Counseling oocyte cryopreservation patients: the impact of the time interval from counseling to retrieval on the concordance between pre-treatment predictions and post-retrieval parameters.

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INTRODUCTION

Age and ovarian reserve are commonly used parameters to counsel patients on expectations of elective oocyte cryopreservation (EOC) outcomes. Intuitively, the delay in treatment would be expected to affect the accuracy of predictions given the temporal decay in ovarian reserve. We reviewed the outcomes for patients who presented for EOC consultation, then followed up for treatment to determine how the interval to retrieval affected the accuracy of pre-counseling predictions.

METHODS

Retrospective review of 283 EOC retrievals from Jan 1, 2021- May 9, 2022. Pre-treatment predictions were made with 2 step process:

A) A nomogram based on internal data, using AMH and age as the independent variables to predict oocytes retrieved.
B) A binomial regression model derived from published and in-house data to predict live birth.

Pre-treatment retrieval and LBR predictions were compared to number of M2 oocytes cryopreserved, and post-retrieval LBR estimates per the **Violet AI.**
The difference between pre- and post-treatment parameters were **analyzed as a function of the time interval from the initial AMH analysis to egg retrieval.**
Outcomes were stratified by age groups, and age as a continuous variable. Pearson's correlation coefficient, ANOVA, Chi-squared, independent sample and pairwise T-tests were calculated where appropriate.

Pre-Treatment Counseling:

A) AMH vs Age nomogram for oocyte retrieval prediction

	AMH stratified by percentiles									
ng/ml	0-0.57	0.57-0.88	0.88-1.19	1.19-1.50	1.50-1.87	1.87-2.37	2.37-2.97	2.97-3.75	3.75-5.1	>5.1
pmol/l	0-4.07	4.07-6.29	6.29-8.50	8.50-10.70	10.70-13.36	13.36-16.90	16.90-21.20	21.20-26.80	26.80-36.43	>36.43
<35	5	7	8	10	13	15	16	17	20	23
35-37	5	7	8	10	12	13	16	16	19	23
38-40	4	6	7	9	10	11	14	16	18	23
41-42	5	5	7	8	8	10	12	14	16	23
43+	2	4	6	8	8	9	10	11	15	19

B) LB Predictor

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Oocyte Age	35														
2	Live Birth Rate per Oocyte	0.0733														
3	Number of Oocyte Cryopreserved	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
4	Number of Oocyte Warmed&Survived	1	3	5	6	8	10	11	13	15	17	18	20	22	23	25
5	Probability of having 1+ live birth childr	7.33%	20.42%	31.66%	36.67%	45.61%	53.29%	56.72%	62.83%	68.08%	72.59%	74.60%	78.18%	81.26%	82.64%	85.09%
6	Probability of having 2+ live birth childr	N/A	1.53%	4.63%	6.61%	11.19%	16.35%	19.05%	24.61%	30.20%	35.72%	38.43%	43.67%	48.66%	51.05%	55.61%
7	Probability of having 3+ live birth childr	N/A	0.04%	0.35%	0.67%	1.67%	3.20%	4.16%	6.47%	9.23%	12.40%	14.11%	17.74%	21.59%	23.57%	27.62%

Post-Treatment Counseling:

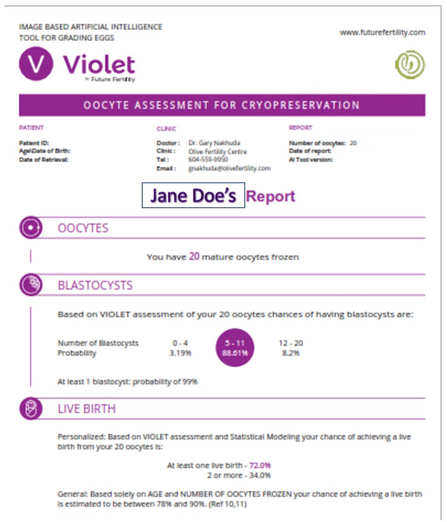
IMAGE BASED ARTIFICIAL INTELLIGENCE TOOL FOR GRADING EGGS

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Violet

OOCYTE ASSESSMENT FOR CRYOPRESERVATION

PATIENT
Patient ID:
Age/Date of Birth:
Date of Retrieval:

CLINIC
Doctor : Dr. Gary Nakhuda
Clinic : Olive Fertility Centre
Tel : 604-559-9950
Email : gnakhuda@olivefertility.com

REPORT
Number of oocytes: 20
Date of report:
AI Tool version:

Jane Doe's Report

OOCYTES

You have 20 mature oocytes frozen

BLASTOCYSTS

Based on VIOLET assessment of your 20 oocytes chances of having blastocysts are:

Number of Blastocysts	0 - 4	5 - 11	12 - 20
Probability	3.19%	88.61%	8.2%

At least 1 blastocyst: probability of 99%

LIVE BIRTH

Personalized: Based on VIOLET assessment and Statistical Modeling your chance of achieving a live birth from your 20 oocytes is:

At least one live birth - 72.0%
2 or more - 34.0%

General: Based solely on AGE and NUMBER OF OOCYTES FROZEN your chance of achieving a live birth is estimated to be between 78% and 90%. (Ref 10,11)

RESULTS

Interval from Consultation to Retrieval	223.2 (+/- 192) Days
Age at Retrieval	35.6 (+/- 4.1) years
Predicted Oocytes vs. Actual Oocytes Vitrified	13.8 (+/- 5.2) vs. 10.4 (+/- 6.1) (p<0.001)
Predicted LBR Models: Pre- vs Post-treatment	52.1% vs. 43.6% (p<0.001)

- Overall, the interval to treatment was not correlated with a difference in pre- to post-treatment ratios.
- Variations in the pre- and post- treatment prediction models was not affected by time interval from initial consult to treatment.
- Stratified by age, the magnitude of differences between pre- and post-treatment increased with the largest differences in the 41-42, and 43+ age groups.

CONCLUSIONS

- Counseling patients about EOC is challenging due to the multiple variables that ultimately dictate the outcomes.
- Our internal modeling data estimated greater number of oocytes and LBR compared to actual M2's vitrified and LBR predicted by Violet.
- The differential in predictions could be due to errors and biases in the modeling, or to the time delay to treatment, which was on average 223 days.
- The impact of delay within the intervals of the study did not appear significant for patients under 40, but older patients had greater discrepancies between pre- and post- treatment parameters with increased durations of beyond 6 months.
- Consistent with other ART outcomes, the impact of advanced age impacts the expected outcomes of EOC, and delay to treatment accelerates the decline in treatment efficacy.