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Successful pregnancy outcome following gamete intra-Fallopian transfer in a patient with Müllerian dysgenesis

Colin SS Lee ^{a,*}, Aldrin TM Lie ^b

^a Alpha International Fertility Centre, 31, Level 2, Jalan PJU 5/6, Dataran Sunway, Kota Damansara 47810, Petaling Jaya, Selangor, Malaysia; ^b TMC Fertility Centre, Selangor, Tropicana Medical Centre, No 11, Jalan Teknologi, Taman Sains Selangor 1, PJU 5, Kota Damansara 47810, Petaling Jaya, Selangor Darul Ehsan, Malaysia

* Corresponding author. E-mail address: colinleess@yahoo.com (C SS Lee).



Colin Lee is a gynaecologist with special interests in therapeutic laparoscopy and preimplantation genetic diagnosis (PGD). His contribution to reproductive medicine includes his development of a mathematical formula to determine the appropriate quantum of ovarian drilling for polycystic ovary syndrome patients and also an elaborate technique, protocol and communication system for embryo transfer. In 2004, he introduced a successful PGD programme at the TMC Fertility Centre and in 2007, he introduced microarray comparative genomic hybridization (CGH). He founded the Alpha International Fertility Centre in July 2011 and has since produced many successful pregnancies following microarray CGH, including tests for chromosomal translocation and inversion.

Abstract A 29-year-old lady with Müllerian dysgenesis was keen to have a baby. Clinically, she was medium built with well-developed secondary female sexual characteristics. There was a short and blind vagina. She had undergone surgery for an imperforated hymen. Her FSH and LH concentrations were normal. Laparoscopy revealed a patent right Fallopian tube, a rudimentary right uterus and extensive pelvic endometriosis. She subsequently underwent gamete intra-Fallopian transfer (GIFT). Oocyte retrieval was carried out laparoscopically and a total of nine oocytes were retrieved. Four of the oocytes were transferred together with motile spermatozoa into the right Fallopian tube and the remaining five oocytes were inseminated with spermatozoa for IVF. Three embryos resulted and were frozen. She subsequently developed moderate ovarian hyperstimulation syndrome. Serum β -human chorionic gonadotrophin concentration 14 days after GIFT was 1612 IU/l. Her antenatal care was relatively uneventful until 31 weeks of gestation when she was diagnosed to have intrauterine growth retardation and oligohydramnios. She then underwent an emergency Caesarean section at 32 weeks of pregnancy delivering a normal baby. 

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KEYWORDS: gamete intra-Fallopian transfer (GIFT), Müllerian dysgenesis

Case report

A 29-year-old lady with Müllerian dysgenesis was referred to the study centre from a public hospital for fertility consultation. She was diagnosed at the age of 16 years of age following

complaints of cyclical abdominal pain. A chromosomal analysis showed that she was a 46, XX genotype. A diagnostic laparoscopy performed during that time revealed the presence of a uterus. The right ovary was reported to be located in the abdominal cavity. It was thought there was absence of

a left Fallopian tube and left ovary. An imperforated hymen was found, for which she had undergone surgery, and there was vaginal agenesis. The vaginal dimple was incised and dilated with graduated Hegar dilators in an effort to create a neovagina. The cervix could not be located or seen pervaginally. A subsequent Intravenous pyelography revealed a crossed fused ectopy with the right kidney seen with fusion of midpole to upper pole of the ectopic kidney. The left ureter's insertion into the bladder was at its normal position. A decision was made for a William's vulvovaginoplasty but as the patient was indecisive the surgery was deferred. Instead she subsequently underwent vaginal dilatation. She continued to suffer from cyclical dysmenorrhoea.

On examination the woman was medium built with presence of secondary female sexual characteristics. A pelvic examination showed the presence of a short and blind vagina. Ultrasound showed the presence of a right uterus and a normal size right ovary. Serum FSH and LH were normal. A decision was made to reassess the abdominal cavity and pelvic cavity and the patency of the right Fallopian tube prior to a gamete intra-Fallopian transfer (GIFT) procedure. Thus, another laparoscopy was carried out. She was found to have stage IV pelvic endometriosis with multiple endometriotic cysts on the right ovary. There was a small uterus measuring about 4 cm long located in the right pelvis and connected to the right Fallopian tube and ovary. The right Fallopian tube was slightly dilated. It was deemed patent as there was evidence of retrograde menstruation. Contrary to the previous laparoscopic findings, a normal size left ovary was present but was located above the pelvic brim along the abdominal sidewall. There was also presence of a vestigial left Fallopian tube. The left portion of the uterus could not be identified. Extensive pelvic adhesiolysis and right ovarian cystectomies were performed. Examination under anaesthesia showed a short blind vagina measuring 4 cm long. The rudimentary right uterus was not palpable vaginally.

