LUTEAL PHASE SUPPORT

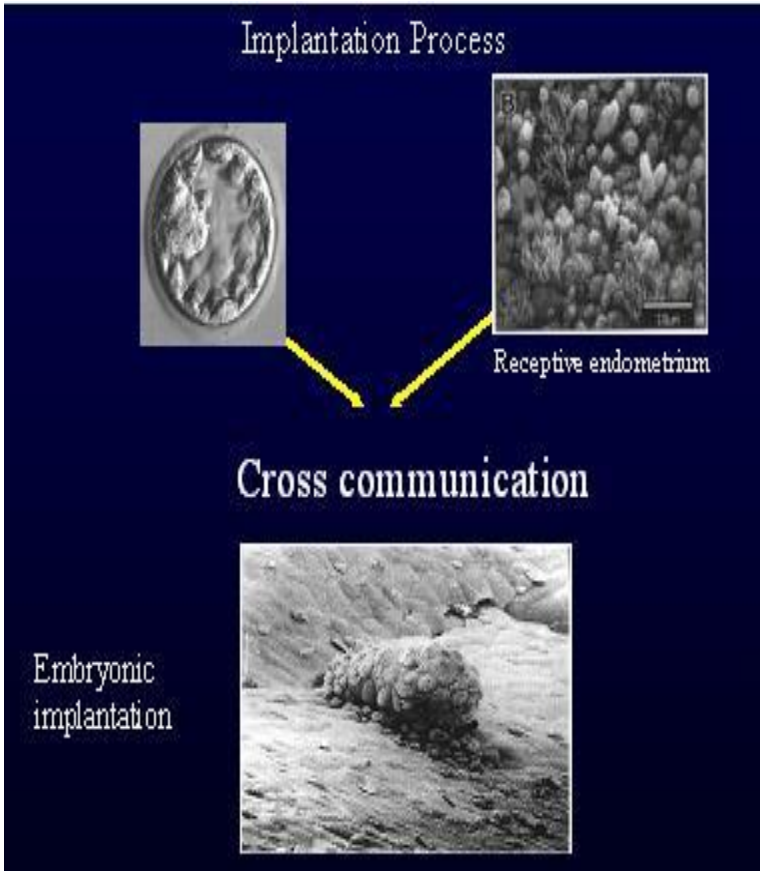
Doç. Dr. Nafiye Yılmaz

Zekai Tahir Burak Kadın Sağlığı Eğitim
Araştırma Hastanesi

TAJEV, 2014

ART & success

***Live birth rate**

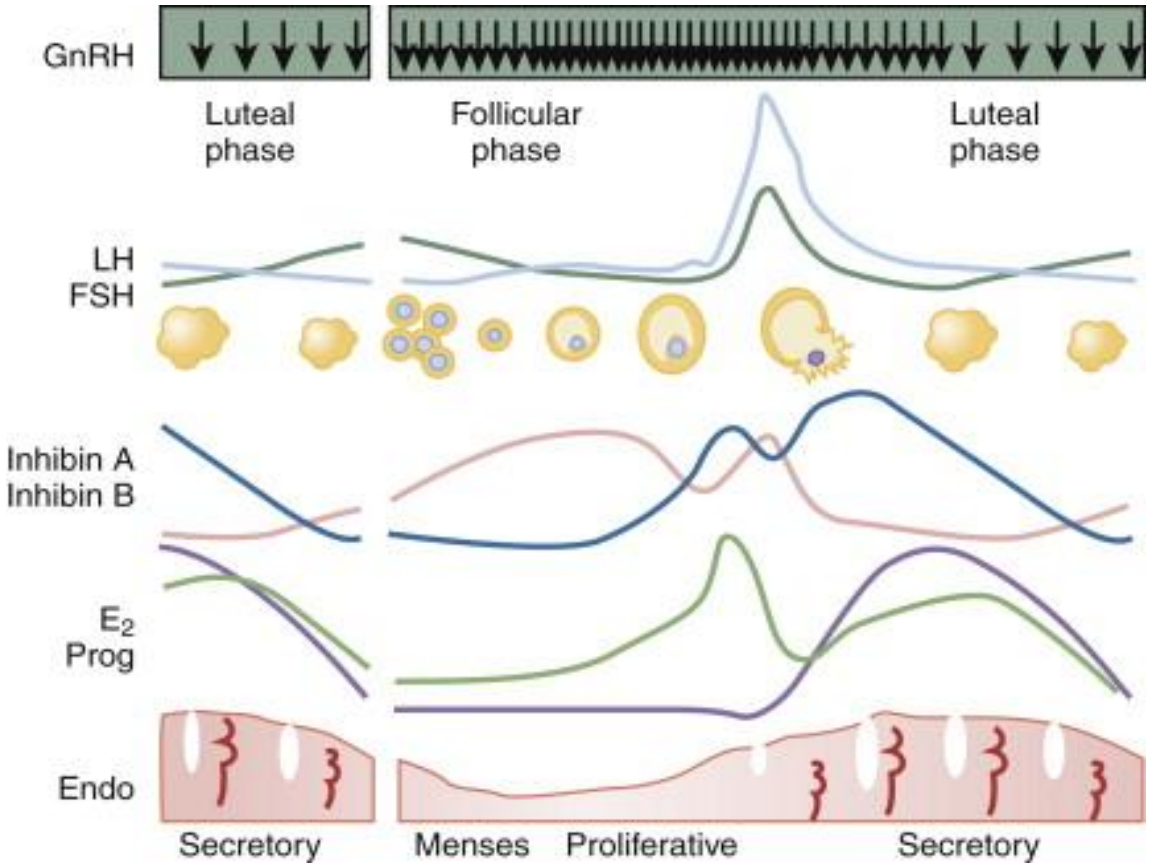


- Optimal luteal phase
- Etiology of luteal phase deficiency (LPD) in ART cycles
- Agents and routes for luteal phase support (LPS)
- When to start and stop LPS?
- LPS in the world
- LPS in Turkey
- LPS – evidence based medicine

Optimal luteal phase

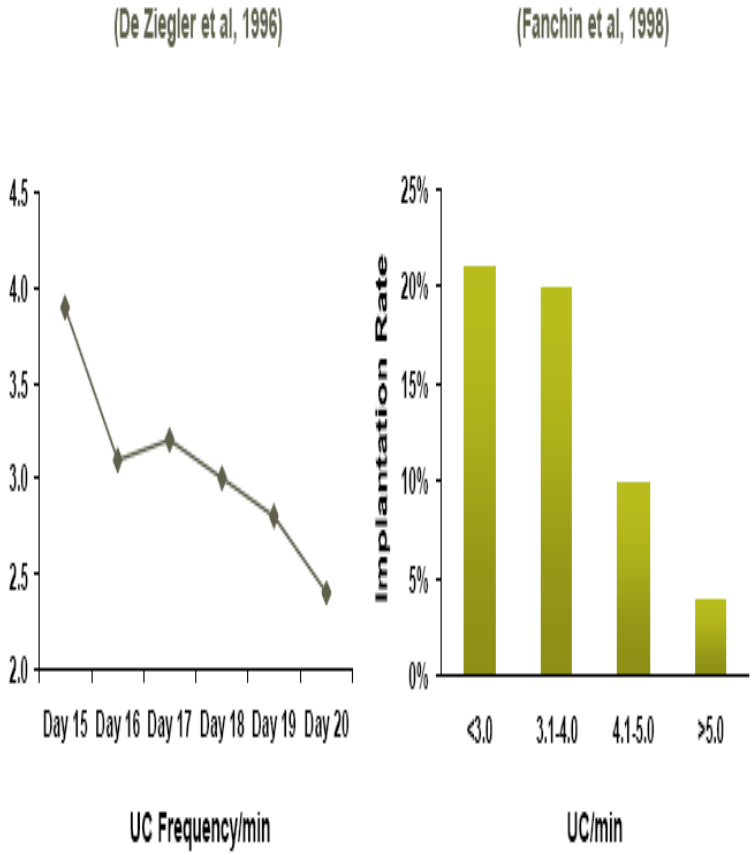
- Optimal follicular phase
- LH
- E
- P

*Corpus Luteum



Functions of Progesterone

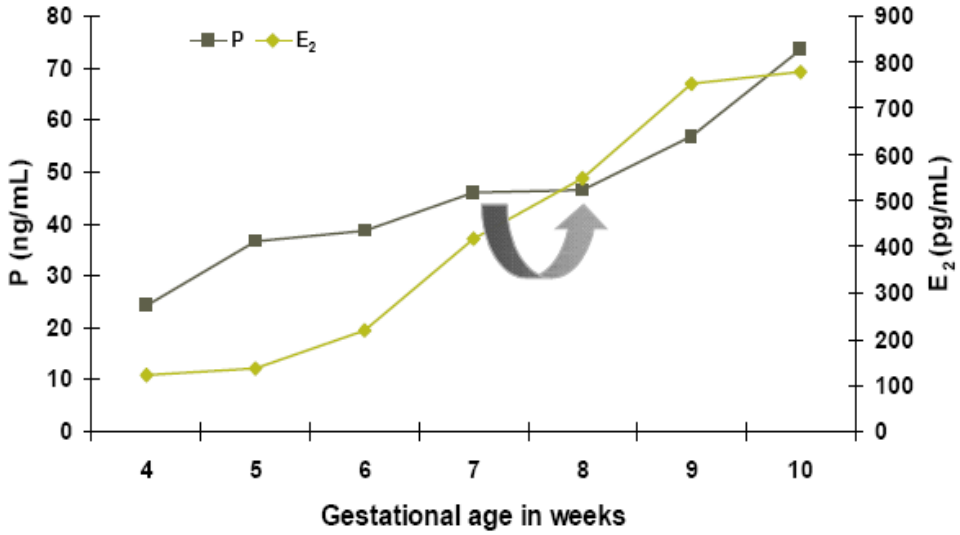
- Luteal phase - secretory endometrium
- Uterine contractility ↓
- Noninflammatory T helper 2↑- implantation ↑
- Nitric oxide↑- Endometrial blood flow and oxygen↑
- Progesterone↓ - endometrial maturation ↓



