

Assisted Reproduction and Safety

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According to the European Society of Human Reproduction and Embryology are held about 1.5 million treatment course per year worldwide, resulting in over 350,000 births. Intra-cytoplasmic sperm injection (ICSI) corresponds to two thirds of the cycles performed and the conventional In-vitro Fertilization (IVF) to one third (ESHRE, 2014) [1].

Attributed to increased risk of genetic problems and birth defects in children conceived by ART (Assisted Reproductive Technologies) as a result of multiple factors, such as artificial induction of ovulation, changes of follicular medium and intracellular oocyte, extracorporeal manipulation of gametes and embryos, freezing and thawing processes, and embryonic biopsies [2-4]. In previous studies, Finnström and colleagues found that the number of maternal complications during pregnancy (preeclampsia, placental abruption and premature rupture of the membrane, as well as increased cesarean) occur at a higher rate after ART compared to general population [5].

Other controlled prospective studies found no difference between the neurological outcomes of children conceived by ART and spontaneously, in the age group 5-8 years [6]. However, the study of children up to 5 years of age in five European countries documented higher chance of serious illnesses, hospitalizations, physiotherapy and speech treatments, among those conceived by ART compared to naturally conceive [7]. Some recent meta-analyses have shown that the number of birth defects in children born by ICSI is higher than among those born spontaneously, but no more frequent than those born in other AR techniques [8,9].

Pregnancy rates with AR has increased over time and there is a tendency to transfer fewer embryos, which results in a decline in rates of multiple pregnancies in many countries, along with improvements in many perinatal outcomes [3]. During the last decade, the extent of embryo culture for 5 to 6 days has become a routine part of in vitro fertilization procedures in many clinics [10]. Since the transfer of a single embryo promotes a decline in twin pregnancy rate, which affects premature birth rates directly, low birth weight and gestational growth retardation [11]. Finnström and colleagues, children born after blastocyst stage transfer at increased risk, although low-key, to premature birth and birth defects compared to those derived from embryos transferred at cleavage stage.

Other researchers also compared many neonatal characteristics of children born after embryo transfers in blastocyst stage and cleavage stage, and found that the risk of preterm birth in singletons, low birth weight and congenital malformations were higher when performed transfers blastocyst [10]. And that in both groups the risk of preterm delivery is higher than the general population.

Recent meta-analysis showed a reduced risk of perinatal mortality, low birth weight (<2500 g), newborn small for gestational age and preterm delivery (<37 weeks) in children conceived by ART from cryopreserved embryos and transferred after thawing, when compared to children born from fresh transfers [12]. However the risk for cesarean births was lower in pregnancies after transfer to fresh. For some researchers, there were no significant differences in the rates of congenital malformations

between ART with ICSI of fresh or crioreservados embryos [10].

Studies also suggest a difference in the risk of severe birth defects during blastogenesis in pregnancies after ICSI or conventional IVF and that this risk may be lower with frozen embryo transfers [13]. Changes in the hormonal status in the laboratory during the process of mitosis or meiosis can cause chromosomal aneuploidies. Chemical compounds can also induce point mutations during artificial conception [9].

The clinical relevance of this issue when it comes to ART is based on the idea that any disturbance of the environment during the folliculogenesis process, gametogenesis and / or embryogenesis, could lead to undesirable changes in epigenetic inheritance. So possible causes for epigenetic disorders among ART children would be parental factors, use of drugs for ovarian stimulation, the culture medium characteristics, extracorporeal manipulation of gametes and embryos [14]. Although animal models can provide a lot of information, the results cannot yet be considered representative of epigenetic events that occur in humans [14]. Interference environmental been associated with segregation changes and integrity of chromosomes during mammalian embryogenesis, establishing It is thus a hypothetical link between genetic and epigenetic mechanisms as causative factors for aneuploidy [15]. In recent years, increasing studies have improved our understanding of the well-being of children born after assisted reproduction techniques. Several factors contribute to the health of fetuses, including infertility parents and maternal age, but the main risks are due to multiple pregnancies and low weight at birth [16].

The long-term evaluation of the offspring of couples who underwent ART compared to offspring conceived naturally, do not show an increase of congenital anomalies and physical growth is similar, as well as the rate of cerebral palsy, however mild neurological disorders are higher in the ART group [17]. There are few studies that evaluated consistently, systematic and prolonged the perinatal outcome of children born through the use of frozen embryos [8].

Some studies with select population control has rated the IQ in children born from in vitro fertilization and no previous study has evaluated the academic performance, measured by test scores in the ninth grade of primary school, adolescents aged 15-16 years born Assisted Reproduction and conceived spontaneously [18]. Additional studies should continue to investigate other aspects of individuals generated by assisted conception, interested, too, childhood, puberty and adulthood [16]. It will need to await the arrival of today's children will childbearing age, especially those born by ICSI, to know better if there are reproductive problems among them [16].

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