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ULTRASOUND IN NATURAL CYCLE IVF: IS IT GOOD ENOUGH?

Renato Bauman

Clinical hospital Sveti Duh, Polyclinic Betaplus; Zagreb, Croatia

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 night 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 fullfilled 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% pregnanacy rate per cycle; 20% pregnancy rate per ET

US + E2 + LH

- Kim SH (1996) 80 cycles – 67 OR - 64 +OR – PR 10% /c; 12,5% /ET
- Paulson RJ (1992) 101 cycles - 78 OR - PR /c 10,9%; PR /ET 14,5%
- Vlaisavljević V (2001) 362 cycles – 318 OR – 269+OR – PR /c 10,2% - PR /ET 20,9%
- Tomaževič T (2009) 397 cycles – 303 +OR – PR /c 12% - PR /ET 23%

Vlaisavljević V (2001) – three protocols for monitoring 587 nIVF cycles

- A/ only US (f>18 mm)
- B/ f>18 mm or E2>0,91 nmol/L
- C/ f> 15 mm + E2>0,49 nmol/L

- Cancellation A=**40,5%**; B=27,8%; C=**9,8%**
- Oocyte recovery rate A= 78,9% B=88,9% C=90%
- PR / OPU C=12,8% B= 5,5% A=10%
- PR / ET C= 24,6% B=10% A= 16,6%

US + LH

- Busso C (2007) – 70 cycles - 52 aspirations - 77% with oocyte (40) – 18 cancelations
- f > 18 mm and LH test negative
- 11,4% PR /c and 29,6% /ET

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

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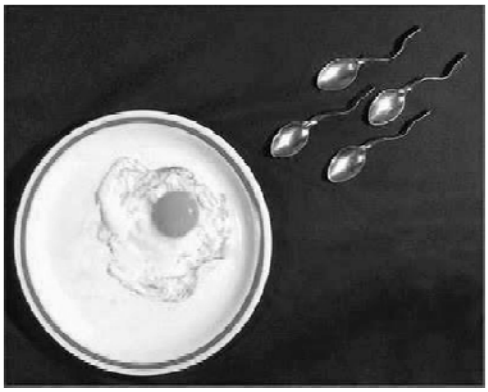
- **US + E2 + LH!** (PR/ET 12,5 – 24,6% - 42,8% bc ET !?)
- US + LH (PR/ET 29,6% !?)
- US (PR/ET 12-20,7%)



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