A case report to influence therapeutic philosophy when presented with the findings on laparoscopy of a unilateral hydrosalpinx with a contralateral diseased but patent fallopian tube without hydrosalpinx

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Summary

Purpose: To determine if a patent fallopian tube associated with hydrosalpinx can be associated with unexplained implantation failure of morphological superior embryos.

Methods: Salpingectomy was performed on a woman with a patent fallopian tube who had failed to conceive despite the previous transfer of 27 superior quality embryos. A single embryo was transferred using minimal stimulation.

Results: Conception and normal delivery occurred.

Conclusions: A patent tube with a hydrosalpinx may be associated with failure of embryos to implant. Salpingectomy can correct this defect.

Key words: Hydrosalpinx; Tubal patency; Embryo implantation; Salpingectomy.

Introduction

There have been numerous reports in the literature regarding the negative effects of a hydrosalpinx on fecundity following in vitro fertilization-embryo transfer (IVF-ET). Most of these reports involved bilateral hydrosalpinges [1-7]. Several studies have demonstrated that salpingectomy for bilateral hydrosalpinges improves pregnancy rates following IVF-ET [8-12] including two prospective studies [13, 14].

There are fewer studies involving a unilateral hydrosalpinx. Kassabji *et al.* [12] found that both unilateral and bilateral hydrosalpinges were associated with diminished fecundity following IVF-ET. Three other studies found that unilateral salpingectomy improves pregnancy rates in women with previous failures following IVF-ET [15-17].

However, not all authors agree that the hydrosalpinx redeuces fecundity [18, 19]. Furthermore some authors support the concept that bilateral hydrosalpinges reduce fecundity but that a unilateral hydrosalpinx does not cause infertility [20].

Frequently surgeons are faced with a unilateral tubal occlusion on one side and a patent but diseased tube on the contralateral side. The dilemma facing the surgeon is whether to remove only the hydrosalpinx and give the woman a chance to conceive naturally from the other side if unlimited IVF cycles is not an option or remove both sides in case the diseased but patent tube can also be responsible for infectious material or toxins interfering with embryo implantation following ET.

The case described herein suggests that even a diseased but patent fallopian tube can inhibit embryo implantation.

Case Report

A 29-year-old woman presented with a two-year history of primary infertility. As part of her evaluation by another infertility center she had undergone laparoscopy which found a non-patent left fallopian tube with a hydrosalpinx and a patent right fallopian tube but with peritubular adhesions and fimbrial phimoses. Left salpingectomy was performed and lysis of adhesions on the right side.

The recommendation by the treating physician was to proceed with in vitro fertilization-embryo transfer (IVF-ET). He explained that the right tube was left in since if IVF-ET failed she would still have a chance to conceive naturally once the hydrosalpinx was removed.

Besides the tubal factor there was a male factor problem with a sperm concentration of 36.4 mill/ml volume 2.3 ml, % motility 16% with 0.8% rapid linear progressive motility, strict morphology only 2% and no antisperm antibody, and hypoosmotic swelling test normal at 60%.

With the previous IVF center she had failed to conceive despite having had 17 embryos of good quality transferred back to her in three cycles of ovarian hyperstimulation and IVF-ET.

She consulted our IVF center and was given the option of a right salpingectomy before proceeding but because her previous laparoscopy performed shortly before her first IVF-ET failed to demonstrate a hydrosalpinx she elected not to have surgery but proceed with more IVF cycles.

Her fourth IVF-ET cycle with intracytoplasmic sperm injection (ICSI) but the first one with our IVF center produced 22 mature oocytes with 21 fertilizing. There were three embryos transferred on day 3 (morula, and a 9- and 8-cell embryo

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without fragmentation) and 17 embryos were cryopreserved (13 at the 2 pronuclear stage). She failed to conceive.

She then had a frozen ET cycle. Despite the transfer of three embryos (9, 9, and 8 cell with ≤ 25% fragmentation), pregnancy did not occur. A second frozen ET cycle of four embryos (8, 7, 5 and 5 cell with ≤ 25% fragmentation) also failed to result in pregnancy.

