

PERINATAL OUTCOME OF BABIES BORN OUT OF ASSISTED REPRODUCTIVE TECHNOLOGY

Dr Priyanka Singh^{1*}, Dr Naresh Kumar²

1. Assistant Professor, Department of Pediatrics Jaipur National University Medical College & Hospital, Jaipur, Rajasthan, India, 2. Senior Resident, Department of Pediatrics, Jaipur National University Medical College & Hospital, Jaipur, Rajasthan, India

*Corresponding author – Dr Priyanka Singh

Email id – dr_priya_ jaipur@yahoo.com

Received: 21/06/2019

Revised:02/08/2019

Accepted: 13/08/2019

ABSTRACT

Background: Over the past40 years ART (Assisted Reproductive Technology) has been greatly refined and expanded resulting in millions of births. However, in many studies the concern has been raised regarding the health outcome of babies born out of ART. **Material and methods:** To assess the perinatal outcome we prospectively studied 75 ART (Assisted Reproductive Technology) babies which were all IVF, born in Mahatma Gandhi Medical College& Hospital, Jaipur between Dec 2012-June 2014. **Results:** Out of total 75 babies, 50.66% babies were born preterm, 43 babies (57.33%) were small for dates (SFD), 49.33% were Low Birth Weight (LBW). Nine babies (12%) had morbidities after birth in the form of Septicemia, Respiratory distress, Hypocalcemia and NEC. **Conclusion:** We conclude that babies born out of ART have comparable and favorable outcome and ART including IVF is a safe and reliable procedure as far as outcome in term of healthy babies are concerned.

Key Words: Assisted Reproductive Technology, Perinatal, In vitro fertilization, Pre term, Small for date

INTRODUCTION

The first pregnancy resulting fromIVF(In Vitro Fertilization) was reported in 1976 and wasan ectopic. Robert G. Edwards (1) physiologist did the world's first successful IVF in 1978, it was named as Louise Brown. In India as well the credit has been gone to Subhash Mukopadhyay (2) for creation of India's first and world's second IVF baby. In spite of that the concern has been raised regarding the clinical health outcome of IVF babies.

Over the past 40 years ART (Assisted Reproductive Technology) has been greatly refined and expanded resulting in millions of births worldwide that now accounts for 1-3 % of all births happening in Europe and US. Many studies have suggested that IVF babies are prone for preterm birth, low birth weight, perinatal mortality, congenital anomalies even in singleton pregnancies and mothers are also at increased risk of pregnancy related complications.

As compared to spontaneously conceived children, infants born after ART have poorer perinatal outcome. Romundstad et al (3) conducted a sibling analysis comparing birth weight, gestational age and the risk of perinatal mortality in siblings born after ART and spontaneous conception. Authors concluded that parental stigmata was more responsible for poorer perinatal outcome rather than the technique used.

To assess the perinatal outcome we studied 75 ART babies which were all IVF, born in Mahatma Gandhi Medical College& Hospital, Jaipur. The study location was Neonatal Intensive Care Unit, Department of Pediatricsin Mahatma Gandhi Medical College& Hospital. This isa Prospective study which included study population from Dec 2012-June 2014.Inclusion criteria was all ART babies born at our institution and exclusion criteria

included all non-IVF babies and ART babies delivered at another center. Observations -

Table-1: Showing distribution of IVF babies

Total	Singleton	Twin	Triplet
75	34	(16*2) 32	(3*3) 9

Out of total 75 babies 34 were singleton, 16 twins and 3 triplets. In term of percentage 45.33% were singleton, 42.66% were twins and 12% were triplets. None of the couples had babies more than triplet at our centre.

Out of total 75 babies 36 (48%) were male and 39 (52%) were female babies.

Table-2: Showing Gestational age groups in IVF babies

Total	Preterm	Term	Post-term
75	38	37	0

50.66% babies were born preterm. Remaining 49.33% babies were born at term. None of the baby was born as a post term baby.

Table-3: Distribution of IVF babies in Weight and Gestational Age groups

Total	SFD	AFD	LFD
75	43	32	0

Out of total 75 babies, 43 babies (57.33%) were small for dates (SFD) and remaining 32 babies (42.66%) were born as appropriate for dates (AFD). None of the babies in the cohort was large for dates (LFD).

Table-4: Showing Birth weight distribution of IVF babies

Total	ELBW <999 g	VLBW 1000- 1499g	LBW 1500- 2499 g	Normal BW >2500 g
75	4	9	37	25

25 (33.33%) of babies born after IVF had a Normal Birth Weight (NBW). 49.33% were Low Birth Weight (LBW). There were 5.33% Extremely Low Birth Weight babies (ELBW) and 12% Very Low Birth Weight babies (VLBW).

