

Pregnancy Outcomes of Intracytoplasmic Sperm Injection in the Reproductive Medicine Unit of a Tertiary Care Center

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ABSTRACT

Aims and objectives: To study and quantify the fetomaternal outcomes of intracytoplasmic sperm injection (ICSI) conceptions.

Methodology: Descriptive study of the fetomaternal outcomes was done in 60 ICSI conceived patients and percentage of each outcome was calculated and the major outcome was identified.

Results: Out of 60 ICSI conceived subjects ($n = 60$), 8.3% of patients had biochemical pregnancies, 1.7% had anembryonic pregnancies and 18.3% of patients had missed abortions. About 3.3% had cervical insufficiency and preterm premature rupture of membranes (PPROM). About 8.3% had gestational diabetes mellitus. And 3.3% had placenta previa, 20% of women experienced preterm birth, 21.7% experienced multiple pregnancies, 1.7% experienced intrauterine death. About 56.7% had cesarean delivery; 21.7% had NICU admissions due to prematurity followed by sepsis, low birth weight, and jaundice. About 1.7% of babies had congenital anomalies, 67% of mothers experienced live births and 3.33% had neonatal deaths; 80% of the babies weighed between 2.5 and 4 kg. We did not have cases of ectopic pregnancy which can be due to proper technique of embryo transfer. No cases of placental abruption, intrauterine growth restriction (IUGR), stillbirth, and eclampsia due to the use of antenatal aspirin. The major outcomes from this study were cesarean delivery (56.7%), followed by miscarriages (28.3%) and multiple pregnancy (17%).

Conclusion: The major outcomes of ICSI pregnancies were cesarean delivery (56.7%), followed by miscarriages (28.3%) and multiple pregnancy (17%).

Clinical significance: This review summarizes the data available on the fetomaternal outcomes after ICSI and also the follow-up of assisted reproductive techniques pregnancies.

Keywords: Cesarean delivery, Intracytoplasmic sperm injection, Miscarriage, Multiple pregnancy.

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BACKGROUND

Infertility is the inability to become pregnant after 1 year of unprotected sexual intercourse.¹ The prevalence of infertility in the US is 7.4–15.5% and in India, the prevalence is 3.9–16.8%.² Assisted reproductive techniques (ART) are one of the milestones in the treatment for human infertility. Multiple pregnancies occur in more than 20% of *in vitro* fertilization/intracytoplasmic sperm injection (IVF/ICSI).³ About 1.7–4.0% of all births occur due to ART in developed countries. Delivery of a singleton infant after 37 completed weeks with a birth weight of more than 2.5 kg indicates a successful perinatal outcome after ART.⁴ Multiple pregnancy, preterm delivery, low birth weight, birth defects,⁵ gestational hypertension, and gestational diabetes are more common in ART pregnancies. Patients undergoing ART must be counseled and informed about all these complications beforehand and reassured.

METHODOLOGY

A descriptive study was done at the Reproductive Medicine Unit of Government Medical College, Thiruvananthapuram, Kerala, India, for a period of 1 year. Sample size calculated was 53 by formula $n > 4pq/L^2$. Both institutional and ethical committee clearance were obtained. The patients who underwent ICSI and became pregnancy positive were recruited and followed them up for maternal and perinatal outcomes. Maternal outcomes studied were miscarriage, ectopic pregnancy, cervical insufficiency, low-lying placenta, gestational hypertension, gestational diabetes mellitus (GDM), preterm premature rupture of membranes

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(PPROM), preterm birth, multiple pregnancy, intrauterine death and mode of delivery. Perinatal outcomes studied were live births, neonatal deaths, stillbirths, NICU admissions (reason and number of days in NICU), birth weight and congenital anomalies. Outcome variables were expressed as percentage. The major outcome was identified.

RESULTS

All the data were collected, tabulated, and analyzed (Tables 1 and 2). Majority of the people aged between 31 and 35 years (40%). The mean age of people who underwent ICSI were 32.6 with a standard

Table 1: Maternal outcomes of ICSI conception

Maternal outcomes	Percentage
Biochemical pregnancy	8.3
Anembryonic pregnancy	1.7
Missed abortion	18
Cervical insufficiency	3.3
PPROM	3
Gestational hypertension	8
GDM	8.3
Low-lying placenta	3.3
Preterm delivery	20
Multiple pregnancy	15
Intrauterine death	1.7
Cesarean section	56.7
Vaginal delivery	10

Table 2: Perinatal outcomes of ICSI conception

Perinatal outcomes	Percentage
Live births	66.6
Neonatal deaths	3.3
NICU admissions	21.7
Congenital anomaly	1.7

deviation of 4.5. Sixty one percent only female factor infertility, 17% had male factor infertility and 22% had combined infertility out of which 23% of patients with female infertility had tubal causes, 46% patient had poor ovarian reserve, 20% had polycystic ovarian syndrome (PCOS), 9% had endometriosis, and 2% had unexplained cause.