The woman then agreed to have a right salpingectomy. A hysterosalpingogram now demonstrated a hydrosalpinx but tubal patency. Furthermore, instead of controlled ovarian stimulation, she was given minimal stimulation. She was started on 150 IU recombinant follicle stimulating hormone (FSH) beginning day 10 (her follicle average diameter was 13.3 mm and the serum estradiol (E2) was 60 pg/ml x 4 days). The serum E2 reached a peak of 306 pg/ml with only one follicle seen on ultrasound. One mature egg was extracted and a single 8-cell embryo without fragmentation was transferred. She conceived this cycle and delivered a healthy full term female baby.

It should be noted that in her first fresh ET and two frozen ETs at our center her endometrial thickness prior to the human chorionic gonadotropin (hCG) injection was 10 mm with a triple line echo pattern but was only 7 mm triple line in her cycle of conception.

Discussion

Despite the transfer of 27 superior quality embryos from a morphologic standpoint and excellent endometrial sonographic parameters at mid-cycle, the patient failed to conceive. Yet as soon as the remaining fallopian tube was removed, she conceived despite having had only a single embryo transferred with a peak endometrial thickness of only 7 mm.

It is not clear if some of her IVF cycles were performed without a hydrosalpinx in her right fallopian tube and it only developed at a later time. If so, then this case could suggest that a diseased tube without a hydrosalpinx can be responsible for embryo implantation defects and can be corrected by salpingectomy.

However, it is possible that the hydrosalpinx developed as a consequence of the attempt at lysis of adhesions. However even if this was the true scenario, the case suggests that a hydrosalpinx can prevent embryo implantation even if there is tubal patency.

There is one caveat however; there are data that controlled ovarian hyperstimulation can prevent embryo implantation [21-26]. The outcome of events could be interpreted that the salpingectomy was not responsible for the ensuing pregnancy but that the removal of follicle stimulating drugs and gonadotropin releasing hormone (GnRH) agonists or antagonists was responsible. The two frozen ETs were performed without ovarian hyperstimulation and thus the authors favor the salpingectomy theory [26].

This case should suggest to the treating surgeon to inform the patient that failure to remove a diseased tube that presently is not a hydrosalpinx may require another operation in the future. Thus, the patient armed with this information, and the various pros and cons of attempting to surgically improve the tube vs removal, can help the woman make the decision that best suits her.

References

[1] Strandell A., Waldenstrom U., Nilsson L., Hamberger L.: "Hydrosalpinx reduces in vitro fertilization/embryo transfer pregnancy rate". *Hum. Reprod.*, 1994, *9,* 861.

[2] Blazar A.S., Hogan J.W., Seifer D.B., Frishman G.N., Wheeler C.A., Haning R.V.: "The impact of hydrosalpinx on successful pregnancy in tubal factor infertility treated by in vitro fertilization". *Fertil. Steril.*, 1997, *67,* 517.

[3] Vandromme J., Chasse E., Lejeune B., Van Rysselberge M., Selvigne A., Leroy F.: "Hydrosalpinges in in vitro fertilization: an unfavorable prognostic feature". *Hum. Reprod.*, 1995, *10,* 576.

[4] Andersen A.N., Yue Z., Meng F.J., Petersen K.: "Low implantation rate after in vitro fertilization in patients with hydrosalpinges diagnosed by ultrasonography". *Hum. Reprod.,* 1994, *9,* 1935.

[5] Fleming C., Hull M.G.: "Impaired implantation after in vitro fertilization treatment associated with hydrosalpinx". *Br. J. Obstet. Gynecol.,* 1996, *103*, 268.

[6] Katz E., Akman M.A., Damewood M.D., Garcia J.E.: "Deleterious effect of in vitro fertilization". *Fertil. Steril.,* 1996, *66,* 122.

[7] Camus E., Poncelet C., Goffinet F., Wainer B., Merlet F., Nisand I. *et al.*: "Pregnancy rates after in-vitro fertilization in cases of tubal infertility with and without hydrosalpinx: a meta-analysis of published comparative studies". *Hum. Reprod.,* 1999, *14,* 1243.

[8] Shelton K.E., Butler L., Toner J.P.: "Salpingectomy improves the pregnancy rate in in vitro fertilzation patients with hydrosalpinx". *Hum. Reprod.*, 1996, *11,* 523.

[9] Puttemans P.J., Brosens I.A.: "Salpingectomy improves in vitro fertilization outcome in patients with a hydrosalpinx: Blind victimization of the fallopian tube?". *Hum. Reprod.*, 1996, *11,* 2079.

