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# SUCCESSFUL PREGNANCY FOLLOWING HYSTEROSCOPIC METROPLASTY AND DOUBLE EMBRYO TRANSFER IN A WOMAN WITH SEPTATE UTERUS, TUBAL PATHOLOGY, AND RECURRENT PREGNANCY LOSS: A CASE REPORT

Pathology

**Dr. Jyoti Pandey**
**Dr. Mahak Jain**
**Dr. Neha Rani**

## ABSTRACT

**Background:** Congenital uterine anomalies, tubal pathology, and metabolic disorders are significant contributors to infertility and recurrent pregnancy loss. Septate uterus, the most common Müllerian anomaly, is strongly associated with early pregnancy loss and implantation failure due to impaired endometrial receptivity. Hydrosalpinx further reduces fertility potential, particularly in in vitro fertilization (IVF) cycles, by negatively affecting the uterine environment. Surgical correction of these abnormalities prior to assisted reproductive techniques has been shown to improve reproductive outcomes. **Case Report:** A 37-year-old woman presented with secondary infertility and a history of two spontaneous first-trimester pregnancy losses. The patient had multiple infertility factors, including septate uterus, unilateral hydrosalpinx, diminished ovarian reserve, hypothyroidism, and type 2 diabetes mellitus, while the male partner had teratozoospermia. Initial imaging suggested a bicornuate uterus; however, diagnostic hysteroscopy confirmed a complete septate uterus, and laparoscopy revealed a left-sided hydrosalpinx with impaired tubal function. Laparoscopic tubal delinking and hysteroscopic metroplasty were performed. The first IVF cycle resulted in a single blastocyst transfer with self eggs resulting in a negative b-Hcg. A relook hysteroscopy identified residual septum, which was subsequently resected to optimize uterine cavity anatomy. A subsequent IVF cycle yielded six blastocysts from donor oocytes. Two high-quality Day-5 blastocysts were transferred, resulting in a clinical pregnancy. The patient is currently 9 weeks pregnant with an ongoing intrauterine gestation. **Conclusion:** This case highlights the importance of comprehensive evaluation and staged correction of uterine and tubal pathologies prior to IVF. Relook hysteroscopy plays a crucial role in ensuring complete restoration of uterine cavity architecture. An individualized, multidisciplinary approach can result in successful pregnancy outcomes even in patients with multiple adverse fertility factors.

## KEYWORDS

Septate uterus; hysteroscopic metroplasty; hydrosalpinx; in vitro fertilization; recurrent pregnancy loss; embryo transfer

## INTRODUCTION

Infertility affects approximately 10–15% of reproductive-age couples worldwide and is often multifactorial in etiology [1]. Congenital uterine anomalies (CUAs), resulting from abnormal Müllerian duct development, are identified in up to 8% of infertile women and up to 13–25% of women with recurrent pregnancy loss [2]. Among these, septate uterus is the most prevalent anomaly and is strongly associated with early miscarriage, preterm birth, malpresentation, and implantation failure [3].

The septate uterus is characterized by a fibrous or fibromuscular septum dividing the uterine cavity, leading to reduced cavity volume, abnormal vascularization, and poor endometrial receptivity [4]. Several studies have demonstrated improved reproductive outcomes following hysteroscopic septum resection, particularly in women with recurrent pregnancy loss and unexplained infertility [5,6].

Tubal pathology remains another significant contributor to infertility. Hydrosalpinx, characterized by a distally blocked, fluid-filled fallopian tube, has been shown to adversely affect endometrial receptivity and significantly reduce implantation and pregnancy rates in IVF cycles [7,8]. Surgical management of hydrosalpinx prior to IVF, either by salpingectomy or proximal tubal occlusion, improves reproductive outcomes [9].

This case report highlights the complex interplay of uterine, tubal, metabolic, ovarian, and male factors contributing to infertility and underscores the importance of comprehensive evaluation, staged surgical correction, and individualized assisted reproductive strategies.

### Case Presentation

A 37-year-old woman presented to our center at Indira IVF, RDC Ghaziabad with complaints of secondary infertility for four years. She had a history of two spontaneous first-trimester pregnancy losses at 8 and 10 weeks of gestation. The first abortion was managed by dilation and evacuation, while the second was managed medically. There was no history of live birth. Her menstrual cycles were regular, and there was no history suggestive of pelvic inflammatory disease or previous pelvic surgery.

### Medical And Endocrine Evaluation

The patient was a known case of hypothyroidism, well controlled on levothyroxine, and type 2 diabetes mellitus since 3 years managed with oral hypoglycemic agents. Ovarian reserve testing revealed diminished ovarian reserve, with low anti-Müllerian hormone levels (AMH-0.54) and suboptimal antral follicle count for age.

