

Oocyte Donation: Pregnancy Results and Obstetric Outcome

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ABSTRACT

Objective: To evaluate the success rate after oocyte donation and the obstetric and neonatal outcome in these pregnancies. **Design:** Prospective study. **Setting:** Babies and US, Infertility, IVF and ICSI Center, Lilavati Hospital, Mumbai. **Study group:** A cohort of 65 women who conceived after oocyte donation. **Main outcome measured:** Obstetric charts of all these women were maintained and the incidence of obstetric complications and the perinatal outcome was studied. **Results:** The most common antenatal complications were first trimester bleeding (31.2%) and pregnancy-induced hypertension (23.4%). The incidence of multiple gestations was 15.6%. No major peripartum events were observed. **Conclusion:** The incidence of obstetric complications is higher in oocyte donation pregnancies. The complications are usually manageable and most patients have a successful pregnancy outcome.

Keywords: Oocyte donation, pregnancy, outcome, bleeding, pregnancy-induced hypertension

Oocyte donation has now become an essential part of therapeutic armamentarium of many infertility clinics. Since the time of its introduction, it has allowed many couples to overcome infertility secondary to factors like advanced age, diminished ovarian reserve, premature ovarian failure, heritable genetic illnesses and surgical menopause. As more and more women delay childbearing these days, the use of donated oocytes and embryos has increased over the years. Though, it is now an established treatment method, the information regarding the obstetric outcome of these pregnancies is still scarce in literature. Because many of the candidates for oocyte donation are beyond the age of 35 years, concerns have been raised regarding the potential for increased medical and obstetric complications in this cohort. Many authors, so far, have reported a high incidence of complications during pregnancy.^{1,2} Advanced maternal age, primiparity and multiple gestations are the various reasons cited for

such increased occurrence of complications. Some authors have also proposed that the allogeneic fetus may predispose the woman to hypertensive disorders, intrauterine growth restriction, placental abnormalities and gestational diabetes mellitus.^{3,4} The present study was a prospective study which analyzed the number of successful pregnancies post oocyte donation and the obstetric and neonatal outcomes in these pregnancies.

MATERIAL AND METHODS

Study Patients

This prospective study was conducted at a tertiary center for infertility and human reproduction. Between years 2004 and 2006, a total of 207 women underwent oocyte donation program. Of these 207 women, successful pregnancies were achieved in 65. Our study group comprised of these 65 women. Various indications for oocyte donation in these women are summarized in Table 1. Obstetric charts were maintained for all these women. Registered obstetric variables included incidence of first trimester abortions, pre-eclampsia, preterm labor and premature rupture of membranes, intrauterine growth restriction (IUGR), placental abnormalities, oligohydramnios and gestational diabetes mellitus. Gestational age at the time of delivery and the mode of delivery were recorded. A record of neonatal weight and Apgar scores was also kept.

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Hormone Therapy

All patients received exogenous estrogen (estradiol valerate) therapy for endometrial preparation before the embryo transfer. However, the protocol used was different in women with functional and non-functional ovaries. Pituitary down regulation with gonadotropin-releasing hormone (GnRH) analog was done in women who were menstruating, before endometrial preparation with estrogen. In nonmenstruating women, cyclical hormonal therapy was given till the following criteria were fulfilled:

- Minimum 3 months of bleeding
- Uterocervical length \geq 5-6 cm
- Endometrial thickness - 8-9 mm.

Micronized progesterone was added on the day of donor's pickup. Day 3 or Day 5 embryo transfer was done. Post-transfer, luteal support was given to all the recipients in the form of estradiol valerate 6 mg/day and micronized progesterone 600 mg/day. β -hCG (human chorionic gonadotropin) was done on Day 14 post-transfer to confirm pregnancy. If pregnancy was confirmed, luteal support was continued till 12 weeks of gestation.