LUTEAL≈ PLACENTAL Shift

7th weeks of gestation

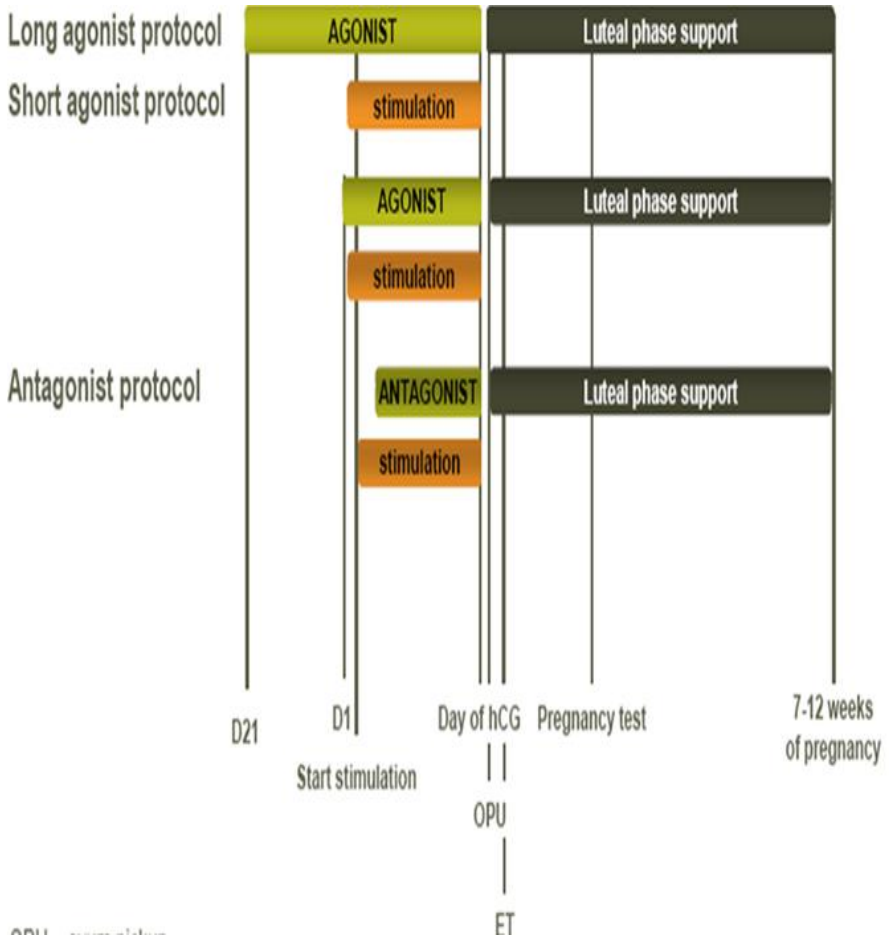
- Removal of CL prior to 7 weeks of gestation leads to pregnancy loss
- Normal pregnancy was sustained when progesterone was given after removal of CL



P = progesterone.
Scott et al. 1991.

COH- OI

- Ovarian stimulation
- Ovulation trigger
* Final maturation of oocytes
* Endometrial preparation prior to implantation
- Luteal phase



The luteal phase of the normal menstrual cycle

LH concentration 4–10 IU/L.

↓

Peak of Progesterone 25 nmol/ L (7.8 ng/ml)

7 or 8 days after the mid-cycle surge

(unless pregnancy occurs)

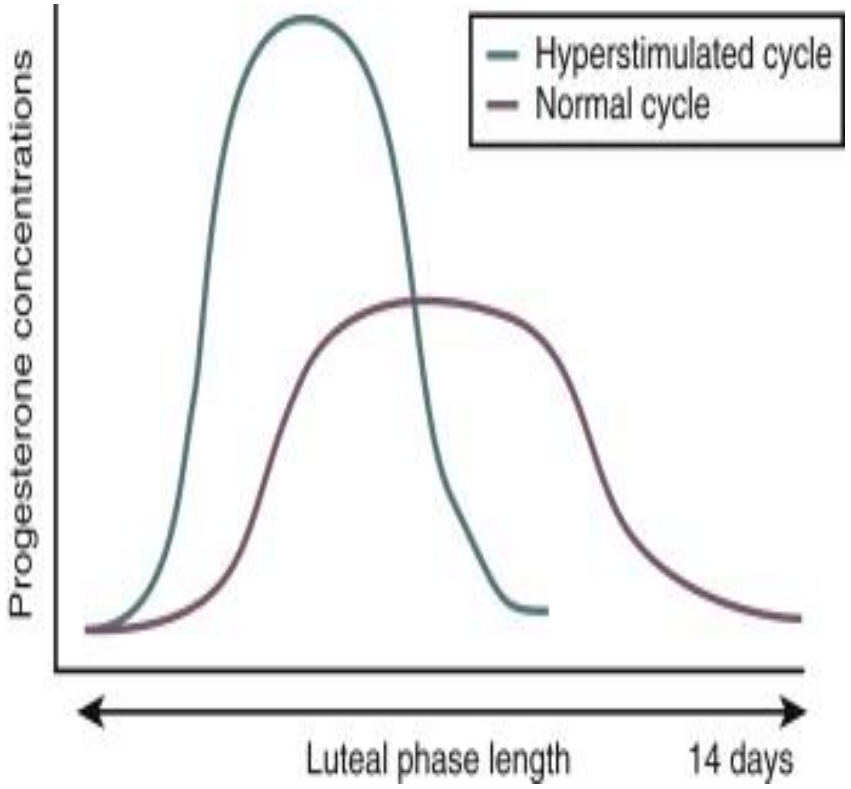
↓

Ovulation and normally functioning CL

Luteal phase in ART

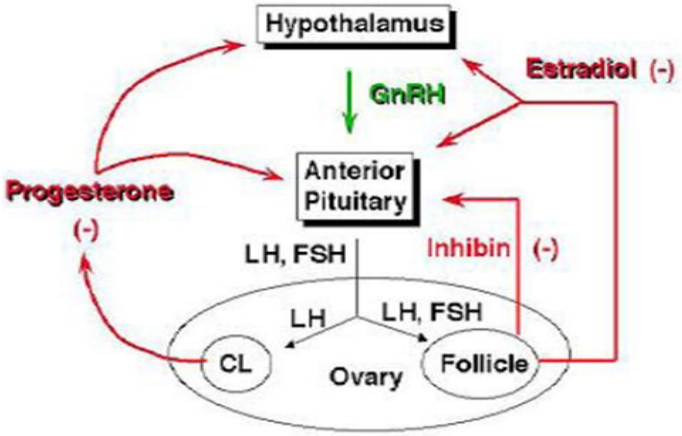
- increase in progesterone (rapidly and excessively)

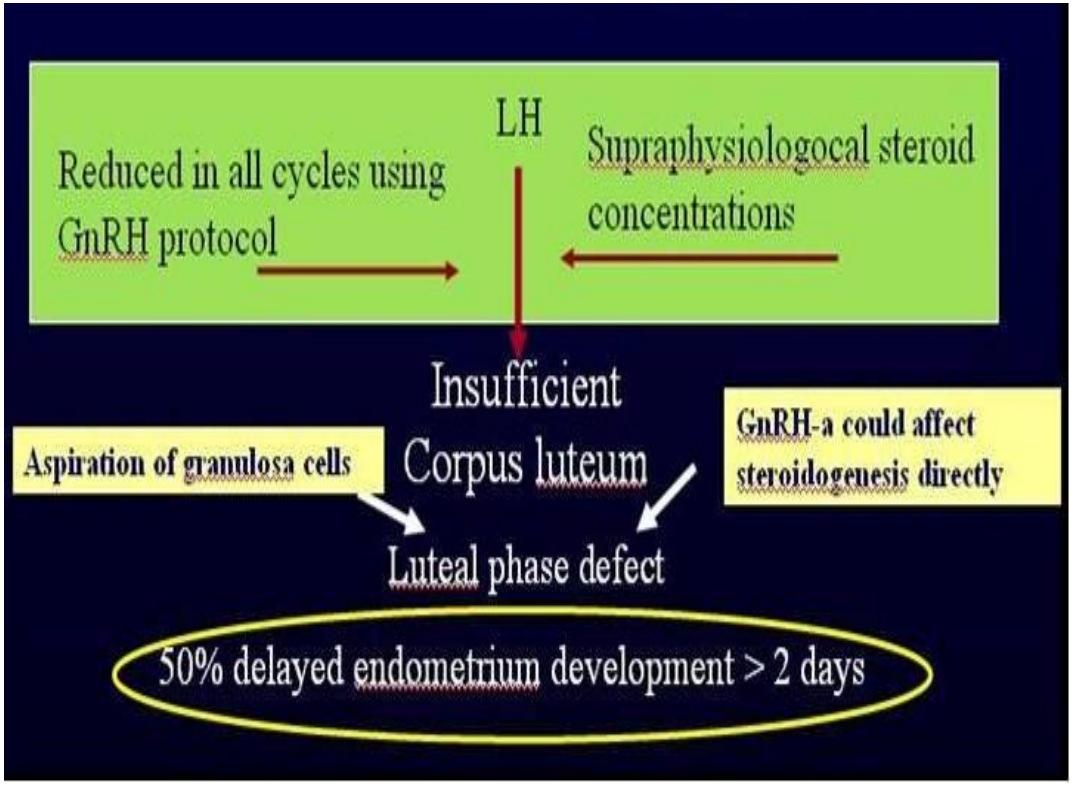
  peak of P 3-4 days after mid cycle surge
- decrease in progesterone (rapidly)
- Short luteal phase



