Assisted Reproductive Technology in Hypogonadotropic Hypogonadism: A Case Series

Katie Miller, MD[1], Nicolas Johnson, MD[2], Meghan Ozcan, MD[2]

1 Wright State University, Department of Obstetrics & Gynecology; 2 University of Cincinnati, Reproductive Endocrinology & Infertility

INTRODUCTION

- The hypothalamic-pituitary-gonadal (HPG) axis regulates female reproductive function.
- Hypogonadotropic hypogonadism (HH) results from dysfunction of the HPG axis and may be congenital, acquired, or iatrogenic.
- HH often presents as hypoestrogenism, hypoplasia of the uterus, oligo-ovulation or anovulation, as well as effects on mental, bone, and metabolic health[1].
- Abnormalities of other endocrine pathways, including prolactin, thyroid stimulating hormone (TSH), growth hormone (GH), and adrenocorticotropin hormone (ACTH), may disrupt the HPG axis and thus fertility[2,3].
- Given the rarity and heterogeneous etiologies of HH, data regarding fertility treatment response and reproductive outcomes remain limited.

AIM

Describe the evaluation, treatment approaches, and reproductive outcomes among patients with hypogonadotropic hypogonadism treated at a single REI center.

CASE PRESENTATIONS

Patient	Demographic	Diagnosis	Treatment	Outcome
1	28 yo; G0	Kallman's	OI/TIC	**Live birth**
2	32 yo; G1P1001	Chronic Liver Disease, severe malnutrition	Supportive hormonal treatment	Undergoing
3	28 yo; G0	Surgical hypopituitarism	OI/TIC	Undergoing
4	26 yo; G0	Kallman's vs. Mosaic Turner's	Failed OI > IVF	**Live birth**
5	20 yo; G0	Kallman's	Failed OI > IVF	Undergoing
6	32 yo; G0	Surgical hypopituitarism	IVF	Undergoing

1: 28yo G0 with infertility and amenorrhea, suspicious for Kallman's syndrome, underwent IVF stimulation cycle with limited response. Transitioned to ovulation induction with timed intercourse, followed by hCG trigger and luteal support, which resulted in successful pregnancy.

2: 32yo G1P1001 with chronic liver disease and severe malnutrition, presenting with amenorrhea for 3 years. Managed with stepwise estrogen replacement and cycle progesterone, without successful return of regular menses.

3: 28yo G0 with history of pituitary adenoma treated with surgery and radiation with resulting endocrine dysfunction. Notable low estradiol but preserved ovarian reserve. Managed with supportive estrogen therapy with plan for ovulation induction.

4: 26yo G0 with suspected Kallman's, failed ovulation induction despite escalating regimens. Underwent IVF with high dose stimulation with eventual successful pregnancy.

5: 20yo G0 with Kallman's failed multiple rounds of OI with inadequate follicular response. Planning for IVM vs. donor embryo.

6: 32yo G0 with surgical hypopituitarism, on HRT with preserved ovarian reserve. Planning for microdose hCG priming followed by ovulation induction and oocyte retrieval.

CONCLUSIONS

- Hypogonadotropic hypogonadism encompasses diverse etiologies, requiring individualized treatment plans.
- Preserved ovarian reserve does not necessarily predict response to ovulation induction.
- Escalation from ovulation induction to IVF may be required depending on underlying pathology.
- Successful live birth is obtainable with tailored treatment strategies.
- This small case series adds to the present data and supports the need for larger studies to guide evidence-based management.

REFERENCES

1. Zhang CM, Zhang H, Yang R, et al. The Reproductive Outcome of Women with Hypogonadotropic Hypogonadism in IVF. Frontiers in Endocrinology. 2022;13:850126. doi:https://doi.org/10.3389/fendo.2022.850126

2. Vila G, Fleseriu M. Fertility and pregnancy in women with hypopituitarism: a systematic literature review. The Journal of Clinical Endocrinology & Metabolism. Published online October 25, 2019. doi:https://doi.org/10.1210/clinem/dgz112

3. Coss D. Regulation of reproduction via tight control of gonadotropin hormone levels. Molecular and Cellular Endocrinology. 2018;463:116-130. doi:https://doi.org/10.1016/j.mce.2017.03.022

CONTACT INFORMATION

K. Miller: katimmille@premierhealth.com
N. Johnson: johns5nc@ucmail.uc.edu