Recombinant versus Urinary Gonadotrophins: A pilot study to evaluate ploidy status of embryos derived from IVF.

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Introduction

The efficacy between both recombinant and urinary gonadotrophins in ovarian stimulation have always been actively compared in different perspectives as they are biochemically different. Urinary gonadotrophin is said to have a higher biological activity which may improve the pregnancy outcome. Besides, urinary gonadotrophin contains LH which is usually added to patients with poor prognosis to obtain better quality oocytes. Yet in other studies, better results were obtained with recombinant gonadotrophins. To date the quality of embryos produced from treatment with either gonadotrophins has not been compared. This pilot study aims to evaluate the ploidy status embryos derived from stimulation with recombinant and/or urinary gonadotrophins.

Methods & Materials

A total of 345 Preimplantation Genetic Testing for Aneuploidy (PGT-A) cases from Sunfert International Fertility Centre in 2018 were analysed. Oocyte donor cases were excluded from this study as some of them were stimulated by external IVF centres. All cases were classified into four groups according to the type of prescribed gonadotrophins given throughout the controlled ovulation stimulation: **Monotherapy recombinant (MR)** such as Gonal F® and Puregon® (n=42); **Monotherapy Urinary (MU)** such as Menopur® and Humog® (n=43); **Combined Recombinant (CR)** which is a combination of Gonal F® and Pergoveris® (n=81); and **Combined Recombinant Urinary (CRU)** such as the addition of Menopur® or Humog® to either Gonal F® or Puregon® (n=179). Intracytoplasmic Sperm Injection (ICSI) was carried out for MII oocytes upon egg retrieval. Fertilized (2PN) oocytes were further cultured to blastocysts (n=1067) for biopsy. Ploidy screening was performed using Next-Generation Sequencing (Veriseq® protocol, Illumina).

Results

Analysis of fertilisation rates did not show significant difference within the groups of monotherapy (68.8% and 69.0%, p=0.94) and combined therapy (63.8% and 64.8%, p=0.65). The monotherapy groups however have a trend towards higher blastulation rate (BR) and blastocyst utilisation rate (BUR) rates compared to combined therapy groups, with the **MU** having the highest BR (76.4%) and BU (57.4%).

In terms of embryonic ploidy status, both groups of monotherapy showed a trend towards higher euploid rate and lower aneuploid rate compared to the combined therapy groups. Within the monotherapy groups however, the **MU** group seemed to do better than **MR** as it has a similar euploid rate (51.2% vs 50.3%) even though the mean age is higher for this group (36.5 vs 32.0). All groups, both combined and monotherapy have similar mosaic rate.

Interestingly, **CR** group has the lowest euploid (42.6%) and highest aneuploid rate (47.1%) compared to all other groups, and this deserves further investigations.

Conclusion

In this small pilot study, we have demonstrated that stimulation with different gonadotrophins used either solely or in combination has a possible impact on the ploidy (but not mosaic) status of the resulting blastocysts. This may however be impacted by different stimulation policies of individual centres. In this study, adding LH into the stimulation protocol seemed to improve on the euploid rate, especially in older women but this seemed to be true in urinary gonadotrophins only. Further studies are necessary to confirm this.

Keywords: FSH, recombinant, urinary, euploidy, aneuploidy

Reference

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