

Successful outcome following assisted reproduction in a woman with pelvic kidney and polycystic ovarian syndrome

R Nagarajan MD MRCOG R Kazem FRCOG

Consultant in Reproductive Medicine, CARE fertility, Northampton

Introduction

Anatomical variations in the pelvis pose both diagnostic and treatment challenges in assisted reproduction. Although ectopic kidneys are relatively common, there are no cases of assisted reproduction in such patients described in literature. We report a patient with Right Pelvic kidney who underwent successful in-vitro fertilisation treatment.

Case Report

The couple gave a history of primary subfertility of one year. Female partner was 30 years of age with body mass index of 30.4. Cycles were irregular between 30-50 days. She was on thyroxine 75 micrograms daily for subclinical hypothyroidism.

Patient had previous investigations for irregular periods and was incidentally found to have Right pelvic kidney on transvaginal ultrasound at age of 25. Magnetic resonance imaging confirmed no other associated abnormalities Patient remained asymptomatic of any kidney related issues.

Initial investigations for subfertility were done at our Fertility Clinic. It was difficult to view the right ovary on a transvaginal scan due to the position of the pelvic kidney. The left ovary was visualised easily. The right ovary was viewed transabdominally. Antral follicle count was 29 and Anti-Mullerian hormone was 73.7 pmol/l. Both ovaries showed polycystic appearance.

Male semen analysis was normal.

Treatment options were discussed and the couple opted to proceed with ovulation induction with Clomiphene-citrate and intrauterine insemination initially. Patient had Hysterosalpingo -Contrast Sonography to establish tubal patency-however it was difficult to establish tubal patency on the right side due to the position of the right kidney. After discussion of inconclusive results, the couple still decided to go ahead with ovulation induction.

The couple underwent three cycles of Clomiphene citrate and Intrauterine insemination. In all cycles it was difficult to view the right on transvaginal scan. Right ovary was viewed by transabdominal scan. Patient also had additional serum oestrogen and luteinising hormone levels monitored in addition to urinary Luteinising hormone home kit testing.

After three unsuccessful cycles of Clomiphene citrate and Intrauterine insemination, couple decided to move to In-Vitro fertilisation treatment. Couple wanted to have pre-implantation genetic testing (PGTA) on embryos. Stimulation was commenced on short antagonist protocol of treatment. Recombinant Follicle stimulating hormone [Ovaleap 112.5 IU, follitropin alfa, Theramex HQ UK Ltd] was used for controlled ovarian stimulation and GnRH antagonist Cetrotide 0.25 mg daily was commenced from day 6 of stimulation. Recombinant Follicle stimulating hormone was increased to 225 IU on day 9 due to minimal response. On day 11 of stimulation the dose was further increased to 300 IU daily and additional serum oestrogen level monitoring was done partly due to difficulties in view of right ovary due to pelvic kidney. Follicular tracking scans were done both by transvaginal and transabdominal route on every occasion. Patient needed to have dose further increased to 450 IU on day 14 due to lack of ovarian response. On day 16 of stimulation patient was noted to have accelerated response and right ovary was visualised transabdominally with multiple large follicles. Patient had Gn-RH agonist trigger 36 hours prior to oocyte retrieval [Gonadotrophin releasing hormone agonist, Buserelin -1 ml] to reduce the risk of ovarian hyperstimulation. Oestrogen levels on day of trigger was 18,000 pg/ml.

Case report continued

Patient was consented for transabdominal egg collection in addition to routine transvaginal egg collection in anticipation of difficulty in egg retrieval from right ovary. Magnetic resonance imaging results were reviewed to ascertain position of right pelvic kidney and right ureter and its relation to right ovary. Patient had conscious sedation for procedure.

Transvaginal scanning revealed easy access to left ovary, however right ovary was positioned high in pelvis just above right pelvic kidney. Left ovary was accessed easily by transvaginal route and all follicles were emptied. Once left ovarian follicles were emptied, right ovary had moved down slightly in pelvis, and it was possible to have a better view of the right ovary by transvaginal scan. With abdominal pressure by second assistant and transvaginal pressure with probe-right ovary was stabilised. Doppler ultrasound was done to ascertain any aberrant large vessels due to pelvic kidney before vaginal puncture. Right kidney was clearly visualised next to right ovary and all follicles from the right ovary were emptied. We made sure we had clear view of the right kidney throughout the procedure to avoid iatrogenic trauma to kidney. 36 eggs were collected of which 25 fertilised and 18 blastocysts created. Patient had uneventful recovery after procedure with no symptoms of ovarian hyperstimulation. Pre-implantation genetic testing was done as per couple's wish and all embryos were frozen electively. Pre-implantation genetic testing revealed eight euploid embryos.