Antenatal Follow-up

Obstetric charts were maintained for all these women. One woman with confirmed ongoing pregnancy was lost to follow-up. Support during the first trimester included 6-8 mg of estradiol which was given orally for 10-12 weeks, natural micronized progesterone 600 mg/day for 14-16 weeks and folic acid 5 mg/day. All women underwent triple marker screening test at 15-16 weeks of gestation. All women underwent regular monthly check-ups and a close check was kept on hemoglobin, urine and blood pressure. Monthly sonographies were done to confirm the fetal well-being.

Table 1. Indication for Oocyte Donation

	Number of women
Primary ovarian failure (ovarian dysgenesis)	14
Secondary ovarian failure	
• Premature ovarian failure/postmenopausal	18
• Surgical castration	12
• Chemotherapy/radiotherapy	0
Repeated previous IVF failures	8
Diminished ovarian reserve	13

RESULTS

The mean age of recipients (who conceived after oocyte donation), at the time of embryo transfer was 38.2 years (range 26-58). Of the 65 women who conceived after oocyte donation, 39 were more than 40 years of age and another 3 were above 50 years. All women were primigravidas. The baseline characteristics of the parturients are summarized in Table 2.

Antenatal Events and Complications

The major antenatal events are summarized in Table 3. First trimester bleeding happened in 20/64 (31.2%) women. Five women had spontaneous abortions in the first trimester and another one carrying twins aborted at 16 weeks with history suggestive of cervical incompetence. All these women were more than 40 years of age.

Ten (15.6%) women had multiple gestations. Of these, 8 women had twin gestation while 2 had triplets. One woman with twins aborted at 16 weeks of gestation. Embryo reduction was performed at 11-12 weeks for the 2 women carrying triplets. There were no complications associated with the procedure.

All women underwent prenatal screening for chromosomal abnormalities with maternal serum triple marker test at 16 weeks. Two women tested screen positive. Amniocentesis was advised to these 2 women for confirming the risk. One woman refused amniocentesis and had a healthy baby. Amniocentesis was performed for the other one and the karyotype was found to be normal. Pregnancy-induced hypertension (PIH) complicated 15 (23.4%) women. All these women were more than 40 years of age. Of these 15 women, 4 women had transient hypertension, 7 women had mild pre-eclampsia which was controlled with drugs; the remaining 4 had severe

Table 2. Baseline Parameters

	Mean
100% Primi	
Age (years)	38.2 (26-58)
Weight	52.0 \pm 7
BMI (kg/m ²)	22.5 \pm 3.6
Parity	
Chronic hypertension	1
Pre-existing diabetes	0

Table 3. Antenatal Events

Antenatal events	No. of women
First trimester bleeding	20 (31.2%)
Abortion	6 (9.3%)
Multiple gestations	10 (15.6%) (8 twins; 2 triplets)
Pregnancy-induced hypertension	15 (23.4%)
Transient hypertension	4
Mild pre-eclampsia	7
Severe pre-eclampsia	4
Chronic hypertension	1
IUGR	8 (12.5%)
Preterm delivery	7 (10.9%)
Gestational diabetes	2 (3.1%)

pre-eclampsia and had to be delivered preterm. All women with severe pre-eclampsia had IUGR. One woman with chronic hypertension had worsening of blood pressure at around 30 weeks and was delivered preterm at 34 weeks in view of the same.

Seven out of 64 (10.9%) women delivered preterm. Of these 7 women, 5 were delivered preterm in view of severe pre-eclampsia. One woman had spontaneous preterm labor at 32 weeks and lower segment cesarean section (LSCS) was done in view of fetal distress. Another woman with twins had to be delivered at 29 weeks due to intrauterine fetal death (IUFD) of one twin.

IUGR was observed in 8 women (12.5%). Of these, 3 women had twins with mild IUGR, another woman delivered at 29 weeks due to IUFD of one twin and the other twin was growth restricted. The other 4 women had PIH and were delivered preterm between 33-35 weeks.

Only 2 women (3.1%) had gestational diabetes which was controlled by diabetic diet and no drugs were required. Fortunately no adverse pregnancy event cropped up in these pregnancies.