Causes of LPD in ART

- Supraphysiological hormone levels
- Oocyte retrieval
- GnRH analog
- Ovulation trigger: HCG, GnRHa
- Endometrial "dyssynchrony"

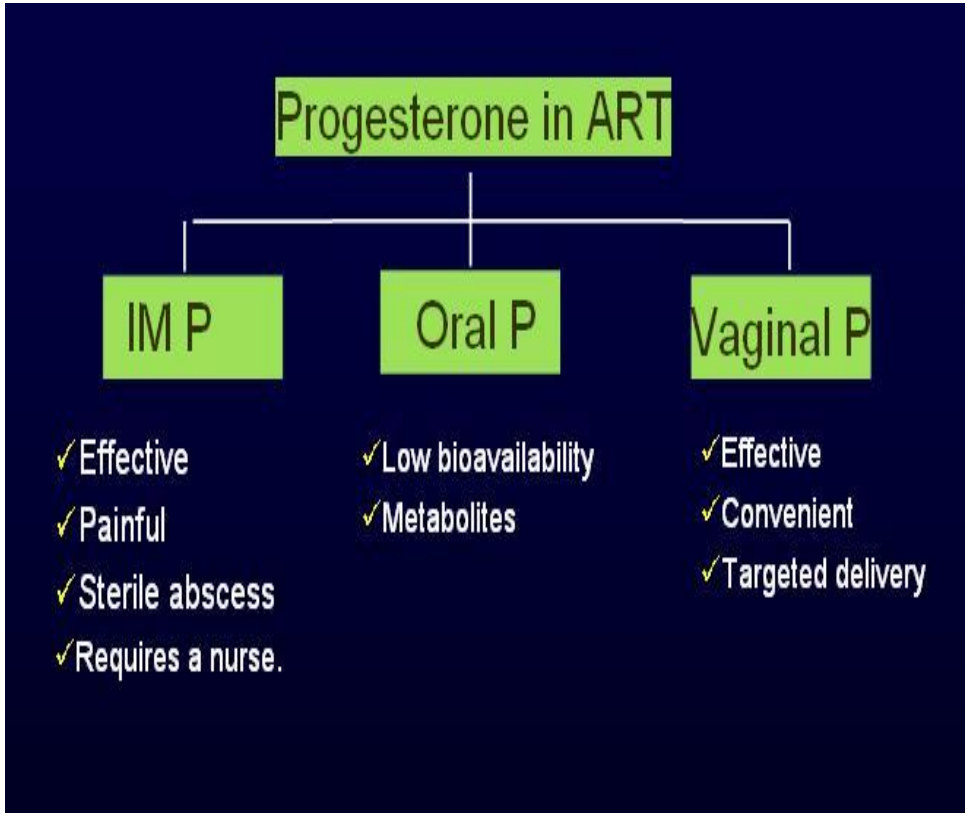


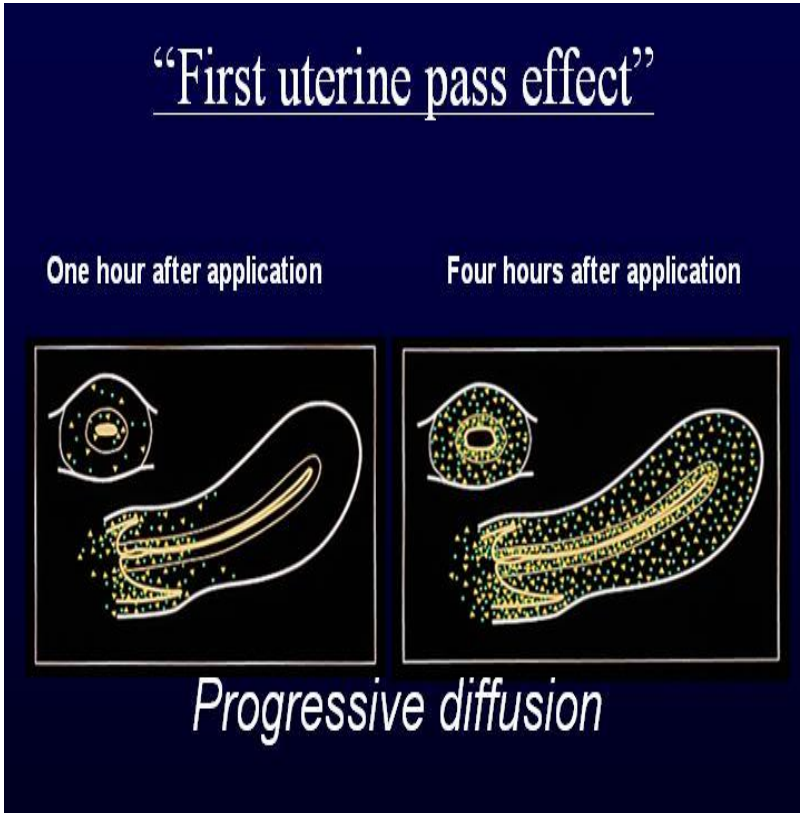


Agents and routes for luteal phase support (LPS)

- HCG
- Progesterone
- Progesterone+Estrogen
- GnRH a
- rLH
- LPS in GnRHa trigger cycles

PROGESTERONE





Vaginal (Crinone 8%) gel vs. intramuscular progesterone in oil for luteal phase support in in vitro fertilization: a large prospective trial

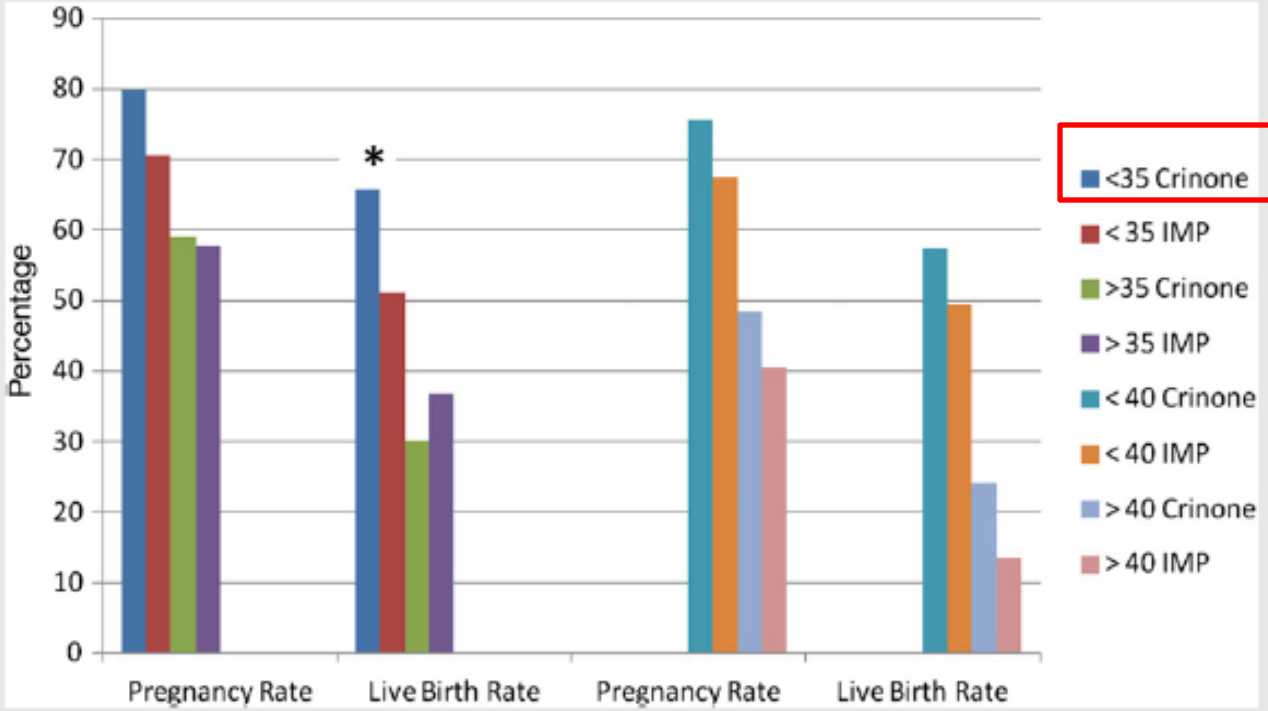
Kaylen M. Silverberg, M.D., Thomas C. Vaughn, M.D., Lisa J. Hansard, M.D., Natalie Z. Burger, M.D., and Tamara Minter, B.S.

