

**ENDOCRINE AND METABOLIC
CONSEQUENCES
OF
ART OFFSPRINGS**

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INTRODUCTION

- ✓ Assisted reproductive technologies (ARTs) have been widely used during the last three decades and progressively more children are born with the help of such methods.
- ✓ There is now evidence that ARTs may be associated with slight epigenetic modifications in the expression of several genes that could have a long-term impact on the health of the offspring.
- ✓ Also, a clear association between such techniques and genomic imprinting abnormalities has been reported.

Metabolic Syndrome and Its Components in Young Adults Conceived by ICSI

- ✓ Intracytoplasmic sperm injection (ICSI) conception presents the early embryo with a radically different environment, which may lead to permanent alterations to key cardiometabolic processes.
- ✓ Blood pressure, indicators of insulin resistance, and lipid profiles have been studied in offspring born after in vitro fertilisation (IVF) and ICSI, with conflicting findings.
- ✓ Results in young adults born after ICSI are lacking.

Do young adult men and women conceived by ICSI more frequently have metabolic syndrome and its individual features in comparison to spontaneously conceived controls?

- ✓ Cardiometabolic and anthropometric parameters from 126 longitudinally followed young adults conceived by ICSI were compared to those of 133 controls.
- ✓ At age 18 years, only 1 of the participants displayed the metabolic syndrome (1 control woman).
- ✓ Mean concentrations of total cholesterol, triglycerides, insulin, HOMA-IR, and blood pressure were comparable between the ICSI conceived and control participants.

- ✓ A higher proportion (19.6%) of men conceived by ICSI had low (<40 mg/dl) HDL cholesterol compared to controls (5.6%).
- ✓ **Conclusion:** While men conceived by ICSI, but not women, had lower mean HDL cholesterol concentrations in comparison to controls, other markers of the metabolic syndrome were not affected by the mode of conception.

Scientific Reports. 2017; 7: Apr 7.

The association between the use of assisted reproductive technology (ART) and autism spectrum disorder (ASD) risk in offspring has been explored in several studies, but the result is still inconclusive.

The risk of ASD in offspring in relation to ART were assessed by conducting a meta-analysis.

A literature search in PubMed, Embase, and Web of Knowledge databases through April 30, 2016 was conducted to identify all the relevant records. Risk ratios (RRs) and 95% confidence intervals (95% CIs) were computed to analyze the strength of association by using fixed- or random-effect models based on heterogeneity test in total and subgroup analyses.

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- ✓ Analysis of the total 11 records (3 cohort studies and 8 case-control studies) revealed that the use of ART is associated with higher percentage of ASD (RR = 1.35, 95% CI: 1.09–1.68, P = 0.007).
- ✓ In subgroup analyses based on study design, study location and study quality: some subgroups also showed a statistically significant association.
- ✓ **Conclusion:** The use of ART may associated with higher risk of ASD in the offspring. However, further prospective, large, and high-quality studies are still required.

Progress in Brain Research 2010;182:161-74.

- ✓ The neuroendocrine impact of ART on the offspring includes slight elevations of systolic blood pressure (SBP) and diastolic blood pressure (DBP), as well as increased circulating triglyceride concentrations, in children born after ART, especially in those with rapid catch-up growth in weight during early childhood.
- ✓ However, the postnatal growth of most children after ART is normal and no increased incidence of the full metabolic syndrome has been observed in these children and adolescents.

Prog Brain Res. 2010;182:161-74.

- ✓ The pace and timing of puberty of these children is normal.
- ✓ No increased incidence of premature adrenarche could be discerned in ART children in the absence of restricted fetal growth.
- ✓ A slight modification of the set point of thyroid stimulating hormone sensitivity was observed in ART children, without an apparent impact on thyroid hormone secretion.
- ✓ **Conclusion:** This has been attributed to epigenetic changes. Questions remain to be answered regarding the future reproductive capacity of children born after ART, as well as their cardiovascular risk in later adult life. Long-term prospective studies should be performed to provide robust evidence.

MISCELLANEOUS GENETIC OR INHERITED METABOLIC DISORDERS

- ✓ MMA
- ✓ Propionic acidemia
- ✓ HMG CoA lyase def.
- ✓ Argeninosuccinyl Lyase def.
- ✓ Methaphysial Chondrodyslasia
- ✓ SED

FINAL CONCLUSIONS

- There is now evidence that ARTs may be associated with slight epigenetic modifications in the expression of several genes that could have a long-term impact on the health of the offspring. An association between such techniques and genomic imprinting abnormalities has been reported.
- These techniques may provide the risk of creation or survival of an affected embryo, who would possibly not been created or survived, otherwise.
- Still more studies must be performed to reveal the endocrine and metabolic consequences of ART offsprings.

**THANK YOU
FOR
YOUR ATTENTION!**

ANY QUESTION?