Three percent of babies were less than 1 kg, 5% were between 1 and 1.5 kg, 13% were between 1.5 and 2.5 kg and 80% of them had normal birth weights. The mean birth weight was 2.73 with a standard deviation of 0.55. About 21.7% of babies were admitted in NICU, out of which 11.6% of babies stayed for 1–7 days, 7% of them stayed for 8–14 days, 3% had stayed for >2 weeks. The mean number of days of NICU stay was 8.1 days with a standard deviation of 5.1 and the median was 6.5. About 7.7% of babies were admitted with RDS, 23.1% as preterm, 15.4% as low birth weight and sepsis, 7.7% had fever, 15.4% had jaundice, 7.7% had hypoglycemia, and 7.7% were under observation.

DISCUSSION

As the prevalence of infertility is very common and increasing number of treatment options are available, studies on the outcomes of these treatments are being studied and should continue to be studied. Various treatment options include ovulation induction, intrauterine insemination, and ART like IVF and ICSI.⁶ Since IVF and ICSI have greater success rates, they are followed in most of the institutions. This study is about the various maternal and perinatal outcomes of ICSI-conceived pregnancies.

In this study, the total rate of miscarriages was 28.3%. According to Chai et al.¹⁹⁴⁵, pregnancies conceived following ART were followed up, and the rate of abortions was 14%.⁷ Out of 60 patients, 2 patients had cervical incompetence which constituted 3.3% of pregnancies. The incidence of cervical insufficiency is 0.02% among the general population. In this study, we had two patients with

PPROM, which was 3.3% of the total pregnancies. There were 12 preterm pregnancies and this was 20% of the total pregnancies. A retrospective study from 2007 to 2009 suggest that ART has predominantly singleton preterm birth and it is 1.5 times compared with non-ART mothers.⁸ The present study implied that out of the total ART group, 17% of women had multiple pregnancies, 12% had dichorionic diamniotic (DCDA) twins and 5% of women had triplets. We had two cases of placenta previa which was 3.3% of the total pregnancy. Low-lying placenta was six times higher in IVF pregnancies and four times higher in ICSI pregnancies.⁹ Five percent of the women had gestational hypertension and 3% had preeclampsia. The difference in results in our study can be due to the use of antenatal aspirin. In this study, 8.3% patient had GDM. But the overall prevalence of GDM in India ranges from 4% (Kashmir) to 45% (Lucknow).¹⁰ In our study, 56.7% of patients underwent lower segment cesarean section (LSCS) and 10% had vaginal delivery. Common indications for LSCS were due to ICSI conception and multiple pregnancy. Singer T et al. also observed increased incidence of cesarean births ($p < 0.001$) among ICSI pregnancies.¹¹ As per Omani-Samani, elective cesarean delivery for obstetric reasons was performed 10 times in the ICSI group and never in the controls ($p < 0.01$).¹² In our study, 67% of mothers experienced live births, 28.5% abortions, 1.7% IUD and 2% neonatal deaths. Another study with similar outcome had a live birth rate of 85%.¹³ Fifteen babies had mortality during follow-up with nine intrauterine deaths after 25 weeks and six cases of neonatal deaths during the first 7 days. Wang et al. found that the perinatal mortality among ICSI group was 2.2 times more than the spontaneous conceptions.¹⁴

CONCLUSION

The major outcomes were cesarean delivery (56.7%) followed by miscarriages (28.3%, mainly missed abortions) and multiple pregnancy (17%). We did not have cases of ectopic pregnancy which can be due to proper technique of embryo transfer and also no cases of placental abruption, intra uterine growth restriction IUGR, still birth and eclampsia, due to aspirin. As obstetric care providers, we should plan for more vaginal deliveries to reduce the cesarean rate and morbidity following cesarean. We should encourage and follow single embryo transfer so that the rate of multiple pregnancies can be reduced and the reason for increased miscarriages should be studied in future.

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