Comparative Outcomes in Stimulated IVF Cycles: A Retrospective Study on Follicle Count

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INTRODUCTION

This retrospective cohort study assessed patients undergoing IVF (In-vitro fertilization) cycles with <3 versus 3 follicles to evaluate the impact of mature follicle count on IVF live birth rate. Having <3 mature follicles is usually considered a poor ovarian response (POR), which has been associated with reduced chances of successful IVF outcomes leading to cancellation of the cycle and conversion to intrauterine insemination (IUI) if possible. Studies have shown that continuing with IVF is often more effective and cost-efficient than switching to IUI for patients with <3 follicles. Emerging evidence also indicates that even with <3 mature follicles, especially in women under 40, favorable pregnancy outcomes may still be achieved.

STUDY QUESTION

To compare pregnancy outcomes between IVF cycles with 1-2 follicles versus 3 follicles, and to assess the implications of these findings for IVF treatment protocols and patient counseling in this population of poor responders.

METHODS

A retrospective cohort analysis of 405 IVF cycles with three follicles of 14mm or more at the time of ovulation was conducted between 2011 to 2017 at two Montreal clinics. Patients were divided into two groups: those with 1-2 follicles and those with 3 follicles. The study reviewed demographic data, ovarian reserve markers, IVF protocols, and outcomes from the cycles. The primary outcome was the clinical pregnancy rate, while secondary outcomes included implantation, miscarriage, live birth rates, and cumulative live birth rates.

RESULTS

Table 1. Baseline characteristics between patients with 1-2 follicles and those with 3 follicles. Values are presented as mean (standard deviation), or percentage (n)

Characteristics	1-2 Follicles (n=139)	3 Follicles (n=266)	P-value
Age	38.59 (3.74)	38.34 (3.54)	0.506
Years of infertility	4.05 (3.06)	3.98 (2.84)	0.807
Anti-Müllerian Hormone (AMH)	0.60 (0.83)	0.70 (0.71)	0.204
Basal Follicle-Stimulating Hormone (FSH)	9.28 (4.33)	8.41 (3.98)	0.046
Antral Follicle Count (AFC)	7.22 (4.68)	8.45 (5.09)	0.025
Gravidity	1.02 (1.41)	1.08 (1.49)	0.690
Parity	0.45 (0.73)	0.42 (0.70)	0.737
Previous IVF Cycle	48.2% (67)	49.2% (131)	0.841
≤ 3 follicles in previous IVF	34.3% (23)	23.7% (31)	0.111
Previous cancelled cycle poor response	82.6% (19)	90.3% (28)	0.404
Diagnosis: Tubal/Endometriosis Male Unexplained/Low ovarian reserve Multiple Causes	18.0% (25) 30.9% (43) 47.5% (66) 3.3% (5)	19.2% (51) 33.1% (88) 43.6% (116) 4.1% (11)	0.903
Standard IVF or ICSI Standard IVF ICSI	47.5% (66) 52.5% (73)	44.4% (118) 55.6% (148)	0.549
Protocol Antagonist Agonist flair-up Long agonist	61.9% (86) 36.7% (51) 1.4% (2)	99.2% (264) 0,8% (2) 0% (0)	<0.001
Smoking status	4.3% (6)	8.6% (23)	0.109

Table 2. IVF cycle outcomes by number of follicles

Outcome	1-2 Follicles (n=139)	3 Follicles (n=266)	P-value
Total dose of gonadotropins	5438.85 (1813.15)	5484.59 (1532.72)	0.789
Estradiol on trigger day	2340.58 (1211.72)	3107.55 (1609.40)	<0.001
Progesterone on trigger day	1.88 (0.87)	2.25 (1.05)	0.003
Number of oocytes retrieved	2.33 (1.35)	3.37 (1.46)	<0.001
Number of mature oocytes	1.96 (1.09)	2.71 (1.24)	<0.001
Fresh embryo transfer (ET)	53.2% (74/139)	63.5% (169/266)	0.045
Freeze-all embryos	2.2% (3/139)	2.3% (6/266)	0.950
Number of embryos transferred	0.53 (0.71)	0.63 (0.78)	0.141
Number of embryos transferred in ET	0.94 (0.70)	1.09 (0.74)	0.165

Table 3. Reproductive outcomes by number of follicles (based on IVF Starts)

Outcome	1-2 Follicles (n=139)	3 Follicles (n=266)	P-value
Presence of gestational sac	11.5% (16/139)	13.9% (37/266)	0.497
Biochemical pregnancy loss rate	1.4% (2/139)	2.3% (6/266)	0.515
Positive fetal heart rate at 7 weeks	8.6% (12/139)	10.5% (28/266)	0.546
Miscarriage rate (out of clinical pregnancies)	31.3% (5/16)	37.84% (14/37)	0.645
Ongoing pregnancy beyond 20 weeks	7.9% (11/139)	8.6% (23/266)	0.800
Live birth in fresh cycle	7.9% (11/139)	8.3% (22/266)	0.899
Cumulative live birth	8.6% (12/139)	9.8% (26/266)	0.709

DISCUSSION

Patients with <3 mature follicles had similar clinical pregnancy rates (27.4% vs. 26.9%, p=0.93) and cumulative live birth rates (20.4% vs. 21.6%, p=0.87) compared to those with three follicles, based on both IVF start and embryo transfer outcomes. This suggests that IVF cycles with <3 mature follicles can still yield viable pregnancy outcomes. Our results align with previous research indicating that patients with fewer mature follicles may still achieve favorable results despite POR.

This suggests that having <3 mature follicles should not necessarily disqualify patients from continuing with IVF treatment. A key aspect of our study was identifying predictors of successful embryo transfer. We found that patient age (p=0.03), number of eggs retrieved (p<0.01), number of mature eggs (p<0.01), and AMH levels (p=0.04) were significant predictors of clinical pregnancy and live birth rates. These findings support the existing literature that the number of eggs correlates with the number of embryos and that AMH levels, while indicative of ovarian reserve, have a limited predictive value for pregnancy rates. Additionally, our study highlighted the lower engagement in subsequent treatments among <3 mature follicles group, emphasizing the psychological and emotional challenges faced by patients with POR. This underscores the need for enhanced support and counseling to inform patients about further treatment options and manage their expectations.

CONCLUSION

IVF cycles with <3 mature follicles yield comparable clinical pregnancy rates and cumulative live birth rates to those with three follicles.