90.66% of babies had Apgar score at one minute between 8-10.6.66% babies had Apgar score less than three. Remaining 2.66% of babies had Apgar Score at one minute between 4-7. Apgar Score at 5 minute was between 8-10 in 96% of babies. 4 % of babies had score 4-7 and 0 % had score less than 3 at 5 minute. Four babies had minor congenital malformation like blind congenital dermal sinus (1), ulnar skin tag as rudimentary polydactyl (1), preauricular sinus (1), and sacra dimple was present in one and life threatening congenital malformations were present in none.

Nine babies (12%) had morbidities after birth in the form of septicemia, respiratory distress, hypocalcemia and NEC (Necrotizing Enter colitis). Out of them six babies (8%) had respiratory distress, one baby (1.33%) had septicemia, hypocalcemia, NEC and apnoeic episode each. Perinatal asphyxia, hypothermia, IVH (Intra Ventricular Haemorrhage) and hypocalcemia was present in 1 baby (1.33%) each separately.

Out of total 53 pregnancies nine mothers (16.98%) had perinatal risk factors. Polyhydraminos was present in three mothers (5.76%). Two Mothers (3.84%) had Diabetes Mellitus, two Mothers (3.84%) had oligohydramnios. Percentage of Pregnancy induced hypertension and oligohydramnios was 1.88.

DISCUSSION

We studied 75 ART babies which were all IVF, born in Mahatma Gandhi Medical College & Hospital, Jaipur. The study location was Neonatal Intensive Care Unit, Department of Pediatrics at our hospital. This is a Prospective study which included study population from December 2012 to June 2014. Inclusion criteria was all ART babies born at our institution and exclusion criteria included all non-IVF babies and ART babies delivered at another center

Out of total 75 babies 34 were singleton, 16 twins and 3 triplets. In term of percentage 45.33% were singleton, 42.66% were twins and 12% were triplets. None of the couples had babies more than triplet at our centre. The report of 2005 data from the Canadian ART registry (4) noted that 30% of deliveries resulting from IVF were twins and 2.7 % were triplets, a dramatic increase over the natural frequency of twinning of about 1:60 pregnancies.

50.66% babies born were preterm, remaining 49.33% babies were born as term. None of the baby was born as post term. Janvier A et al (5) in 2011 concluded

that multiple pregnancies in ART significantly increase the risk of prematurity. According to them 7 % of women carrying a singleton fetus deliver prematurely before 37 weeks; for twins the frequency is 50%, and for triplets 90%. The incidence of more serious prematurity, that is, being born before 32 weeks is 1.1 % for singleton in general, 8-14 % amongst twins and 28-41 % amongst triplets.

Out of total 75 babies, 43 babies (57.33%) were small for date (SFD) and remaining 32 babies (42.66%) were born as appropriate for date (AFD). None of the babies under study was large for date (LFD). In the various studies it is found that compared with spontaneous conception, IVF singleton pregnancies are at increased risk for still birth or neonatal death (2 - fold), small for gestational age (1-2 fold) and NICU admission (1-2 fold) (6-12).

In our study we had 49.33% LBW, 33.33 % NBW, 12 % VLBW and 5.33 ELBW babies were born after ART .In 2012 Bassil KL et al (13) concluded that the incidence of LBW in singleton IVF pregnancies is 2 %. In contrast, 30-50% of twins and 92% of triplets weigh less than 2.5 kilograms and 24-31% of triplets weigh less than 1.5 kilograms at birth.

Four babies had a minor congenital malformation and none of them had life threatening major congenital malformations. Davies MJ, et al concluded that congenital anomalies are significantly increased among singletons after advanced ART but not among twins (14). The most complete systemic review showed an Odds Ratio of 2.0 for major birth defects and an Odds Ratio of 1.30 for all birth defects combined (15). According to a review study published in 2013, naturally conceived infants IVF infants are having 1.32 relative risks of birth defects as compared to infants born out of IVF. (16)

Analysis of National Birth Defects Study in US suggested that infants conceived through IVF had more birth defects, notably septal heart defects, cleft lip with or without cleft palate, esophageal atresia, and anorectal atresia; the mechanism of causality is unclear. (17)

Out of total 75 babies only 1 baby (1.33%) had early sepsis, another one had Pneumonia. Cuifang Fan, et al (18) in their series reported that RDS was present in 2.5% of IVF and 1.5% of spontaneous pregnancy. Similarly, neonatal pneumonia was present in 4.1% of IVF babies and 2.2% of non – IVF babies.7.9% of IVF babies and 10.7% of non-IVF babies had

hyperbilirubinemia in the study conducted by them. Hyn - A Kim, et al (19) in their study found the percentage of NEC was 2.7 in IVF babies and 6.6 in spontaneous pregnancies. This review of the most common techniques of assisted reproductive technologies has demonstrated that babies born after ART are largely safe. The mean birth weight of IVF babies was 2.20 Kg, standard deviation (SD) is 0.713577 and mean birth weight for non IVF babies was 2.14 Kg. The difference between IVF and non IVF babies was not significant statistically. The mean age of mothers who underwent IVF was 34.23 Years. There was no mortality in IVF babies during hospital stay. In a study on 73 infants born out of IVF pregnancies including 33 boys and 40 girls' authors found that 8.7% of singleton infants and 54.2 % of twins had Low Birth Weight (LBW). (20)

CONCLUSION

We conclude that babies born out of ART have comparable and favorable outcome and ART including IVF is a safe and reliable procedure as far as outcome in term of healthy babies are concerned.

