

REASSURING IVF OUTCOMES FOR BRCA CARRIERS: MATCHED COHORT DATA TO GUIDE EVIDENCE-BASED FERTILITY COUNSELING



Amy Ng, M.D.¹, Miriam Tarrash, M.D.², Daniel Ilg, M.S., C.G.C.², Alexandra Peyser, M.D.²,
Randi H. Goldman, M.D.², and Tomer Singer, M.D.²

1. Zucker School of Medicine at Hofstra/Northwell, Manhasset, NY, 2. Northwell Health Fertility, Manhasset, NY



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BACKGROUND & OBJECTIVES

- *BRCA1* and *BRCA2* are tumor suppressor genes. Heterozygous pathogenic mutations are found in roughly 1 in 300 to 1 in 800 people, most commonly in Ashkenazi Jews.
- Heterozygous pathogenic mutations significantly increase the lifetime risk of ovarian and breast cancer, and have been associated with lower serum AMH values and earlier menopause.
- We aimed to compare IVF cycle length, total gonadotropin usage, and egg retrieval/IVF outcomes of patients with *BRCA1* or *BRCA2* mutations against age and AMH matched non-carrier controls.

MATERIALS AND METHODS

- Retrospective cohort study of patients with *BRCA1* or *BRCA2* mutations who underwent fertility treatment between July 2017 and January 2026. Controls were age and AMH matched non-carrier patients undergoing treatment during the same time period.
- Cycle characteristics (age at retrieval, AMH, day 3 FSH, number of stimulation days, peak estradiol level [E2 Max], and total gonadotropin dose) were obtained.
- Egg retrieval/IVF outcomes included number of oocytes retrieved, number of mature oocytes (MII), normal fertilization (2PN), day 5 blastocysts (D5), and ratio of euploid embryos to biopsied blastocysts (euploid ratio).
- Incomplete/cancelled cycles and cycles with male factor infertility (<5 million sperm/mL) were excluded.
- Performed two-tailed t-tests assuming equal variances.

Table 1: Cycle characteristics, IVF outcomes in *BRCA1* and *BRCA2* positive patients against age and AMH matched control groups

	<i>BRCA1</i> (n=34)	Control 1	p-value	<i>BRCA2</i> (n=28)	Control 2	p-value
Age at Retrieval	34.1±2.9	34.1±2.9	1.000	33.5±4.5	33.5±4.5	1.000
AMH	2.4±2.6	2.4±2.6	0.991	2.6±2.0	2.5±2.0	0.932
Day 3 FSH	6.7±2.2	6.3±3.0	0.643	6.9±2.7	9.4±3.6	*0.025
Stimulation Days	10.9±2.2	10.7±2.1	0.736	10.7±1.8	10.8±1.5	0.983
E2 Max	1485.7±1380	2979.6±1616	*0.000	1756.1±2159	3159.3±1997	*0.015
Letrozole Use	64.7% (22)	2.9% (1)	-	85% (24)	7.1% (2)	-
Total Gonadotropins	4271.7±1682	4035.3±1393	0.530	4094.6±2015	4276.5±1646	0.713
Oocytes Retrieved	13.1±8.4	14.4±8.4	0.508	18.8±12.8	14.1±9.8	0.128
MI	10.0±6.7	9.8±6.7	0.928	14.5±10.2	9.0±7.3	*0.027
2PN	7.1±5.3	8.4±5.6	0.357	13.1±8.7	7.7±5.3	*0.016
D5	1.9±2.6	2.3±2.8	0.544	4.3±4.2	2.3±2.8	0.061
Euploid Ratio	0.6±0.3	0.5±0.4	0.201	0.5±0.2	0.5±0.4	0.610

RESULTS

- Sixty-two cycles were included in the study; 55% (34/62) had a *BRCA1* and 45% (28/62) had a *BRCA2* mutation.
- Both *BRCA* groups had similar number of stimulation days and total gonadotropin use compared to their control groups.
- E2 Max was lower in *BRCA* groups compared to control groups; however, co-treatment with letrozole occurred more frequently in *BRCA* groups (75% vs. 8%).
- *BRCA1* and Control 1 have no differences in eggs retrieved, MIIs, 2PNs, D5s, and euploid ratio.
- *BRCA2* had no difference in the number of eggs retrieved compared to Control 2, but produced greater number of MIIs and 2PNs.

CONCLUSIONS

- *BRCA* carriers experienced similar ovarian stimulation cycle lengths and total gonadotropin usage compared to age and AMH matched controls.
- *BRCA1* demonstrated similar IVF/ICSI outcomes to controls.
- *BRCA2* had a greater number of MIIs and 2PNs compared to controls. They were also found to have more eggs retrieved, though this was not statistically significant.
- These results can aid in counseling *BRCA* patients on how their cycle will (and will not) differ from non-carriers.
- Further research with larger cohorts is warranted.