To obtain a good oocyte is a fundamental step to maximize the efficiency of natural cycle IVF.

Major problem in natural cycle IVF is the high percentage of failure to collect oocytes from each cycle.

Due to mistakes in the timing of retrieval, to a deficient follicular growth or to a precocious LH surge.

US

- Dominant follicle has a linear growth rate between 1.4 and 2.2 mm per day until the day of LH peak.
- When LH surge it measures 18.1 – 22.6 mm.
- Direct correlation between follicular growth and E2 level.
- Endometrial shape and thickness reflects E2 levels.
Timing of oocyte retrieval

TVUS  + CD, PD, 3D
E2 measurements
LH measurements
Additional help:
Indomethacin (50 mg oral + 100 mg rectal right before OPU
Lenton EA, 2007 or everyday from F>14 mm Kardoch 2008;);
Double lumen aspiration needles with follicle flushing
(91%+OPU vrs. 68,5% Daya 1995)
GnRH antagonists

Studies with US, E2, LH

- Tomaževič T (2011) – 1167 cycles - 943 oocytes
  (80%) - 613 ET (65%) - pregnancy per cycle 9% - pregnancy per ET 17%
- Take home baby rate 7%
- E2>0.39 nmol/L (>104 pg/ml)
- f>16 mm
- Endometrial thickness > 5 mm
- When minimal criteria fulfilled LH urinary test; if
  negative HCG
- Aspiration 31-32 h after HCG

Studies with US, E2, LH

- Janssens RMJ (2000) f>18 mm; E2; LH<15 IU/L
- 75 cycles; 14 (18.6% cancelled): 61 aspirations
  (81.3%); 50 oocytes (66.6%); 35 ET (46.6%); 9.3%
  pregnancy rate per cycle; 20% pregnancy rate per
  ET
<table>
<thead>
<tr>
<th>Study</th>
<th>Cycles</th>
<th>Oocytes</th>
<th>Positive OR</th>
<th>Positive PR</th>
<th>Cancellation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim SH (1996)</td>
<td>80</td>
<td>64</td>
<td>67</td>
<td>64</td>
<td>10% /c; 12.5% /ET</td>
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<tr>
<td>Paulson RJ (1992)</td>
<td>101</td>
<td>78</td>
<td>78</td>
<td>78</td>
<td>10.9%</td>
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<tr>
<td>Vlaisavljević V (2001)</td>
<td>362</td>
<td>318</td>
<td>269+OR</td>
<td>269</td>
<td>10.2%/c; 20.9% /ET</td>
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<tr>
<td>Tomažević T (2009)</td>
<td>397</td>
<td>303</td>
<td>303 +OR</td>
<td>303</td>
<td>12% /c; 23% /ET</td>
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</table>

<table>
<thead>
<tr>
<th>Protocol A</th>
<th>Cancellation Rate</th>
<th>Oocyte Recovery Rate</th>
<th>PR / OPU</th>
<th>PR / ET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only US (f&gt;18 mm)</td>
<td>40.5%</td>
<td>78.9%</td>
<td>12.8%</td>
<td>24.6%</td>
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<tr>
<td>f&gt;18 mm or E2&gt;0.91 nmol/L</td>
<td>27.8%</td>
<td>88.9%</td>
<td>5.5%</td>
<td>10%</td>
</tr>
<tr>
<td>f&gt;15 mm + E2&gt;0.49 nmol/L</td>
<td>9.8%</td>
<td>90%</td>
<td>9%</td>
<td>16.6%</td>
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</table>

<table>
<thead>
<tr>
<th>Study</th>
<th>Cycles</th>
<th>Oocytes</th>
<th>Positive OR</th>
<th>Positive PR</th>
<th>Cancellation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Busso C (2007)</td>
<td>70</td>
<td>52</td>
<td>40</td>
<td>40</td>
<td>18 cancelations</td>
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<tr>
<td>f &gt; 18 mm and LH test negative</td>
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<td></td>
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<tr>
<td>11.4% PR /c and 29.6% /ET</td>
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</tr>
</tbody>
</table>
Studies with just US

- Schimberni M (2011) f >16 mm – 1000 cycles - 788 oocytes - 618 ET
- 12.8% /cycle and 20.7% /ET

Just US / Sv Duh (f>15 mm, end>6/7 mm) 2002-2012

- 1324 NC
- 1044 aspirations
- 830 oocytes (62% per cycle; 79.5% per aspiration)
- 620 ET
- 90 pregnancies
- PR 6.8% /c; 14.5% /ET
- Take home baby rate 5.6%

Just US / Sv Duh (f>15 mm, end>6/7 mm) 2009-07/2012

- according the legislation older patients
- no weekend OPU
- 23 - 50 years old, median 37
- 412 cycles, 353 oocytes
- 250 ET, 30 pregnancies
- PR /c 7.3 %
- PR /ET 12%
CD; PD; 3D; 4D

- time consuming
- perifollicular BF velocities gradually increase in the periovulatory period while the PI remains constant and RI in perifollicular vessels shows low to moderate values. This values suggest increase in blood flow (Bourne TH, 1991)
- the blood volume does not differ between follicles containing an oocyte and those with no oocyte in the aspirate
No significant increase in PSV between fertilization/nonfertilization cycles but decrease in PI and RI (Gavrić Lovrec V, 2001)

3D CD/PD

- controversial
- hypothesis – follicles containing oocytes able to produce a pregnancy – more uniform perifollicular vascular network (Vlaisavljević V, 2003)
- reduction of perifollicular arterial blood flow resistance after hCG administration is a good indicator of the recovery of mature oocytes in ART treatment (Nakagawa K, 2006)
- increase in perifollicular capillary network volume after hCG administration (Vlaisavljević V, 2010)

Conclusions

ULTRASOUND IN NATURAL CYCLE IVF: IS IT GOOD ENOUGH?

- US + E2 + LH! (PR/ET 12,5 – 24,6% - 42,8% bc ET ??)
- US + LH (PR/ET 29,6% ?)
- US (PR/ET 12-20,7%)
References


References