The woman subsequently had four monthly injections of gonadotrophin-releasing hormone analogue (Leucrin, leuprorelin acetate, 3.75 mg, i.m.; Abbott) for the treatment of remnant endometriosis prior to GIFT. She tolerated the treatment well. Following the gonadotrophin-releasing hormone analogue therapy she underwent GIFT. Down-regulation was achieved with subcutaneous leuprorelin acetate, 0.2 mg daily. Follicular stimulation was achieved with subcutaneous purified FSH (Puregon, Organon) 200 IU daily for 11 days. Oocyte retrieval was performed on day 13 of stimulation. Subcutaneous human chorionic gonadotrophin (Ovidrel, 6500 IU; Serono, Italy) was administered 36 h prior to oocyte retrieval. Oocyte retrieval was carried out laparoscopically and a total of nine oocytes were retrieved. Four of the oocytes were placed about 1.75 cm into the right Fallopian tube and the other five oocytes were used for IVF. Out of the five oocytes that were inseminated, three fertilized and were subsequently frozen.

Luteal-phase support was given with pervaginal progestogen pessaries (Cyclogest, 400 mg 12 hourly; UK). She developed moderate ovarian hyperstimulation syndrome which was treated successfully as an outpatient with intravenous hydration and albumin. Serum β -human chorionic gonadotrophin 14 days after GIFT confirmed that she was pregnant. Ultrasound scanning initially showed a triplet pregnancy.

Serial ultrasound scans subsequently showed only one growing fetus.

Her antenatal care was otherwise uneventful until 31 weeks of gestation when she developed oligohydramnios. She then underwent an emergency classical Caesarean section at 32 weeks of pregnancy, delivering a healthy, normal 1.24 kg baby boy in January 2007. Her post-natal care was uneventful. As at the time of writing, the child is almost 4 years old and appears well in every aspect.

Discussion

Uterine anomalies occur in approximately 3–4% of women (Acien, 1997). Depending on the type and severity, the anomalies can be associated with normal or adverse reproductive outcomes such as infertility, recurrent pregnancy losses and preterm labour (Raga et al., 1997). As the embryological development of the female reproductive tract involves a complex series of events, any alteration of these events can lead to various levels of anomalies. There is currently no universal standardized method to classify all the anomalies, although the classification by the American Society of Reproductive Medicine (American Fertility Society, 1988) is commonly used. Other forms of classification have also been recommended to achieve a more standardized and accurate description of complex anomalies. As the development of the female reproductive tract is closely related to the urinary tract, urinary tract anomalies are a common finding.

Vaginal agenesis is an uncommon condition and is seen in 1 in 5000 females (Evans et al., 1981). It is associated with variable developmental abnormalities of the uterus. Approximately 10% of women with vaginal agenesis may have a functional uterus thus allowing reproductive function with the help of assisted reproductive techniques (ACOG Committee Opinion No. 355, 2006).

Although magnetic resonance imaging is considered as a gold standard to define the extent of the anomaly, this study centre decided that a laparoscopy was indicated as this patient had extensive endometriosis which allowed the study to optimize her pelvic cavity and also assess the size, location of the ovaries and the patency of her Fallopian tubes.

As far as is known, this is the first reported case of a successful pregnancy in a patient with Müllerian dysgenesis where there is no communication between the uterus and the vagina. Although there are other reported successful pregnancies in women with vaginal agenesis, these cases were after vulvovaginoplasty (Hampton et al., 1990 and Nargund and Parsons, 1996).

A GIFT procedure was decided as she had a functional right uterus and right Fallopian tube with normal ovaries, the left of which was located in the abdominal cavity. Regular dosages of gonadotrophins were used as women with Müllerian dysgenesis have been shown to respond similarly with dosages recommended to normal women (Wood et al., 1999). Oocyte retrieval was performed laparoscopically due to the location of the ovaries as well as to facilitate the transfer of the oocytes and the spermatozoa into the functional right Fallopian tube.

Antenatally and post-natally, the patient was monitored closely for possible complications, including ectopic

pregnancy, intrauterine growth retardation, severe premature labour, uterine rupture and haematopyometra. None of these occurred except for intrauterine growth retardation and associated oligohydramnios. Post-natally, the lochia dissolved naturally. In summary, this case illustrates the importance of an accurate diagnosis and the successful conception in a lady with vaginal agenesis but with a functional uterus and endometrium, via GIFT.

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