SHORT COMMUNICATION

CARDIFF, UK

Fluid Within the Endometrial Cavity in an IVF Cycle—A Novel Approach to its Management

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Fluid within the endometrial cavity before embryo transfer in IVF cycles is associated with failure of implantation. The etiology of endometrial fluid is surrounded in controversy but it is associated with hydrosalpinges, polycystic ovarian disease, and subclinical uterine infections. The current treatment consists of postponing embryo transfer. This of course has biological and psychological disadvantages; a decreased implantation rate from frozen embryo transfer, and frustration and disappointment for the couple. Removing the fluid with an embryo transfer catheter immediately before embryo transfer may be a successful method of treatment.

KEY WORDS: Endometrial cavity fluid; implantation; treatment.

INTRODUCTION

Many new developments have occurred in the treatment of infertility but successful intervention of the embryo implantation process still remains a great challenge. It has been noted that when fluid is identified before embryo transfer in the endometrial cavity, this has a negative effect on implantation rates. So strong is this effect that there have been no documented cases in the literature of an ongoing pregnancy in such a scenario. This series represents the first documented successful intervention in the management of excessive endometrial fluid at the time of embryo transfer.

CASE SERIES

Patient 1

A 29-year-old woman presented to the Cardiff Assisted Reproduction Unit with a 5-year history of

primary infertility. This was believed to be of tubal etiology as she had a right partial salpingectomy for an ectopic pregnancy 3 years back. A recent laparoscopy confirmed the tubal etiology by revealing pelvic adhesions and damage to the remaining tube. The patient's partner had a normal semen analysis.

In view of the laparoscopic finding the couple was offered IVF. A transvaginal ultrasound scan was performed immediately before the embryo transfer. After discussion with the patient who did not wish to postpone the embryo transfer, an empty embryo transfer catheter was inserted into the uterine cavity. During the procedure 5 mL of clear fluid was aspirated from the cavity and sent for microscopy, culture, and sensitivity including chlamydia screening. The specimen was subsequently found to be sterile. The uterus was rescanned after the aspiration and no fluid was demonstrated within the cavity. An uneventful embryo transfer was then carried out. The patient subsequently conceived and a recent ultrasound scan confirms a single live intrauterine pregnancy.

Patient 2

A 37-year-old woman with a 6-year history of primary infertility attended our infertility clinic. After initial investigations revealed regular spontaneous ovulation, patent tubes, and a partner with a normal semen analysis and in view of the woman's age, IVF was performed. At the time of oocyte collection, fluid was noted in the endometrial cavity with a transvaginal ultrasound scan. This was discussed with the patient before embryo transfer. Before embryo transfer 5 mL of fluid was aspirated with the aid of a transfer catheter. The patient later conceived with this treatment cycle.

Patient 3

A 28-year-old woman with a 2-year history of secondary infertility attended our clinic. Previously she had a left ectopic gestation after a spontaneous conception. This was treated surgically with a left salpingectomy. In view of the tubal damage IVF was performed. Again at the time of oocyte collection a large collection of fluid was noted in the endometrial cavity, which persisted until the time of embryo transfer. Seven milliliter of fluid was aspirated from the endometrial cavity with the aid of a Rocket catheter. The patient later conceived.

Fig. 1. Transvaginal scan showing a sagittal section of the uterine cavity at the time of oocyte collection. Fluid within the endometrial cavity at the level of the fundus can be easily seen.

Patient 4

A 37-year-old woman attended our clinic with a 3-year history of primary infertility. Initial investigations revealed regular ovulation but this woman's partner had a significant degree of oligoasthenoteratospermia. After counseling about the therapeutic options available the couple wished to pursue intracytoplasmic sperm injection. Because of this fact tubal assessment was not required. From the first transvaginal scan before ovulation induction the patient had a large pool of fluid noted within the endometrial cavity. At the time of embryo transfer 6 mL of clear fluid was again aspirated. The patient later conceived.

Patient 5

A 33-year-old woman presented to our clinic with an 8-year history of primary infertility. Investigations revealed an ovulation secondary to polycystic ovaries and patent tubes. Her partner's semen analysis was

normal. She was first treated with two cycles of intrauterine insemination but due to a poor ovarian response this was abandoned. This was followed by a cycle of IVF. At the time of embryo transfer fluid was noted in the uterine cavity. Five milliliter of clear fluid was aspirated and embryo transfer was performed uneventfully. The patient later conceived.

DISCUSSION

There have been many developments in the understanding of reproductive physiology. This has allowed therapeutic interventions such as ovulation induction and intracytoplasmic sperm injection. Implantation, on the other hand, is still largely an enigma and direct therapeutic interventions are not yet possible. We do not fully understand what allows one embryo to implant and yet another seemingly identical one not to. Potential molecular and biophysical markers of implantation have been identified at the endometrial and embryonic level (1). The presence of fluid

Fig. 2. Transvaginal scan showing a coronal section of the uterine cavity at the time of oocyte collection. Two large pools of fluid can be seen.

within the endometrial cavity has attracted attention recently as an additional potential marker of embryo implantation. There is generally a consensus that when excessive fluid is noted in the uterine cavity embryo implantation will fail. A review of the literature reveals there have not been any documented case of excessive fluid within the uterine cavity at the time of embryo transfer and a resulting pregnancy.

The mechanism of how excessive fluid generates in the cavity and how it interferes with implantation is surrounded in controversy. It has been suggested that the fluid could be generated from a hydrosalpinx discharging into the cavity (2). Although this idea is supported by the fact that hydrosalpinges are associated with a decrease in implantation after IVF, it is by no means the only possible mechanism for fluid formation (3). Subclinical intrauterine infection has been previously implicated as a cause of excessive uterine cavity fluid and there is of course strong evidence that an intrauterine infection has a negative effect on any implanting embryos (4). The microscopic

analysis followed by culturing of the endometrial fluid excluded this as the cause in one of the cases. It has also been suggested that the fluid within the cavity is a result of abnormal endometrial development (5). A number of studies have indicated that abnormal endometrial development and differentiation around the time of implantation is a potential cause of reproductive failure in certain groups of infertile patients (6–8). In an IVF cycle, embryos are replaced into the uterus at the cleavage stage, i.e. 2–4 cells. Following replacement, the embryos proliferate inside the uterine cavity. The process of implantation begins when the embryos have reached the 100–200-cell stage. The presence of excessive fluid inside the cavity could have adverse effects on cell proliferation or interfere with the very early stages of embryo implantation such as “apposition” and “attachment.” The only previous treatment option for fluid in the cavity would be to freeze all embryos and hence allow postponement of embryo transfer until satisfactory endometrial development could be achieved. This small series illustrates

Fig. 3. Transvaginal scan 7 weeks postembryo transfer showing a single viable intrauterine pregnancy CRL = 9.2 mm = 7 weeks 0 days.

that pregnancy can occur in women who had fluid in the uterine cavity at the time of embryo transfer.

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