### Male Partner Evaluation

Semen analysis of the male partner aged 39 years revealed teratozoospermia with normal sperm concentration and motility. Genetic evaluation was unremarkable.

### Imaging And Diagnostic Workup

Hysterosalpingography (HSG): Left cornual block.

Transvaginal Sonography (TVS): Bicornuate uterus with low ovarian reserve.

However, due to diagnostic uncertainty and the patient's history of recurrent pregnancy loss, combined diagnostic hysteroscopy and laparoscopy were planned.

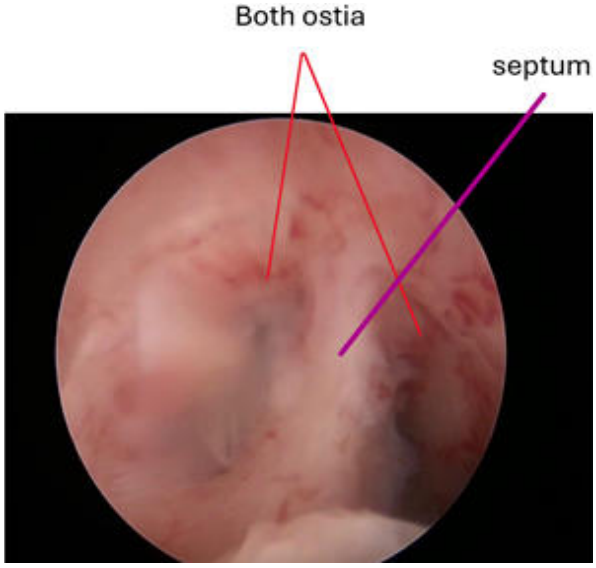
### Laparoscopy Findings

- Left tube: Chromopertubation negative with hydrosalpinx and clubbed fimbriae(Figure 1)
- Left tubal delinking performed using bipolar cautery
- Right tube: Delayed spill present
- Mild fundal dipping observed

(**Figure 1-**On Laproscopy)

**Hysteroscopy Findings**

- Asymmetrical uterine cavity with a larger right cavity
- A complete septate uterus(Figure 2) seen with presence of a thick uterine septum, extending from the fundus toward the internal os seen
- Right ostia visualized at right side of the cavity and left ostia visualized on the left side.




(**Figure 2-** On Hysteroscopy)

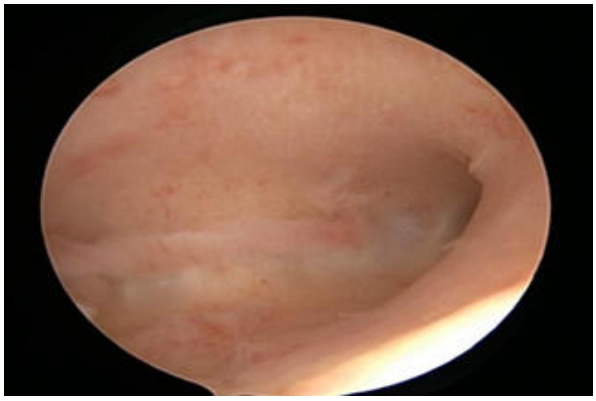
Hysteroscopic metroplasty was carried out using monopolar energy under laparoscopic guidance until a single unified uterine cavity was achieved.

Relook hysteroscopy was advised

**Assisted Reproductive Treatment And Follow-Up**

Following surgical correction, the patient underwent controlled ovarian stimulation and first ovum pickup, yielding a single embryo (Day 5, Grade 5AB). A single embryo transfer was performed; however, pregnancy was not achieved.

Given the previous surgical intervention and failed implantation, a relook hysteroscopy was performed prior to further embryo transfer. This revealed a residual uterine septum, which was subsequently resected to optimize the uterine cavity (figure 3).



(**Figure 3-** uterine cavity after residual septum removal after relook hysteroscopy)

Considering the patient's age and diminished ovarian reserve, a donor-oocyte IVF cycle was planned. The cycle yielded six good-quality blastocysts. Two high-quality Day-5 blastocysts were transferred under ultrasound guidance.

The patient achieved a clinical pregnancy and is currently 9 weeks pregnant, with ongoing antenatal follow-up.

**DISCUSSION**

Infertility is frequently multifactorial, and successful outcomes depend on systematic identification and correction of all contributing factors. The present case represents a complex interplay of uterine anomaly, tubal pathology, endocrine dysfunction, diminished ovarian reserve, and male factor infertility, culminating in recurrent pregnancy loss and implantation failure. A structured, staged approach ultimately resulted in an ongoing pregnancy.