Cycle outcome: all patients.

Variable	Crinone (n = 172)	PIO (n = 302)	*P* value
Total pregnancy rate (%)	122 (70.9%)	194 (64.2%)	.16
Live birth rate (%)	89 (51.7%)	137 (45.4%)	< .05
Spontaneous abortion (%)	8 (4.7%)	19 (6.3%)	NS
Biochemical (%)	22 (12.8%)	36 (11.9%)	NS
Ectopic (%)	3 (1.7%)	3 (1.0%)	NS

Note: NS = not significant.

Silverberg. Intravaginal vs. intramuscular progesterone. Fertil Steril 2012.



Pregnancy and live birth rates stratified by patient age. *$P<.05$.

Silverberg. Intravaginal vs. intramuscular progesterone. Fertil Steril 2012.

Conclusion(s): In younger patients undergoing IVF, support of the luteal phase with Crinone produces significantly higher pregnancy rates than does IMP. Crinone and IMP appear to be equally efficacious in the older patient. (Fertil Steril® 2012;97:344-8. ©2012 by American Society for Reproductive Medicine.)

Progesterone vaginal ring versus vaginal gel for luteal support with in vitro fertilization: a randomized comparative study

Laurel Stadtmauer, M.D., Ph.D.,[a] Kaylen M. Silverberg, M.D.,[b] Elizabeth S. Ginsburg, M.D.,[c] Herman Weiss, M.D.,[d] and Brandon Howard, Ph.D.[e]

[a] Jones Institute for Reproductive Medicine, Norfolk, Virginia; [b] Texas Fertility Center, Austin, Texas; [c] Brigham and Women's Hospital, Center for Reproductive Medicine, Boston, Massachusetts; and [d] Teva Women's Health, Petah Tikva, Israel; [e] Teva Women's Health, Frazer, Pennsylvania

Objective: To compare the efficacy and safety of luteal phase support in IVF with a progesterone (P) vaginal ring or gel (VR or VG).

Design: Prospective, randomized, single-blind, multicenter, phase III clinical trial (ClinicalTrials.gov identifier: NCT00615251).

Setting: Nineteen private and three academic high-volume U.S. IVF centers.

Patient(s): One thousand two hundred ninety-seven infertile patients were randomized to a weekly P VR (n = 646) or a daily P 8% VG (n = 651).

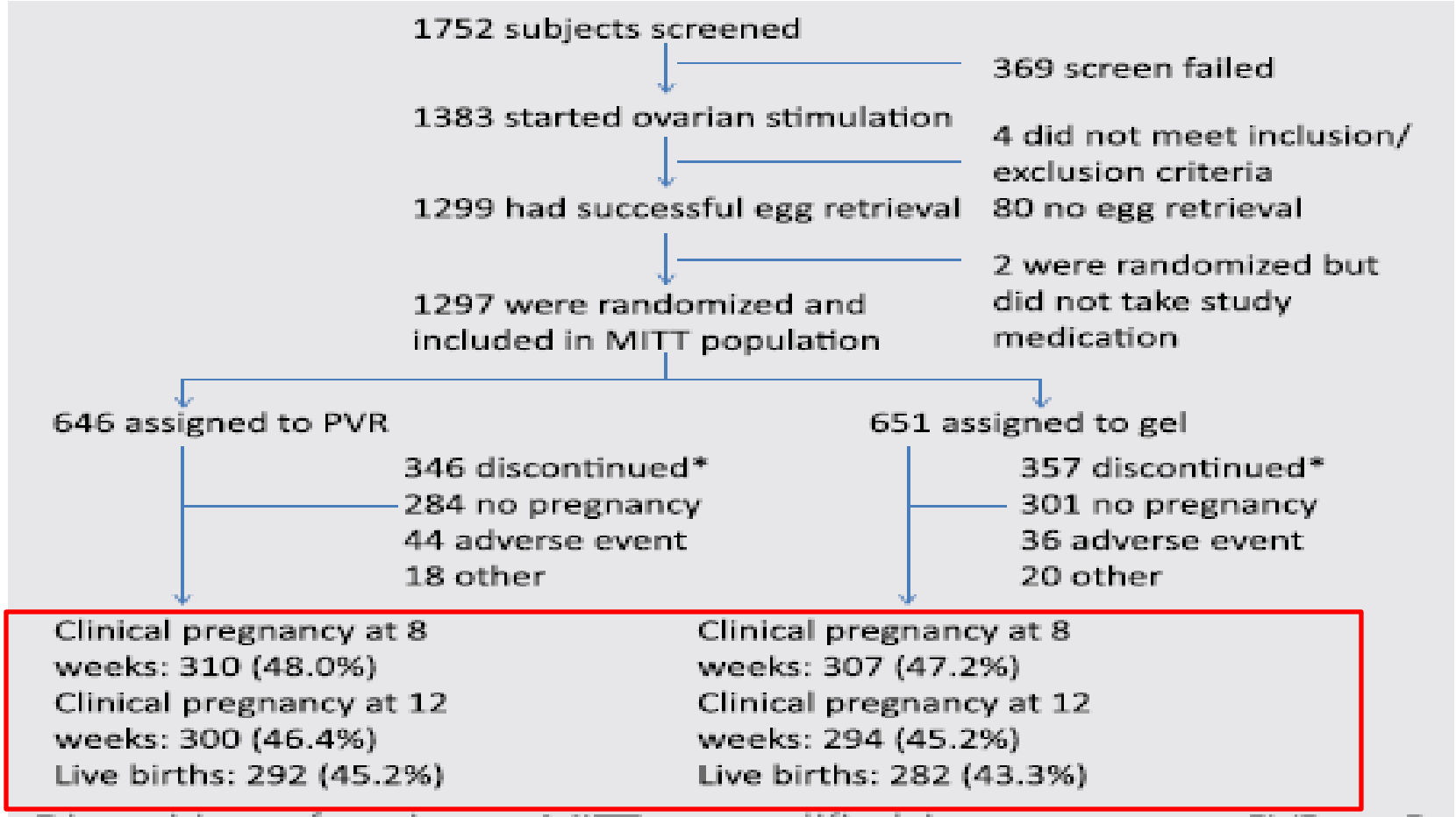
Intervention(s): IVF was performed per site-specific protocols. The day after egg retrieval, patients were randomized and began VR or VG therapy, which continued for up to 10 weeks' gestation.

Main Outcome Measure(s): Clinical pregnancy rates at 8 and 12 weeks of pregnancy; rates of biochemical pregnancy, live birth, spontaneous abortion, ectopic pregnancy, and cycle cancellation; and safety and tolerability were secondary measures.

Result(s): Clinical pregnancy rates at 8 and 12 weeks were high and comparable between groups: 48.0% for VR and 47.2% for VG at week 8 and 46.4% (VR) and 45.2% (VG) at week 12. Live-birth rates were 45% (VR) and 43% (VG). Adverse event profiles were similar between groups.

Conclusion(s): The weekly P VR provided similar pregnancy rates to the daily VG, with no major differences in safety. (Fertil Steril® 2013;99:1543–9. ©2013 by American Society for Reproductive Medicine.)

Use your smartphone



Disposition of patients. MITT = modified intent-to-treat; PVR = P vaginal ring. *Reasons for discontinuation included lack of pregnancy, not meeting protocol requirements, noncompliance with protocol, investigator discretion, subject request to be withdrawn, AE, and loss to follow-up.

Stadtmauer. P vaginal ring versus gel for IVF. Fertil Steril 2013.

Vaginal progesterone gel for luteal phase support in IVF/ICSI cycles: a meta-analysis

