Association between cytoplasmic granularity of oocytes and age in patients undergoing elective oocyte cryopreservation

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INTRODUCTION

Centrally localized cytoplasmic granularity (CLCG) is an intracytoplasmic abnormality characterized by a dark, spongy-like granular appearance in the center of the oocyte11. While several studies have investigated the association of CLCG with the quality of oocytes retrieved from patients during infertility treatments, elective oocyte cryopreservation (EOC) cycles provide a unique opportunity to understand the frequency and impact of CLCG in a different population.

OBJECTIVE

The purpose of this study was to assess the CLCG rates in a cohort of patients undergoing EOC treatments and the association between CLCG and patient age.

METHODS

We assessed the CLCG of 5,318 metaphase II (MII) oocytes obtained from 422 EOC cycles from 05/20/2017 to 04/01/2018 with a minimum of 5 MII oocytes per cycle. Cycles were classified according to the percentage of MII oocytes with CLCG in the cohort of each retrieval: no CLCG (0%), low CLCG (1-25%), intermediate CLCG (26-50%), high CLCG (51-75%) and severe CLCG (76-100%). Patients were grouped into four age categories: <35, 35-36, 37-38, and ≥38 years. Frequencies of CLCG grades in each age group were then compared using Monte Carlo resampling and CLCG percentage comparisons were assessed using Kruskal-Wallis H test. P<0.05 was considered statistically significant.

RESULTS

Figure 1: Metaphase II (MII) human oocyte exhibiting centrally localized cytoplasmic granularity (CLCG), as well as a large perivitelline space (Atlas of human embryology, 2012).2

Figure 2: Median percentage of MII oocytes with CLCG (in EOC cycles) organized by age group. (<35 years: 10.5% [OR: 0.226], 35-36 years: 11.1% [OR: 0.290], 37-38 years: 12.6% [OR: 0.226], ≥38 years: 22.2% [OR: 0.290]; p<0.05)

Figure 3: Percentage of cycles that exhibit no, low, intermediate, high, or severe CLCG per age group.

CONCLUSIONS

Our results indicate that there is a significant difference in the percentage of MII oocytes with CLCG per cycle between women ≥38 years of age undergoing EOC and the other age groups. Furthermore, these data reveal that among three out of four cycles of women undergoing EOC will exhibit no to low percentage of MII oocytes with CLCG. Further studies are necessary to determine the influence of CLCG grades on vitrification and IVF outcomes in this population.

Table 1: Percentage of MII oocytes that exhibit CLCG per EOC cycle organized by age group. Patients of ≥38 years old and younger showed a higher percentage of cycles graded as no or low CLCG (26.2 - 30.6% and 46.8 - 53.6%, respectively) in comparison to patients ≥38 years old (22.2% and 33.3%), respectively; p<0.05 for frequency comparisons.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No CLCG</th>
<th>Low CLCG</th>
<th>Intermediate CLCG</th>
<th>High CLCG</th>
<th>Severe CLCG</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 35 years</td>
<td>26.2</td>
<td>53.2</td>
<td>12.7</td>
<td>4.8</td>
<td>3.2</td>
</tr>
<tr>
<td>35 – 36 years</td>
<td>27.7</td>
<td>53.6</td>
<td>13.4</td>
<td>4.5</td>
<td>0.9</td>
</tr>
<tr>
<td>37 – 38 years</td>
<td>30.8</td>
<td>46.8</td>
<td>14.5</td>
<td>4.8</td>
<td>3.2</td>
</tr>
<tr>
<td>≥38 years</td>
<td>22.2</td>
<td>33.3</td>
<td>23.8</td>
<td>15.9</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Approximately 76% of cycles presented no to low CLCG.

The median percentage of MII oocytes with CLCG was higher in cycles of patients ≥38 years and above, compared to other groups.

Groups of patients ≥38 years and younger exhibited a higher percentage of cycles graded as no to low CLCG.

References


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