ThyrART: Association of embryo quality and reproductive outcome after IVF with thyroid autoimmunity

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Introduction

The role of thyroxine (T_4) during embryo development is recognized as crucial. The physiological changes that take place during Assisted Reproduction Technologies application and may impact thyroid function or thyroid kinetics is presented in **Figure 1**.

The research question of this study was if embryo quality and reproductive outcomes after in-vitro fertilization (IVF) are affected by maternal thyroid function and / or thyroid auto-immunity (TAI).

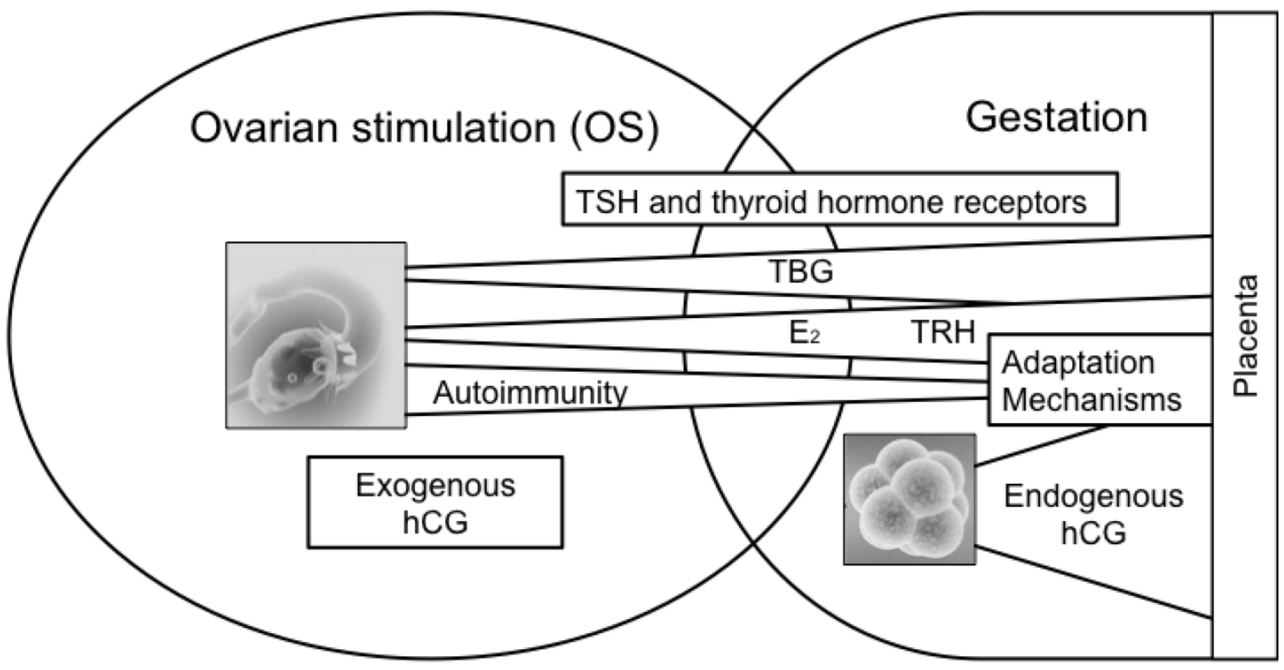

Figure 1. The physiological changes that take place during Assisted Reproduction Technologies application and may impact thyroid function or thyroid kinetics .

Description of methods

We conducted a prospective study (ThyrART), assessing embryo quality and reproductive outcome of women undergoing ovarian stimulation with a flexible GnRH-antagonist protocol for IVF (classic or ICSI), whose thyroid function (TSH, fT_3, fT_4) and TAI (anti-TPO, anti-Tg) were closely observed. All women were assessed five times during OS [day 3 of menstrual cycle, day 5 of menstrual cycle, day of hCG administration, oocyte pick-up (OPU) day and day of pregnancy test (15 days after OPU)]. The study design is shown in **Figure 2**.Embryo quality scores were calculated and reproductive outcomes were recorded.

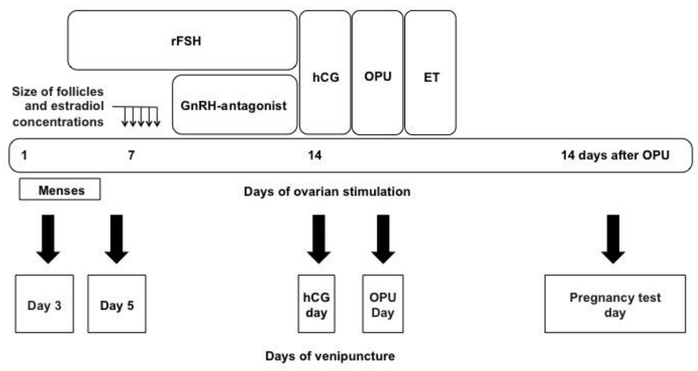

Figure 2. Study design.

Results

Demographic data of women are presented in table 1.

Best embryo score at day 2 was positively correlated with the overall change of fT4 concentrations (r=0.64, p=0.048). Biochemical pregnancy and live birth rates were negatively correlated with overall change of TSH concentrations (r=-0.741, p=0.004, and r=-0.534, p=0.06, respectively).

Table 1. Demographic data of women

N (%)	42 (100)
Age (years)	36 (6)
BMI (kg/m^2)	22.6 (4.8)
Gravidity	0 (0)
Parity	0 (1)
Cause of infertility (%)	
Tubular factor	11 (26.2)
Male factor	21 (50)
Couple factor	2 (4.8)
Endometriosis	1 (2.4)
Unexplained	7 (16.6)

Conclusion

The facts that changes in maternal TSH concentrations are associated with pregnancy outcomes and that changes in thyroid hormones are associated with embryo parameters need further confirmation.

Interventional studies in women undergoing ovarian stimulation for IVF are needed to demonstrate a possible positive influence of levo-thyroxine supplementation, in selected cases, on their reproductive outcomes.

References

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3. Reh et al, Fertil Steril. 2010;94(7):2920-2.

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