

INTRODUCTION

- Follicular stimulating hormone (FSH) and luteinizing hormone (LH) act synergistically to support follicular development during in vitro fertilization (IVF).
- Previous studies have shown that combining recombinant FSH (rFSH) with an LH source improves clinical outcomes and implantation rates during ovarian stimulation.
- LH and hCG share similarities in their actions, binding to the same receptor and exhibiting comparable effects due to their high homology.
- Highly purified menotropins (hp-hMG) are products combining urinary FSH with a small amount of hCG.
- A few studies have explored the use of small adjunction of human chorionic gonadotropin (hCG) in controlled ovarian stimulation (COS) for IVF.
- Due to a shortage of hp-hMG, we sought an alternative hCG source to supplement follitropin delta in our standard COS for IVF.
- This study introduces the STORM protocol, an original algorithm that combines follitropin delta with a very small amount of urinary hCG for COS.
- The algorithm determines precise gonadotropin doses based on the patient's anti-Müllerian hormone (AMH) level and body weight.

STUDY QUESTION

Is a microdose of hCG combined with follitropin delta as effective as a standard antagonist protocol involving follitropin delta and hp-hMG?

OBJECTIVE

Our aim was to compare the reproductive outcomes of COS for IVF using the STORM protocol, in an antagonist cycle, to those of the standard antagonist protocol using follitropin delta and hp-hMG.

METHODS

Study Design. This was a retrospective monocentric study involving 118 patients who underwent COS for IVF between January 2022 and January 2023. Group A (n=59) consisted of patients undergoing COS using the STORM protocol, while Group B (n=59) included patients undergoing the standard follitropin delta and hp-hMG protocol. Groups A and B were matched for age, weight, AMH, and cause of infertility.

Main Outcome Measures. The gonadotropin doses in both groups were determined based on the patient's weight and AMH levels.

RESULTS

Table 1. STORM protocol regimen.

Follitropin Delta Calculated	STORM Protocol Regimen	
Dose	Follitropin Delta Dose	Urinary hCG dose
6mcg	Add 3mcg	50 IU q2days
6-8.66mcg	Add 6mcg	50 IU q2days
9-11.66mcg	Add 9mcg	50 IU daily
12mcg	Add 12mcg	50 IU daily

- COS for IVF using the STORM protocol yielded a comparable number of good quality blastocysts to the standard stimulation protocol using rFSH and hp-hMG (Table 2).
- Secondary outcome comparisons between Group A and Group B showed a similar number of follicles >14mm, mature oocytes, blastocysts, clinical pregnancy rates, miscarriage rates and ongoing pregnancy rates.

RESULTS (cont.)

Table 2. Reproductive outcomes.

	STORM (n=59)	Follitropin delta + hp-hMG (n=59)	P value
Age	35.9 ± 4.5	36.0 ± 4.3	0.90
BMI	25.6 ± 4.5	25.4 ± 4.2	0.80
AMH (ng/ml)	2.78 ± 2.1	2.72 ± 2.0	0.87
Follicles>14mm (n)	13.0 ± 7.3	11.9 ± 7.6	0.42
Retrieved oocytes (n)	16.3 ± 11.6	15.1 ± 10.6	0.55
Mature oocytes (MII) (n)	13.0 ± 8.4	11.0 ± 7.6	0.17
Fertilized oocytes (2PN) (n)	8.9 ± 6.7	7.7 ± 5.8	0.30
Blastocysts (n)	5.8 ± 5.0	5.0 ± 4.4	0.36
Good quality blastocysts (n)	3.21 ± 3.2	3.5 ± 2.8	0.52
Clinical pregnancy rate (%)	54.1	35.7	0.13
Ongoing pregnancy rate (%)	41.6	30.9	0.41
Miscarriage rate (%)	23	13	0.48

CONCLUSION

The use of small amount of urinary hCG as an alternative LH source in combination with follitropin delta for COS, yields a similar number of good quality blastocysts compared to the standard combination of follitropin delta and hp-hMG in antagonist protocols.