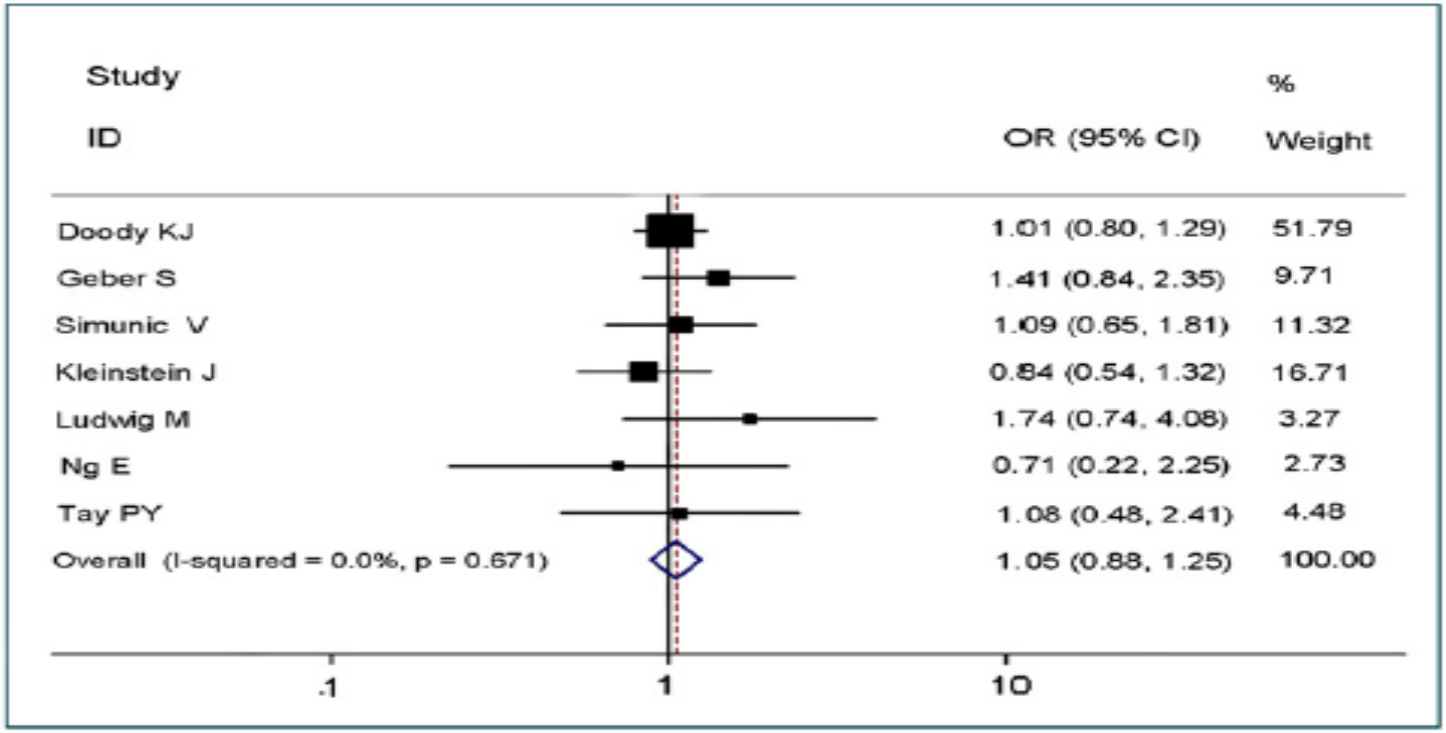
Nikolaos P. Polyzos, M.D.,[a,b] *Christina I. Messini, M.D.,*[a] *Evangelos G. Papanikolaou, M.D., Ph.D.,*[c] *Davide Mauri, M.D.,*[b] *Spyridon Tzioras, M.D.,*[b] *Ahmed Badawy, M.D., Ph.D.,*[d] *and Ioannis E. Messinis, M.D., Ph.D.*[a]

Baseline characteristics and pregnancy outcomes of eligible trials.

Author	Enroll year	Arms	Patients (n)	Age (y)	Stimulation protocol	Initiation of LPS	Embryos transfered	Clinical pregnancy (n)
Doody (16)	2005–2006	Gel 8% 90 mg × 1	403	33.1	1) GnRH agonist	OR+1	3 D3	174
		Ins 100 mg × 2	404	33	2) hMG/FSH		2 D5	163
		Ins 100 mg × 3	404	33.1				183
Geber (12)	2001–2001	Gel 8% 90 mg × 1	122	34.5	1) GnRH agonist	OR+1	<4 D2/3	54
		Cap 200 mg × 3	122	34.8	2) rFSH		3 D5	44
Simunic (13)	2004–2005	Gel 8% 90 mg × 1	140	32.4	1) GnRH agonist	NR	<3 D3/5	43
		Cap 200 mg × 3	145	31.9	2) rFSH			42
Kleinstein (11)	1999–2001	Gel 8% 90 mg × 2	212	30.1	1) GnRH agonist	ET	2/3	47
		Cap 200 mg × 3	218	30.7	2) hMG or FSH			55
Tay (15)	1999–2000	Gel 8% 90 mg × 1	36	33.5	1) GnRH agonist	ET	NR	13
		Cap 200 mg × 1/× 2/× 3	55	31.6	2) gonadotropins			19
		Pes 200 mg × 2	35	32.5				12
Ng (17)	2000–2001	Gel 8% 90 mg × 1	30	NS	1) GnRH agonist	ET	NR	7
		Pes 400 mg × 2	30	NS	2) hMG			9
Ludwig (14)		Gel 8% 90 mg × 1	73	31.4	1) GnRH agonist/	ET−1	NR	21
		Cap 200 mg × 3	53	31.5	antagonist 2) hMG or FSH			10

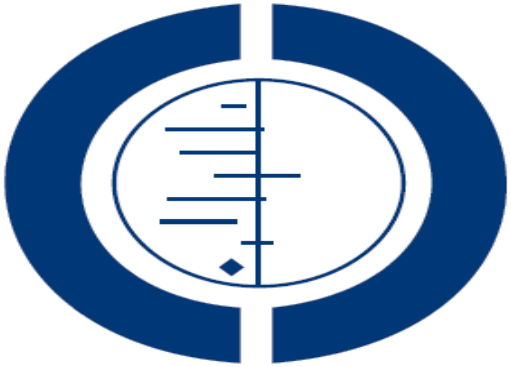
Note: Cap = capsules; ET = embryo transfer day; Ins = inserts; NR = not reported; OR = oocyte retrieval day; Pes = pessaries.

Polyzos. Vaginal progesterone gel in IVF/ICSI cycles. Fertil Steril 2010.



A. Overall clinical pregnancy

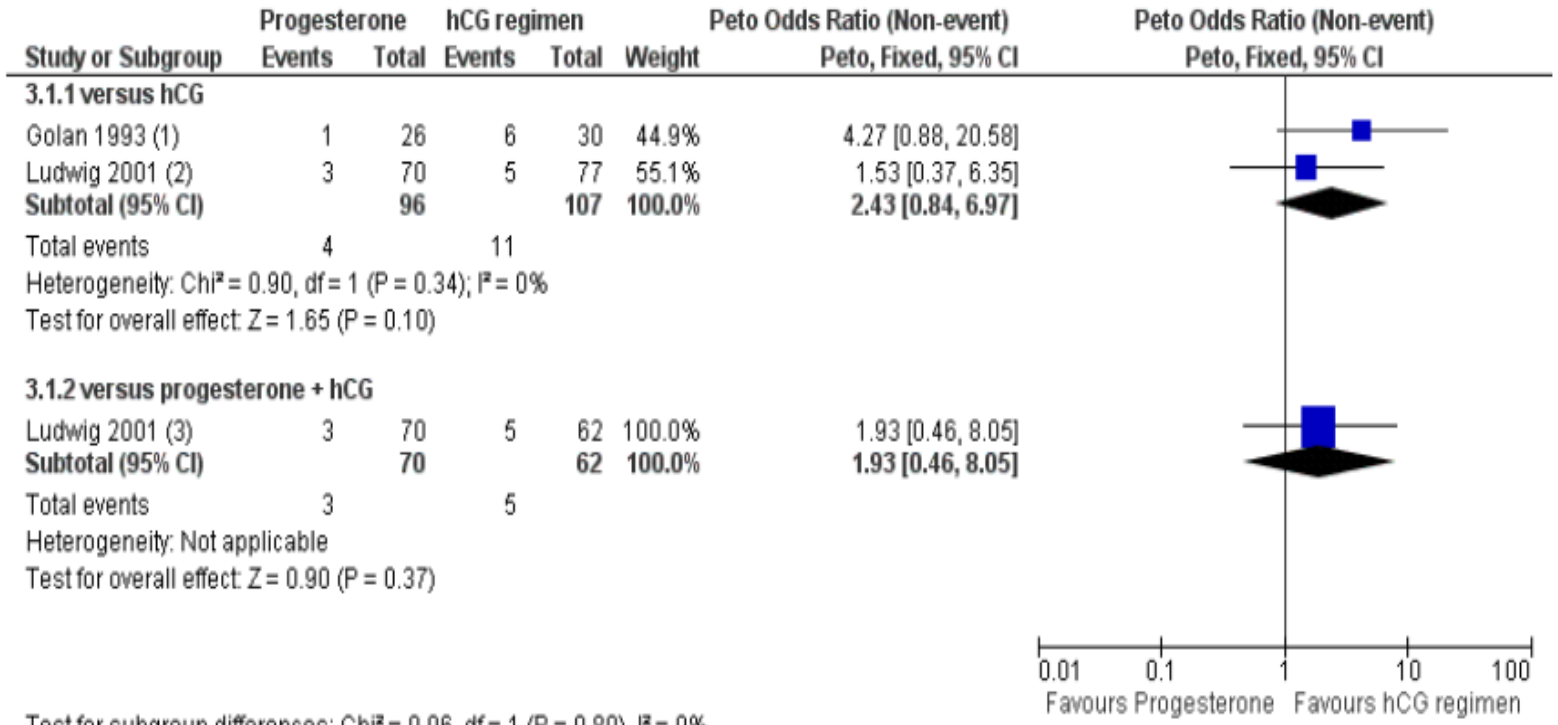
Conclusion(s): This meta-analysis provides solid evidence that no significant difference exists between vaginal gel and all other vaginal progesterone forms in terms of clinical pregnancy rates. (Fertil Steril® 2010;94:2083–7. ©2010 by American Society for Reproductive Medicine.)



Luteal phase support for assisted reproduction cycles (Review)

van der Linden M, Buckingham K, Farquhar C, Kremer JAM, Metwally M

Figure 8. Forest plot of comparison: 3 Progesterone versus hCG regimens, outcome: 3.1 Live Birth Rate.