Patient subsequently had downregulated Frozen embryo transfer cycle with oestrogen and progesterone support and had single euploid embryo transfer which was successful. Early scan revealed viable intrauterine pregnancy of 7 weeks gestation, however patient subsequently had a miscarriage at 9 weeks gestation.

Discussion

Ectopic kidneys occur due to failure of kidneys to ascend during week 6-9 of foetal development.

Despite the rarity, it is imperative to be aware of these anatomical variations during surgery and patient management. Pelvic kidney poses challenges in in-vitro fertilisation treatment for a variety of reasons including tortuosity of ureters, aberrant and highly variable vasculature. Knowledge of these anatomical variations is paramount to avoid iatrogenic complications.

Pelvic kidney can also be associated with other congenital anomalies¹ that may require further attention. There are reported cases associated with vaginal atresia, imperforate hymen, hypoplastic uteri, and rudimentary fallopian tube and ovary. These anomalies can occur as the mesonephric duct (also known as the Wolffian duct) gives rise to the urinary and reproductive organs.

Imaging can play a significant role in identifying the variant anatomy to assist in the management of pelvic disorders. Magnetic resonance imaging can provide valuable information in relation to position of kidney, aberrant vasculature if any, course of ureter and associated abnormalities.

Transvaginal ultrasound has been the standard method of oocyte retrieval with very few cases of complications being reported³. The review of the literature showed that the main complications were haemorrhage (0.08%), pelvic abscess (0.6%) and injuries of the bowel, bladder, and the pelvic vessels occasionally. However-patients with pelvic distortions, previous surgeries, severe endometriosis with pelvic adhesions and congenital anomalies are at high risk of complications during transvaginal oocyte retrieval. Ureteric injuries² is one of the rarest complications, however there are reports of ureteric injury with transvaginal egg collection.

Discussion continued

Doppler study is advised for recognition of the vascular structures positioned in the line between transducer (vaginal wall) and ovary and to reduce the risk of haemorrhagic complications

Follicular tracking can be challenging when clear view of ovaries is obscured by anatomical variation and clinicians should be prepared to do additional serum oestrogen monitoring to reduce risk of ovarian hyperstimulation and low threshold to freeze embryos if any signs or symptoms of ovarian hyperstimulation is encountered.

Most patients with pelvic kidney have uneventful pregnancy-however risk of urinary tract infections, urinary calculi, pressure symptoms are higher in patients with pelvic kidney. Although significant hydronephrosis due to pelvic kidney is very rare-there is at least one such case described in literature. There is no significant increase in pre-eclampsia. There has also been reported cases of labour dystocia and obstruction to descent of foetal head in labour due to pelvic kidney.

Conclusion

1. Awareness of the difficulties encountered with a pelvic kidney in patients undergoing IVF will help in appropriate management. Patients who have difficulty in visualisation of ovaries during follicular tracking will benefit from serum oestrogen monitoring.
2. Low threshold to freeze all embryos in such patients with anatomical variations to reduce risk of ovarian hyperstimulation where follicular tracking can be challenging.
3. MRI might be a valuable tool to give us knowledge of location, relation of ureter to ovaries and variations in blood supply in patients with anatomical variation.
4. Use of Colour Doppler during egg collection and having expertise in trans-abdominal egg retrieval are beneficial.
5. Counselling of patients about rare complications and high index of suspicion and awareness of complications will help in prompt diagnosis and management.

References

1. El Khamlichi A, Allali N, Dafiri R. Forme typique du syndrome de Mayer-Rokitansky-Küster-Hauser et rein ectopique : association rare [Typical form of Mayer-Rokitansky-Küster-Hauser syndrome and ectopic kidney. A rare association]. *Gynecol Obstet Fertil.* 2011 Feb;39(2)
2. Choudhary, R. A., Bhise, N. M., Mehendale, A. V., & Ganla, K. N. (2017). Ureteric Injury During Transvaginal Oocyte Retrieval (TVOR) and Review of Literature. *Journal of human reproductive sciences*, 10(1), 61–64.
3. ESHRE Working Group on Ultrasound in ART et al. "Recommendations for good practice in ultrasound: oocyte pick up[†]." *Human reproduction open* vol. 2019