Peripartum Events and Neonatal Outcome

All women were delivered by cesarean section in view of precious pregnancies. None but one had atonic postpartum hemorrhage, which was managed conservatively. No life-threatening complications were observed in any of the deliveries.

A total of 67 infants were born (49 single and 18 twins). There was one stillborn: this mother had twin gestation with severe PIH, which led to IUGR and oligohydramnios. One twin died *in utero*. Cesarean section was done at 29 weeks. The other twin had Apgar score <7 at 5 minutes, was admitted in neonatal intensive care unit (NICU) for a period of 1 month. All fetus except one had (as mentioned above) Apgar >7 at 5 minutes. No major congenital malformations were observed except for one newborn that had a cleft lip. The 2 women who tested screen positive for chromosomal abnormalities had healthy babies.

DISCUSSION

As more and more women delay childbearing these days, the use of donated oocytes has increased over the years. Problems with conventional approaches to fertility treatment in older women are as follows:

- Oocytes are of poor quality
- Ovulation is less likely
- Corpus luteum may be deficient
- Endometrial receptivity is decreased
- Blastocyst hatching is reduced
- Increased incidence of an embryonic trophoblast development is seen
- Pregnancy may end in abortion and IUFD.

The answer to these problems is oocyte donation. It is highly successful in women of all ages. The use of donor eggs has proved to be a valuable means to achieve pregnancy in many couples with older wives whose egg quality and/or quantity is diminished. Abdalla et al reported that pregnancy, implantation and miscarriage rates are independent of the age of the uterus.⁵ The mean age of women in the present study was 38.2 years (range 26-58 years).

First trimester bleeding is a common occurrence in oocyte donation pregnancies.^{2,6,7} It has been observed to occur in 35-70% of cases and this high incidence is associated with multiple implantations,⁸ early fetal loss⁹ and endometrial preparation therapy. In the present study, first trimester bleeding occurred in 31.25% women.

The incidence of multiple pregnancies in our study was 15.6%, which is comparatively lower than the incidence cited in other studies.⁹ Our policy of transferring 2 or 3 embryos at a time can explain this low incidence of multiple gestations. Transfer of more embryos increases the risk of multifetal gestations which are associated

with higher obstetric and perinatal complications, especially in older women.

The most conspicuous complication in oocyte recipients is PIH. This is explained by the advanced maternal age, primiparity and the higher incidence of multifetal gestations. In the present study, PIH was seen in 15/65 (23%) women which is similar to incidence cited in other studies.^{1,2,7} The incidence was higher in women with multiple gestations compared to those with singleton pregnancies. In a recent study conducted by Krieg et al, obstetric complications were compared between women who conceived after oocyte donation, with women more than 38 years of age who conceived after *in vitro* fertilization (IVF). They observed that oocyte recipients and autologous oocyte controls had similar rates of complications of prematurity, hypertensive disorders of pregnancy, gestational diabetes and placental abnormalities. Infant birth weights and gestational age at time of delivery were similar between the two groups.¹⁰

PIH has been associated with high rate of premature delivery, IUGR and low birth weight. In our study, the incidence of IUGR was more in women with pregnancy complicated by PIH. All women were delivered by cesarean section because of higher anxiety amongst the mothers and higher level of concern in the medical team. The perinatal outcome was comparable to that after natural/spontaneous conception and most infants did well in their neonatal period with no major complications.

Donor oocyte program has proved to be a boon for many infertile couples and is now one of the essential parts of any infertility clinic. This study suggests that though the rate of obstetric complications is increased in women undergoing oocyte donation, most of these women thrive well in pregnancy and ultimately have a successful neonatal outcome. This

study is; however, limited by the absence of age-matched controls.

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Stages of CKD

- Stage 1: Kidney damage with normal or increased GFR >90.
- Stage 2: Kidney damage with GFR 60-90.
- Stage 3: Kidney damage with GFR 30-60.
- Stage 4: Kidney damage with GFR 15-30.
- Stage 5: Kidney failure, dialysis or GFR <15 (>60, 30-60, < 30: >60 by GP, 30-60 by MD physician and <30 by DM).