[10] Aubriot F.X., Chapron C., Morice P., Dubuisson J.B.: "Hydrosalpinx et stérilité: Indications de la salpingectomie". *Contracept. Fertil. Sex,* 1995, *23,* 670.

[11] Andersen A.N., Linhard A., Loft A., Ziebe S., Andersen C.Y.: "The infertile patient with hydrosalpinges: IVF with or without salpingectomy?". *Hum. Reprod.*, 1996, *11,* 2081.

[12] Kassabji M., Sims J.A., Butler L., Muasher S.J.: "Reduced pregnancy outcome in patients with unilateral or bilateral hydrosalpinx after in vitro fertilization". *Eur. J. Obstet. Gynecol. Reprod. Biol.,* 1994, *56,* 129.

[13] Strandell A., Lindhard A., Waldenstrom U., Thorburn J., Janson P.O., Hamberger L.: "Hydrosalpinx and IVF outcome: a prospective, randomized multicentre trial in Scandinavia on salpingectomy prior to IVF". *Hum. Reprod.*, 1999, *14*, 2762.

[14] Dechaud H., Daures J.P., Arnal F., Humeau C., Hedon B.: "Does previous salpingectomy improve implantation and pregnancy rates in patients with severe tubal factor infertility who are undergoing in vitro fertilization? A pilot prospective randomized study". *Fertil. Steril.,* 1998, *69,* 1020.

[15] Pie-Zeigler R., Shelton K.E., Toner J.P.: "Salpingectomy(ies) improves the pregnancy rate after IVF in patients with unilateral or bilateral hydrosalpinx". *J. Assist. Reprod. Genet.,* 1995, *12* (suppl.), 65.

[16] Choe J., Check J.H.: "Salpingectomy for unilateral hydrosalpinx may improve in vivo fecundity". *Gynecol. Obstet. Invest.,* 1999, *48*, 285.

[17] Kiefer D.G., Check J.H.: "Salpingectomy improves outcome in the presence of a unilateral hydrosalpinx in a donor oocyte recipient: A case report". *Clin. Exp. Obstet. Gynecol.*, 2001, *28,* 71.

[18] Ng E.H., Yeung W.S., Ho P.C.: "The presence of hydrosalpinx may not adversely affect the implantation and pregnancy rates in in vitro fertilization treatment". *J. Assist. Reprod. Genet.,* 1997, *14,* 508.

[19] Sharara F.I., Scott R.T. Jr., Marut E.L., Queenan J.T. Jr.: "In-vitro fertilization outcome in women with hydrosalpinx". *Hum. Reprod.,* 1996, *11,* 526.

[20] Wainer R., Martin C., Camus E., Vasseur C., Camier B., Merlet F.: "Does hydrosalpinx reduce the pregnancy rate after in vitro fertilization?". *Fertil. Steril.*, 1997, *68,* 1022.

[21] Paulson R.J., Sauer M.V., Lobo R.A.: "Embryo implantation after human in vitro fertilization importance of endometrial receptivity". *Fertil. Steril.*, 1990, *53,* 870.

[22] Check J.H., O'Shaughnessy A., Lurie D., Fisher C., Adelson H.G.: "Evaluation of the mechanism for higher pregnancy rates in donor oocyte recipients by comparison of fresh with frozen embryo transfer pregnancy rates in a shared oocyte programme". *Hum. Reprod.,* 1995, *10,* 3022.
[23] Simon C., Cano F., Valbuena D., Remohi J., Pellicer A.: "Clinical evidence for a detrimental effect on uterine receptivity of high serum oestradiol concentrations in high and normal responder patients". *Hum. Reprod.*, 1995, *10,* 2432.
[24] Check J.H., Choe J.K., Katsoff D., Summers-Chase D., Wilson C.: "Controlled ovarian hyperstimulation adversely affects implantation following in vitro fertilization-embryo transfer". *J. Assist. Reprod. Genet.*, 1999, *16,* 416.
[25] Check J.H., Choe J.K., Nazari A., Summers-Chase D.: "Ovarian hyperstimulation can reduce uterine receptivity. A case report". *Clin. Exp. Obstet. Gynecol.*, 2000, *27,* 89.
[26] Check J.H., Check M.L.: "A case report demonstrating that follicle maturing drugs may create an adverse uterine environment even when not used for controlled ovarian hyperstimulation". *Clin. Exp. Obstet. Gynecol.,* 2001, *28,* 217.

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