Test for subgroup differences: Chi² = 0.06, df = 1 (P = 0.80), I² = 0%

(1) IM progesterone 100 mg daily vs IM hCG 1000 IU or 2500 IU 4 times

(2) Vaginal progesterone 200 mg 3 times daily vs hCG 5000 IU twice and 2500 IU twice

(3) Vaginal progesterone 200 mg 3 times daily vs vaginal progesterone 200 mg 3 times daily + single dose hCG 5000 IU

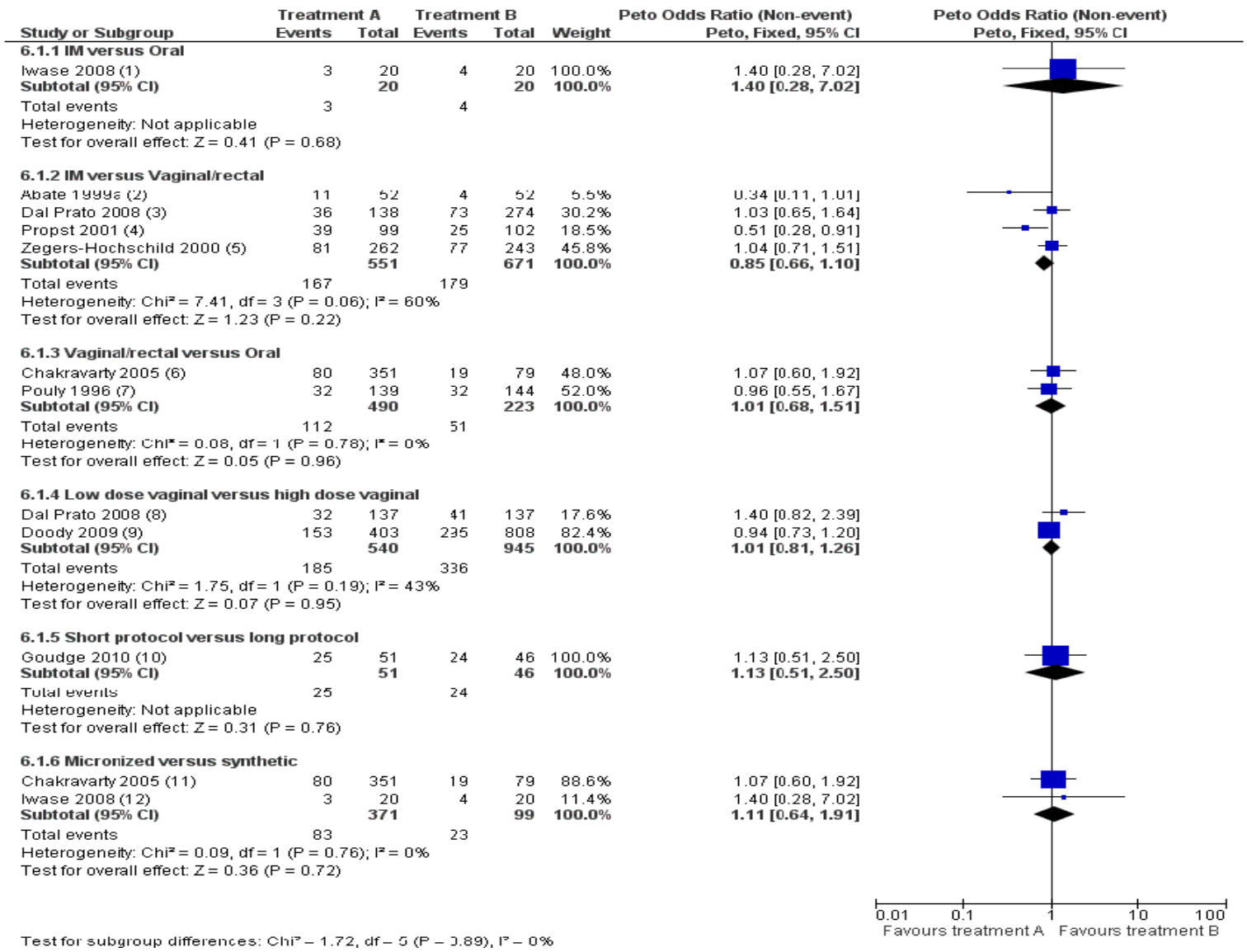
Low-dose (≤100 mg) vs high-dose (>100 mg) vaginal P Outcome

	No. of studies	No. of participants	OR (95% CI)
Live birth	2	1485	1.01 (0.81-1.26)
Clinical preg. rate	12	4973	1.04 (0.92-1.17)
Ongoing preg. rate	5	3034	0.99 (0.85-1.15)
Miscarriage rate	8	2350	1.27 (0.85-1.89)
Multiple preg. rate	4	905	0.95 (0.57-1.58)

im vs vaginal P

	No. of studies	No. of participants	OR (95% CI)
Live birth rate	4	1222	0.85 (0.66-1.10) **a**
Clinical pregnancy rate	13	2932	1.14 (0.97-1.33)
Ongoing pregnancy rate	4	1223	1.34 (1.05-1.71) **b**
Miscarriage rate	5	1324	1.18 (0.80-1.72)
Multiple pregnancy rate	1	505	1.03 (0.63-1.67)

Figure 11. Forest plot of comparison: 6 IM progesterone versus oral progesterone, outcome: 6.1 Live Birth Rate.



sc P (Prolutex) vs vaginal P (Crinone)-IVF: A non-inferiority RCT

	Prolutex	Crinone	p
Ongoing pregnancy-ITT	27.4%	30.5%	0.40
Ongoing pregnancy-PP	29.2%	31.2%	0.61
Implantation rate-ITT	35.0	33.1	0.85
Implantation rate-PP	35.1	32.9	0.97
Delivery-live birth-ITT	26.8	29.9	0.37
Delivery-live birth-PP	28.5	30.5	0.58

ITT = intention to treat; PP = per protocol

Lockwood, Fertil Steril , 2013

Comparison of oral dydrogestrone with progesterone gel and micronized progesterone for luteal support in 1,373 women undergoing in vitro fertilization: a randomized clinical study

Ashalatha Ganesh, M.B.B.S., M.M.S.T., Ph.D.,[a] Nishant Chakravorty, M.B.B.S., M.M.S.T.,[a] Rashmi Mukherjee, M.Sc.,[a] Sourendrakanta Goswami, M.B.B.S.,[b] Koel Chaudhury, Ph.D.,[a] and Baidyanath Chakravarty, M.B.B.S., M.D.[b]

Demographic data of patients randomly subjected to three different luteal supplementation protocols.

Demographic parameter	Oral dydrogesterone protocol, group A (n = 422)	Micronized vaginal P gel, group B (n = 482)	Vaginal P capsules, group C (n = 459)
Mean age (y)	32 ± 4.53	32 ± 4.65	33 ± 4.59
Mean BMI (kg/m^2)	23.71 ± 3.59	23.88 ± 3.45	23.85 ± 3.49
FSH (mIU/mL)	6.36 ± 1.76	5.98 ± 1.79	6.40 ± 2.01
LH (mIU/mL)	5.48 ± 2.64	5.24 ± 1.94	5.44 ± 2.40
E_2 (pg/mL)	47.73 ± 27.70	48.14 ± 29.38	46.07 ± 30.55
Basal antral follicle	14.50 ± 12.85	13.88 ± 7.61	12.20 ± 7.22
Endometrial thickness	9.41 ± 1.90	8.79 ± 3.28	8.96 ± 2.23
Pregnancy rate	28.67 (121/422)[a]	28.63 (138/482)[a]	22.65 (104/459)[a]
Miscarriage rate	11.57 (14/121)[a]	13.04 (18/138)[a]	18.26 (19/104)[a]

Note: Data presented as mean ± SD or percentage (number).

[a] Not significant.

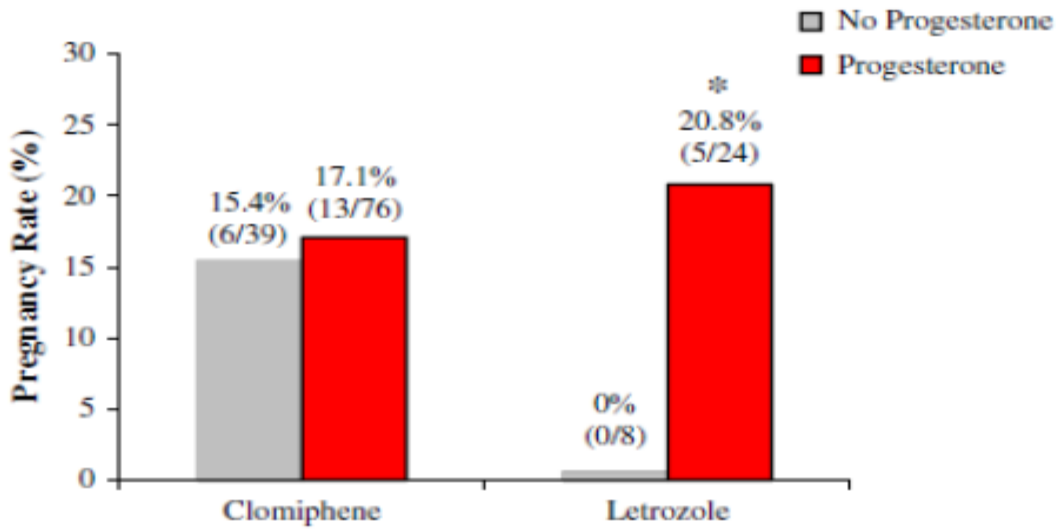
Ganesh. Oral dydrogesterone as luteal support. Fertil Steril 2011.

