in about 17–44% of endometriosis and refers to cysts of the ovaries associated with ectopic endometrial tissue and containing degraded hemorrhagic content hence the appearance of a chocolate-colored effluent when ruptured (10, 11). It is thought that endometriomas form from deposition of endometrial cells with subsequent invagination of the underlying ovarian cortex. Although the majority of chocolate cysts arise from the ovaries, a significant proportion have been found in other sites including the peritoneum overlying the anterior and posterior cul de sac, within the broad ligament and inguinal canal as well as uterine serosa (12, 13). In addition, these cysts can be bilateral and are usually small to medium in size. However, a few have been reported to grow to very large sizes (14). This case report presents an atypical presentation of chocolate cyst. Firstly, the classical clinical symptoms associated with endometriosis were not present in this patient notably cyclical abdominopelvic pain associated with menstruation. Secondly, the left ovary was auto amputated and was attached to dome of bladder and peritoneum of lower anterior abdominal wall, partially extending into the retropubic space of Retzius. It had probably taken blood supply from surrounding structures as it did not look necrotic.

Interestingly, the ultrasound report was suggestive of ovarian fibroma or endometrioma of left side. The first hypothesis is abnormal embryological migration of the left ovary to the ventral wall along the allantois. However, in the case presented the development of the ovary was normal. A second hypothesis was therefore

preferred. The etiopathogenic theory to explain adnexal auto-amputation is the mechanical hypothesis, in which an acute or chronic torsion, disrupting the blood flow, leads to ischemia, then necrosis, followed by auto amputation. This remaining mass is either absorbed or evolves towards an auto-amputated ovary which may adhere to surrounding structures or remains as free-floating peritoneal Mass (15-19). Adnexal torsions are in most cases due to the presence of adnexal masses, ovarian cyst or teratoma, or malformations of tubal or ovarian ligaments with over laxity of adnexae (18,19-21).

Adnexal auto-amputation is mostly reported in neonates, but also during Intrauterine life, secondary to abnormal imaging findings on routine ultrasound examination Showing pelvic mass (15,17,19). In teenagers or adults, this phenomenon is more rarely reported but it may also be under-diagnosed as most patients are asymptomatic (15,18). Furthermore, when symptoms do occur, they are non-specific, and mostly consist of chronic pelvic pain with or without palpable mass at physical examination (15,16,18). Previous history of acute lateralized pelvic pain may contribute to the diagnosis of adnexal auto amputation, as was the case in the patient reported herein who presented undocumented lower back pain initially thought to be renal colic. In some women who do not report any history of pain, an undiagnosed fetal or neonate torsion is possible, because it most likely occurs during these periods (17,18,19). Laparoscopic findings classically describe a pelvic mass, either free floating in peritoneal cavity, either engulfed by the omentum or adherent to surrounding pelvic structures, as in the present case (15,16,19).

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