

# Successful pregnancy with laparoscopic oocyte retrieval and in-vitro fertilisation in mullerian agenesis

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## ABSTRACT

**A 28-year-old woman with mullerian agenesis presented with primary infertility and was considered for laparoscopic oocyte retrieval and in-vitro fertilisation. Her 27-year-old younger sister served as a gestational carrier. The patient underwent ovarian stimulation and 11 mature oocytes were retrieved by laparoscopy. After successful in-vitro fertilisation, two embryos were transferred to the gestational carrier. Two weeks after embryo transfer, the pregnancy was confirmed by serum human chorionic gonadotropin levels. Another two weeks later, an ongoing singleton pregnancy with foetal heartbeat was confirmed by transvaginal ultrasonography.**

**Keywords:** gestational carrier, in-vitro fertilisation, laparoscopic oocyte retrieval, mullerian agenesis, pregnancy

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## INTRODUCTION

Mullerian agenesis or vaginal aplasia is a syndrome where there is absence of mullerian structures, including the fallopian tubes, the uterus, and the internal portion of the vagina. This condition was first characterised by Mayer<sup>(1)</sup>, Rokitansky<sup>(2)</sup>, Kuester<sup>(3)</sup>, and Hauser and Schreiner<sup>(4)</sup>, hence this condition is also known as the Mayer-Rokitansky-Kuster-Hauser syndrome. The diagnosis is often made by laparoscopy or imaging in women who present with primary amenorrhoea with normal hormone profiles and chromosomal analysis. The use of three-dimensional ultrasonography (US) or magnetic resonance imaging can provide a non-invasive and more accurate means of diagnosing this condition<sup>(5)</sup>.

## CASE REPORT

A 28-year-old woman, diagnosed to have mullerian agenesis, presented with primary amenorrhea

and infertility, and was considered for *in-vitro* fertilisation (IVF) using a gestational carrier. She exhibited normal secondary sexual characteristics and was confirmed to have a normal karyotype (46XX). On physical examination, no hirsutism and acne was noted, and she found to have an absent vagina. US showed absence of uterus and vagina but normal ovaries. At laparoscopy, the US findings were confirmed. Her husband was 32 years of age, and had normal male factor and semen specimen suitable for IVF. Her sister, 27 years of age had previously carried two pregnancies successfully to term, and wished to be her carrier.

The genetic patient underwent a standard controlled ovarian stimulation, using a long down regulation protocol with decapeptyl and stimulation with recombinant follicle stimulating hormone (FSH). Baseline abdominal US showed ten pre-antral follicles of size 5-10 mm. US was repeated on day 13 (right ovary with six follicles, all >18 mm in diameter; left ovary with eight follicles, all >18 mm in diameter) to exclude the development of the dominant follicle. Serum oestradiol concentrations on day 13 of stimulation were 2,368 pg/ml. Human chorionic gonadotropin (hCG) was then administered (10,000 IU). Oocyte retrieval was scheduled 36 hours later by laparoscopy. Oocytes were aspirated using a specially-designed needle (Cook, Queensland, Australia) under laparoscopic guidance.

The gestational carrier was treated with oral contraceptives to facilitate synchronisation of the cycle. Oral micronised oestradiol was administered according to graduated dosage scheme with 2 mg given on treatment days one to four, 4 mg given on treatment days five to eight, and 6 mg given on treatment days nine to 11. Oral micronised oestradiol was then continued at a dosage of 6 mg daily and progesterone therapy begun on treatment day 16, by which time the genetic patient received hCG.

Oocytes were collected under general anaesthesia. Laparoscopic oocyte retrieval was

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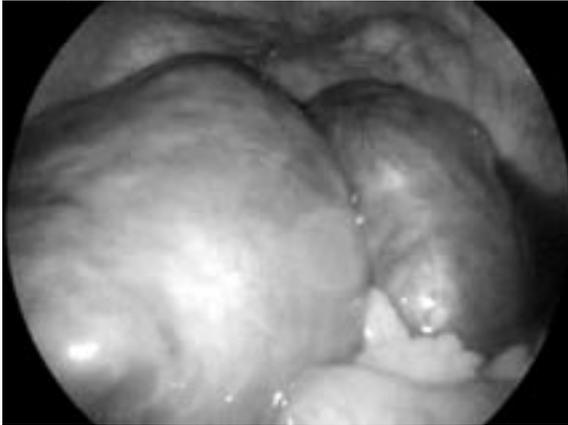
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**Fig. 1** Laparoscopic photograph of the genetic patient shows both ovaries during oocyte retrieval.

preferred to transabdominal US-guided aspiration due to increased abdominal wall thickness and poor visualisation of the ovaries. Carbon dioxide gas was injected into the abdomen for distension and pushing the bowel away. A laparoscope equipped with a three-chip camera was inserted through the 10 mm umbilical port. The ovary was fixed by holding instruments introduced through 5 mm port, and oocyte retrieval was done using 3 mm port instead of the usual 5mm port.

Follicles containing oocytes appear as grey-blue areas of 20-25 mm on the surface of the ovary through the laparoscope (Karl Stroz, Germany) (Fig. 1). All the follicles visible by laparoscopy were punctured by the needle and the contents aspirated. Follicles close together in the ovary were punctured one after another, while retaining the needle tip in the ovary. The follicular aspirate was collected in 10 ml sterile tubes and the contents kept warm (37°C) in a warming block. The procedure was repeated in the second ovary also until all the follicles were aspirated. The follicular aspirates were immediately transferred to the embryology laboratory.