Luteal support with intravaginal progesterone increases clinical pregnancy rates in women with polycystic ovary syndrome using letrozole for ovulation induction

Christopher P. Montville, M.D., Maram Khabbaz, M.D., Mira Aubuchon, M.D., Daniel B. Williams, M.D., and Michael A. Thomas, M.D.

FIGURE 3

Pregnancy rates in IUI cycles. *$P < .01$, difference of proportion.



Montville. Vaginal P in letrozole cycles. Fertil Steril 2010.

Impact of luteal phase support on pregnancy rates in intrauterine insemination cycles: a prospective randomized study

Ahmet Erdem, M.D., Mehmet Erdem, M.D., Songül Atmaca, M.D., and Ismail Guler, M.D.

Department of Obstetrics and Gynecology, Gazi University School of Medicine, Ankara, Turkey

Objective: To determine the impact of luteal phase support on pregnancy rates in ovarian stimulation and intrauterine insemination (IUI) cycles with gonadotropins in couples with unexplained infertility.
Design: Prospective randomized controlled trial.
Setting: University-based infertility clinic.
Patient(s): Two hundred fourteen couples with unexplained infertility who were treated during 427 ovarian stimulation and IUI cycles with recombinant FSH.
Intervention(s): Patients underwent ovarian stimulation with recombinant FSH combined with IUI. Patients randomized into the study group (n = 109) received luteal phase support in the form of vaginal progesterone gel (Crinone 8% gel). Patients randomized into the control group (n = 105) received no luteal phase support.
Main Outcome Measure(s): Clinical pregnancy and live birth rate per cycle and per patient.
Result(s): Demographic data were found to be homogeneous between the study and control groups. Clinical pregnancy rates per cycle and per patient were significantly higher in the study group (21.1% and 39.4%, respectively) compared with the control group (12.7% and 23.8%, respectively). Live birth rate per cycle and per patient was also significantly higher in patients with luteal support (17.4% and 35.8%, respectively) compared with control subjects (9.3% and 18.1%, respectively).
Conclusion(s): Luteal phase support with vaginal progesterone gel significantly affects the success of ovarian stimulation and IUI cycles in patients with unexplained infertility. (Fertil Steril® 2009;91:2508–13. ©2009 by American Society for Reproductive Medicine.)

Cycle characteristics of patients undergoing treatment with (study group) or without (control group) vaginal progesterone gel.

	Study group	Control group	
Duration of therapy (days)	8.7 ± 2.4	9.1 ± 3.1	NS
Total amount of gonadotropins (IU)	985.2 ± 511.3	937.9 ± 417.6	NS
No. of follicles 9–16 mm	2.9 ± 2.1	2.8 ± 2.1	NS
No. of dominant follicles (>16 mm.)	1.6 ± 0.6	1.5 ± 0.9	NS
Endometrial thickness on the day of hCG	10.9 ± 1.9	10.9 ± 2.0	NS
Total progressive motile sperm number after sperm preparation ($\times 10^6$/mL)	37.2 ± 45.6	48.8 ± 58.0	NS
Type of gonadotropin			NS
rec alpha	116	107	
rec beta	107	97	
Total pregnancy rate per cycle (%)	56/223 (25.1)	28/204 (13.7)	*P*=.002
Clinical pregnancy rate per cycle (%)	47/223 (21.1)	26/204 (12.7)	*P*=.028
Live birth rate per cycle (%)	39/223 (17.4)	19/204 (9.3)	*P*=.016
Clinical pregnancy rate per patient (%)	43/109 (39.4%)	25/105 (23.8%)	*P*=.01
Live birth rate per patient (%)	39/109 (35.8%)	19/105 (18.1%)	*P*=.003
Multiple pregnancy rate per cycle	3/223 (1.34%)	4/204 (1.96%)	NS

Erdem. Luteal support in IUI with gonadotropins. Fertil Steril 2009.

Progesterone luteal support after ovulation induction and intrauterine insemination: a systematic review and meta-analysis

Micah J. Hill, D.O.,[a] Brian W. Whitcomb, Ph.D.,[b] Terrence D. Lewis, M.D.,[c] Mae Wu, D.O.,[c] Nancy Terry,[d] Alan H. DeCherney, M.D.,[a] Eric D. Levens, M.D.,[e] and Anthony M. Propst, M.D.[c]

Objective: To evaluate the effect of luteal phase P support after ovulation induction IUI.
Design: A systematic review and meta-analysis.
Setting: Not applicable.
Patient(s): Undergoing ovulation induction IUI.
Intervention(s): Any form of exogenous P in ovulation induction IUI cycles.
Main Outcome Measure(s): Clinical pregnancy and live birth.
Result(s): Five trials were identified that met inclusion criteria and comprised 1,298 patients undergoing 1,938 cycles. Clinical pregnancy (odds ratio [OR] 1.47, 95% confidence interval [CI] 1.15–1.98) and live birth (OR 2.11, 95% CI 1.21–3.67) were more likely in P-supplemented patients. These findings persisted in analyses evaluating per IUI cycle, per patient, and first cycle only data. In subgroup analysis, patients receiving gonadotropins for ovulation induction had the most increase in clinical pregnancy with P support (OR 1.77, 95% CI 1.20–2.6). Conversely, patients receiving clomiphene citrate (CC) for ovulation induction showed no difference in clinical pregnancy with P support (OR 0.89, 95% CI 0.47–1.67).
Conclusion(s): Progesterone luteal phase support may be of benefit to patients undergoing ovulation induction with gonadotropins in IUI cycles. Progesterone support did not benefit patients undergoing ovulation induction with CC, suggesting a potential difference in endogenous luteal phase function depending on the method of ovulation induction. (Fertil Steril® 2013;100:1373–80. ©2013 by American Society for Reproductive Medicine.)

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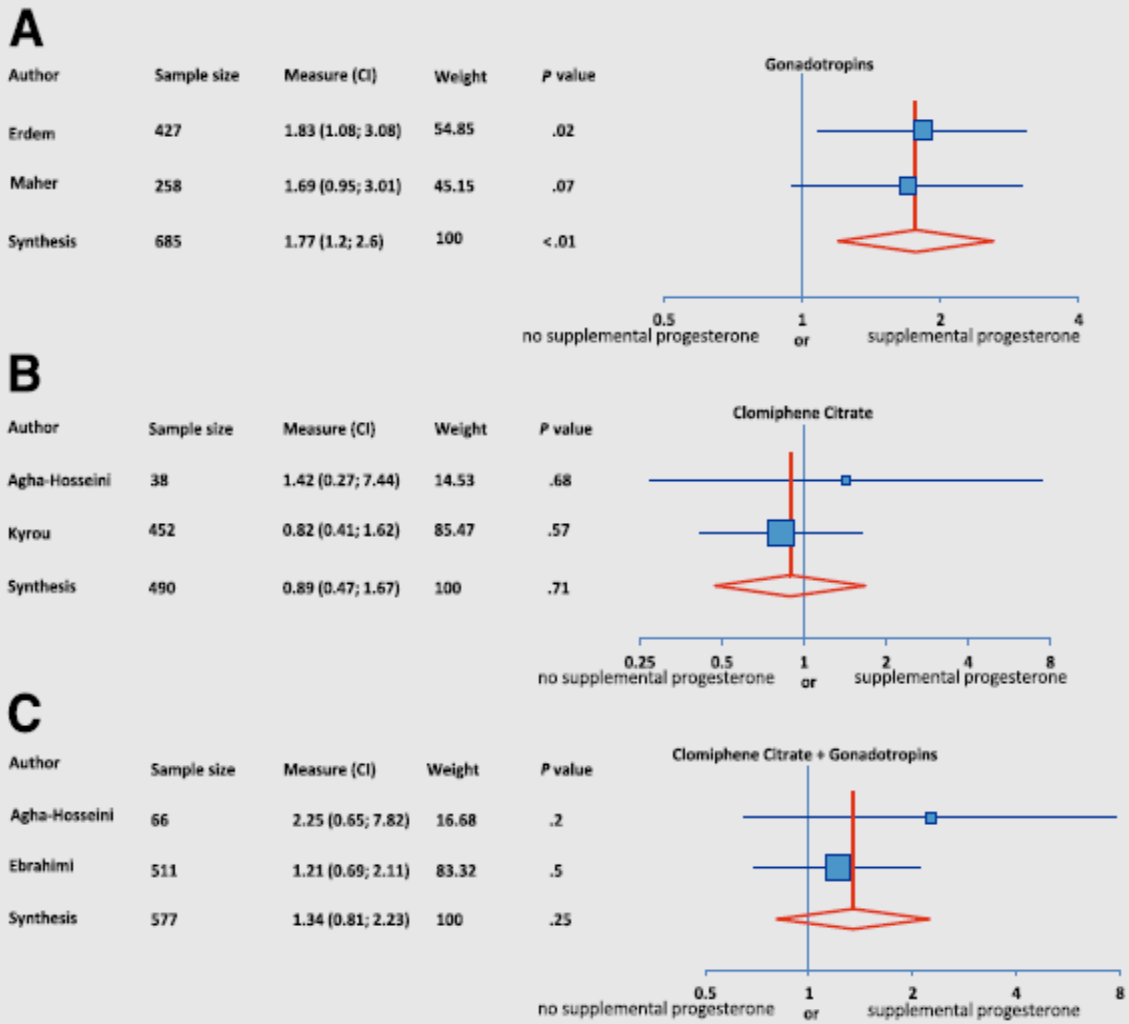

Forrest plot of clinical pregnancy in subgroup analysis based on method of ovulation induction. (A) gonadotropins; (B) clomiphene citrate; (C) clomiphene citrate + gonadotropins. CI = confidence interval.