REFERENCES

1. Steptoe PC, Edward RG. Birth after the Reimplantation of Human Embryo. The Lancet 312(8085): 366
2. Mukerji S, Mukherjee S, Bhattacharya SK. Indian J. Cryog. 1978;3:80
3. Romundstad LB, Romundstad PR, Sunde A, et al. Effects of technology or maternal factors on perinatal outcome after assisted fertilization: a population-based cohort study. Lancet 2008;372:737-43.
4. Gunby J, Bissonnette F, Librach C, Cowan L. Assisted reproductive technologies in Canada: 2005 results from the Canadian Assisted Reproductive technologies Register. Fertility and Sterility. 2009;91:1721-30
5. Javier A, Spelke B, Barrington KJ. The epidemic of multiple gestations and neonatal intensive care unit use: the cost of irresponsibility. J Pediatr. 2011;159:409-13
6. Kallen B, Otterblad-Olausson P, Nygren KG. Neonatal outcomes in pregnancies from ovarian stimulation. Obstet Gynecol 2002;100:414-19
7. Jackson RA, Gibson KA, Wu YW, Croughan MS. Perinatal outcomes in singletons

- following in vitro fertilization :a meta-analysis. *ObstetGynecol* 2004;103:551-63
8. Schieve LA, Ferre C, Peterson HB, Macaluso M, Reynolds MA, Wright VC. Perinatal outcome of singletons infants conceived through assisted reproductive technology in the United States. *ObstetGynecol* 2004;103:1144-53
 9. Katallinic A, Rosch C, Ludwig M .Pregnancy course and outcome after intracytoplasmic sperm injection: a controlled,prospective cohort study. *FertilSteril* 2004;81:1604-16
 10. Helerhorst FM, Perquin DAM, Donker D, KeirseMJNC. Perinatal outcome of singletons and twins after assisted conception: a systemic review of controlled studies .*BMJ* 2004;328:261
 11. Luke B, Brown MB, Nugent C, Gonzales – Quintero VH, WitterFR, NewmanRB. Risk factors for adverse outcomes versus assisted conception twin pregnancies. *FertilSteril* 2004;81:328-36
 12. Schieve LA, Ferre C, Peterson HB, Jeng G, Wilcox LS. Low and very low birth weight in infants conceived with use of assisted reproductive technology. *NEng J Med* 2002;346:731-7
 13. Bassil KL, Shah PS, Barrington KJ, Harrison A, da silvaOP, LeeSK, et al. The changing epidemiology of preterm twins and triplets admitted to neonatal intensive care units in Canada, 2003 to 2008. *Am J Perintol*. 2012;29:237-44
 14. Davies MJ, Moore VM, Willson KJ, Van Essen P, Priest K, Scott H, et al. Reproductive technologies and the risk of birth defects. *NEng J Med*. 2012;366:1803-13
 15. Hansen M, Bower C, Milne E, de Klerk N, J Kurinczuk J. Assisted reproductive technologies and the risk of birth defects –a systemic review. *Human Reproduction*. 2005;20:328-38
 16. Hansen M, Kurinczuk JJ, Milne E, de Klerk N, Bower C (2013). "Assisted reproductive technology and birth defects: a systematic review and meta-analysis". *Hum. Reprod. Update* 19 (4): 330–53. doi:10.1093/humupd/dmt006. PMID 23449641.
 17. Reefhuis J, Honein MA, Schieve LA, Correa A, Hobbs CA, Rasmussen SA (February 2009). "Assisted reproductive technology and major structural birth defects in the United States". *Hum. Reprod.* 24 (2): 360–6.
 18. Cuifang Fan, Yanmei Sun, Jing Yang, Suqing Ye, Suqing Wang. Maternal and neonatal outcomes in dichorionic twin pregnancies following IVF treatment: a hospital –based comparative study. *Int J ClinExpPathol* .2013;6(10);2199-2207
 19. Hyun A Kim, Myo Jing. Perinatal outcome of preterm twins < 34 weeks after IVF pregnancies versus natural conception: same oral feeding tolerance. *J Koran Soc Neonol*. 201;19:84-90
 20. Olivennes F, Mannaerts B, Struijs M, Bonduelle M, Devroey P (2001). "Perinatal outcome of pregnancy after GnRH antagonist (ganirelix) treatment during ovarian stimulation for conventional IVF or ICSI: a preliminary report". *Hum. Reprod.* 16 (8): 1588–91. doi:10.1093/humrep/16.8.1588. PMID 11473947

How to cite this article: Singh P., Kumar N., Perinatal outcome of babies born out of assisted reproductive technology. *Int.J.Med.Sci.Educ* 2019;6(3):70-73