A total of 11 oocytes were recovered under stereomicroscope and subjected to IVF. Fertilisation was confirmed in seven oocytes the next day. G1 media supplemented with 10% human serum albumin (HSA) was used for embryo culture. On day three post-oocyte retrieval, two 8-16 cell, Grade I embryos were transferred to the gestational carrier using a soft tipped catheter (Cook, Queensland, Australia) and the remaining five embryos were cryopreserved by cryoloop vitrification method. Two weeks after embryo transfer, the serum hCG (815 mIU/ml) was tested as positive. US done two weeks later confirmed a single amniotic sac with foetal heart beat.

## DISCUSSION

Mullerian agenesis is the second most common cause of primary amenorrhoea after Turner syndrome. Its incidence is 1:4,000 female births<sup>(6)</sup>. This condition is generally asymptomatic, and patients usually do not seek professional advice until puberty when menstruation does not occur. Identification of this condition in the early reproductive years will help the family to have genetic offspring. Occasionally, patients will report for the evaluation of recurrent pelvic pain usually associated with functioning endometrium within a rudimentary uterine horn. However, the genetic patient in our present case did not have a uterine horn.

Patients with mullerian agenesis present certain technical difficulties for oocyte retrieval. Three methods of oocyte retrieval have been described, each with its own advantages and difficulties. In patients with an already surgically-created artificial vagina, US-guided transvaginal approach may be considered as a first option. However, sometimes because of the absence of elasticity and relaxation of the artificial vagina and high lateral placement of the ovaries, the transvaginal approach may be technically difficult and at times impossible<sup>(7)</sup>.

The next favoured method is the transabdominal transperitoneal US-guided oocyte retrieval, as reported by Damario<sup>(8)</sup>. The only major limitation with this approach is in patients with marked central obesity and poor visibility of ovaries due to overlying loops of bowel. The next method is the laparoscopy-guided oocyte retrieval. This method is considered to be the last option for oocyte retrieval, if the previous two methods of retrieval are technically difficult or unfeasible due to the difficulties already described. The patient here was taken up for the laparoscopic retrieval because she has not opted for a vaginal reconstruction, and her marked obesity made the transabdominal approach technically difficult.

The use of a surrogate gestational carrier for IVF was first reported by Utian et al<sup>(9)</sup>. Currently, surrogacy, where legally and ethically accepted, is a feasible option and has made it possible for the patients devoid of a functional uterus, either congenitally or surgically, to have their own genetic children. In 1996, results from a survey of IVF programme in the United States of America showed no congenital anomalies in the female offsprings from patients with congenital absence of uterus and vagina<sup>(10)</sup>. They concluded that congenital absence of uterus and vagina is not inherited commonly in a dominant fashion.

It is likely a polygenic, multifactorial, or possibly a recessive trait. A similar observation was also found in our case as uterus and vagina are absent in the patient, however no such anomalies were found in her four sisters.

In conclusion, we report a successful pregnancy with laparoscopic oocyte retrieval in a patient with mullerian agenesis associated with poor access to transabdominal US-guided retrieval. This procedure may be useful in a select number of patients with mullerian anomalies.

## REFERENCES

1. Mayer. CAJ. Über Verdoppelung des Uterus und ihren Arten, nebst Bemerkungen über Hasenscharte und Wolfsrachen. *J Chir Auger* 1829; 13:525-64.
2. Rokitansky KF. Über die sogenannten Verdoppelungen des Uterus. *Med Jb Ost Staat* 1838; 26:39-77.
3. Kuester H. Uterus bipartitus solidus rudimentarius cum vagina solida. *Z Geburtshilfe Gynaekol* 1910; 67:692-718.
4. Hauser GA, Schreiner WE. [Mayer-Rokitansky-Kuester syndrome. Rudimentary solid bipartite uterus with solid vagina] *Schweiz Med Wochenschr* 1961; 91:381-4. German
5. Strubbe EH, Willemsen WN, Lemmens JA, et al. Mayer-Rokitansky-Kuster-Hauser syndrome: distinction between two forms based on excretory urographic, sonographic, and laparoscopic findings. *Am J Roentgenol* 1993; 160:331-4.
6. Edmonds DK. Adolescent Gynaecology. *Curr Obstet Gynaecol* 2002; 12:150-4.
7. Wood EG, Batzer FR, Corson SL. Ovarian response to gonadotrophins, optimal method for oocyte retrieval and pregnancy outcome in patients with vaginal agenesis. *Hum Reprod* 1999; 14:1178-81.
8. Damario MA. Transabdominal-transperitoneal ultrasound-guided oocyte retrieval in a patient with mullerian agenesis. *Fertil Steril* 2002; 78:189-91.
9. Utian WH, Sheean L, Goldfarb JM, et al. Successful pregnancy after in vitro fertilization-embryo transfer from an infertile woman to a surrogate. *N Engl J Med* 1985; 313:1351-2.
10. Petrossa JC, Gray MR, Davis AJ, et al. Congenital absence of the uterus and vagina is not commonly transmitted as a dominant genetic trait: outcomes of surrogate pregnancies. *Fertil Steril* 1997; 2:387-9.