**Uterine Septum And Reproductive Outcome**

Septate uterus is the most common Müllerian anomaly and is strongly associated with adverse reproductive outcomes, particularly recurrent first-trimester miscarriage and implantation failure [1–3]. The septum is composed of fibrous tissue with poor vascularization and abnormal endometrial receptivity, leading to defective placentation and early pregnancy loss [4].

Multiple studies have demonstrated that hysteroscopic metroplasty significantly improves live birth rates and reduces miscarriage rates in women with septate uterus [3,5]. Grimbizis et al. reported a reduction in miscarriage rates from nearly 60% to less than 15% following septal resection [3]. In IVF populations, untreated septate uterus has been associated with lower implantation and pregnancy rates compared to surgically corrected cavities [6].

In the present case, initial imaging suggested a bicornuate uterus; however, hysteroscopy revealed a septate uterus, highlighting the limitations of imaging alone. Hysteroscopy remains the gold standard for diagnosis and treatment, as misclassification of uterine anomalies is common with HSG and two-dimensional ultrasound [7].

**Role Of Relook Hysteroscopy**

Relook hysteroscopy has gained increasing importance in infertility management, particularly following metroplasty and repeated implantation failure. Residual septum, intrauterine adhesions, or suboptimal cavity configuration may persist despite initial surgery [8]. Di Spiezio Sardo et al. demonstrated that second-look hysteroscopy identifies residual pathology in up to 30% of patients after hysteroscopic metroplasty, with subsequent intervention improving reproductive outcomes [9]. In this case, residual septum just above the internal os was identified during relook hysteroscopy and corrected, likely contributing to improved implantation during the subsequent embryo transfer.

**Tubal Factor Infertility and Hydrosalpinx**

Hydrosalpinx is a well-established negative predictor of IVF success. The presence of hydrosalpinx reduces implantation, pregnancy, and live birth rates by nearly 50% [10]. Proposed mechanisms include embryotoxic fluid reflux into the uterine cavity, mechanical washout of embryos, and inflammatory alteration of endometrial receptivity [11].

Randomized controlled trials and meta-analyses have consistently demonstrated improved IVF outcomes following salpingectomy or proximal tubal occlusion in women with hydrosalpinx [12,13]. The Cochrane review by Johnson et al. concluded that surgical management of hydrosalpinx prior to IVF significantly improves clinical pregnancy and live birth rates [13].

In the present case, laparoscopic evaluation revealed a unilateral hydrosalpinx with clubbed fimbriae and negative chromopertubation. Tubal delinking was performed, eliminating the detrimental uterine environment and optimizing conditions for embryo implantation.

**Endocrine And Metabolic Factors**

Hypothyroidism and diabetes mellitus are independent risk factors for infertility, early pregnancy loss, and adverse IVF outcomes if inadequately controlled [14,15]. Thyroid hormones play a crucial role in endometrial receptivity, trophoblast invasion, and placental development [14].

Similarly, insulin resistance and hyperglycemia negatively affect oocyte quality, embryo development, and implantation [16]. In this case, both conditions were diagnosed early and managed with levothyroxine and metformin, respectively, likely minimizing their adverse reproductive impact.

**Advanced Maternal Age and Diminished Ovarian Reserve**

Advanced maternal age and diminished ovarian reserve are associated with reduced oocyte yield, lower embryo quality, and increased aneuploidy rates [17]. Despite these challenges, blastocyst culture and

careful embryo selection can still yield favorable outcomes.

### Male Factor: Teratozoospermia

Teratozoospermia is associated with reduced fertilization rates and impaired embryo development [19]. The use of hyaluronic acid sperm selection has been shown to improve selection of mature sperm with intact DNA, potentially improving embryo quality and implantation [20]. Although male factor was present, adequate fertilization and blastocyst development were achieved.

### Embryo Transfer Strategy

The decision to perform a double blastocyst transfer was individualized, considering advanced maternal age, prior implantation failure, and improved uterine environment after surgical correction. While elective single embryo transfer is preferred to reduce multiple pregnancy risk, double embryo transfer may be justified in selected poor-prognosis patients [21].

The successful outcome following transfer of two high-quality Day-5 blastocysts (4AA and 3AB) emphasizes the cumulative benefit of optimal embryo selection and uterine preparedness.

## CONCLUSION

This case illustrates that even in the presence of multiple infertility factors—septate uterus, hydrosalpinx, endocrine disorders, diminished ovarian reserve, and male factor infertility— successful pregnancy can be achieved through meticulous evaluation, staged surgical correction, and individualized IVF strategy. Relook hysteroscopy and management of hydrosalpinx play a pivotal role in optimizing uterine receptivity and improving implantation outcomes.

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