Hill. Progesterone luteal support for IUIs. Fertil Steril 2013.

The Journal of Reproductive Medicine©

Effect of Luteal Phase Support with Vaginal Progesterone in Intrauterine Insemination Cycles with Regard to Follicular Response

A Prospective Randomized Study

Berna Seckin, M.D., Figen Turkcapar, M.D., Yunus Yıldız, M.D., Bahar Senturk, M.D., Nafiye Yılmaz, ___, and Cavidan Gulerman, ___

OBJECTIVE: To investigate the effect of luteal phase support with vaginal progesterone on pregnancy rates of the gonadotropin-stimulated intrauterine insemination (IUI) cycles in patients with unexplained infertility with regard to follicular growth.

STUDY DESIGN: A total of 149 patients with unexplained infertility who underwent 166 recombinant follicle stimulated hormone–stimulated IUI cycles were prospectively randomized into 2 groups for luteal phase support. The study group (n = 71) received vaginal progesterone gel supplementation, and the control group (n = 78) received no drug for luteal support. The clinical pregnancy rates and live birth rates per cycle and per patient were compared between the groups.

RESULTS: The differences between the groups with regard to clinical pregnancy rates and live birth rates per patient or per cycle were not different among all patients. In cycles with > 1 dominant follicle (multifollicular response), the clinical pregnancy rate per patient was significantly higher in the supported cycles as compared with the unsupported cycles (28.2% vs. 11.4%, respectively, p = 0.04). Reproductive outcomes in cycles with a single dominant follicle (monofollicular response) were not different between supported and unsupported cycles.

CONCLUSION: Luteal phase support with vaginal progesterone affects the success of gonadotropin-stimulated IUI cycles with multifollicular response but not with monofollicular response. (J Reprod Med 2014;59:000–000)

The clinical pregnancy rate per patient was significantly higher in the supported cycles with > 1 dominant follicle.

Keywords: assisted reproduction techniques, infertility, intrauterine insemination, luteal phase support, progesterone, recombinant FSH, unexplained infertility, vaginal progesterone.

A good-quality luteal phase requires adequate progesterone (P) secretion, which prepares the endometrium for implantation[1] and is also critical for the maintenance of early pregnancy.[2] The corpus luteum is an important contributor of P under the influence of pituitary-derived luteinizing hormone (LH) and later trophoblast-derived human chorionic gonadotropin (hCG) during a cycle of conception.[3,4]

Efficacy of luteal phase support with vaginal progesterone in intrauterine insemination: a systematic review and meta-analysis.

Miralpeix E, González-Comadran M, Solà I, Manau D, Carreras R, Checa MA - J. Assist. Reprod. Genet. - **Jan 2014**; 31(1); 89-100

Abstract

The supplementation of luteal phase with vaginal progesterone significantly increases live birth among women undergoing IUI when receiving gonadotropins for ovulation induction. Women receiving CC to induce ovulation do not seem to benefit from this treatment

PROGESTERONE + ESTROGEN

Human Reproduction Vol.23, No.6 pp. 1346–1354, 2008
Advance Access publication on April 12, 2008
doi:10.1093/humrep/den115

Estrogen addition to progesterone for luteal phase support in cycles stimulated with GnRH analogues and gonadotrophins for IVF: a systematic review and meta-analysis

E.M. Kolibianakis[1,3], C.A. Venetis[1], E.G. Papanikolaou[1], K. Diedrich[2], B.C. Tarlatzis[1] and G. Griesinger[2]

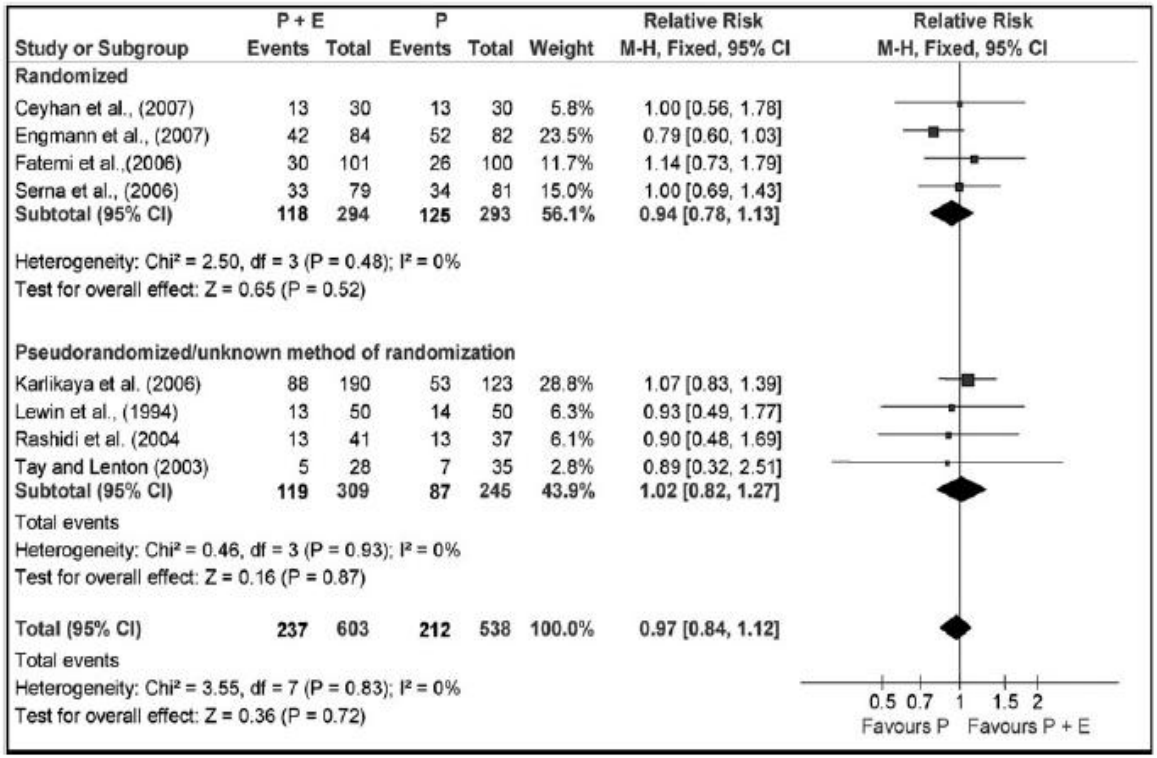

Figure 3: RR for clinical pregnancy in randomized trials and in trials with pseudo-randomization or unknown randomization methods, evaluating estrogen addition to progesterone during the luteal phase.

European Journal of Obstetrics & Gynecology and Reproductive Biology 167 (2013) 171–175

Contents lists available at SciVerse ScienceDirect

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Oral oestradiol supplementation as luteal support in IVF/ICSI cycles: a prospective, randomized controlled study

H. Lin, Y. Li *, L. Li, W. Wang, Q. Zhang, X. Chen, D. Yang

Department of Gynaecology and Obstetrics, Sun Yat-sen Memorial Hospital of Sun Yat-sen University, Guangzhou, China

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Keywords:
Oestradiol
Luteal phase support
Clinical pregnancy rate

ABSTRACT

Objective: To explore whether oral oestradiol (E2) supplementation (6 mg) in the luteal phase is beneficial to the outcome of patients undergoing gonadotrophin-releasing hormone agonist (GnRHa) long protocol in vitro fertilization (IVF)/intracytoplasmic sperm injection (ICSI) cycles.
Study design: Prospective, randomized, controlled study at the IVF Clinic, Sun Yat-sen Memorial Hospital. In total, 402 patients with an indication for IVF or ICSI were recruited. Patients were prospectively randomized to receive either progesterone injection plus oral E2 supplementation (Group A, $n = 202$) or progesterone injection alone (Group B, $n = 200$) as luteal support after oocyte retrieval. The main outcome measure was the clinical pregnancy rate.
Results: No significant difference in the clinical pregnancy rate or miscarriage rate was observed between Group A and Group B (50.9% vs 58.0%, 14.6% vs 11.2%; $p > 0.05$). In different age subgroups (≤35 years and >35 years) all measurements were comparable in patients with or without E2 supplementation, as well as in subgroups with different E2 levels on the day of human chorionic gonadotrophin injection (E2 ≥ 3000 pg/ml and E2 < 3000 pg/ml).
Conclusion: Adding E2 as luteal support did not increase the clinical pregnancy rate or reduce the miscarriage rate. Routine use of a combination of E2 and progesterone as luteal support in GnRHa long protocol IVF/ICSI cycles is not recommended.

Table 2
Comparison of outcomes between the two groups.

	Group A	Group B	*p*-Value
Clinical pregnancy rate [% (*n*)]	50.9 (103/202)	58.0 (116/200)	0.307
Implantation rate [% (*n*)]	32.7 (146/447)	38.8 (170/438)	0.058
Livebirth rate [% (*n*)]	43.6 (88/202)	51.5 (103/200)	0.238
Miscarriage rate [% (*n*)]	14.6 (15/103)	11.2 (13/116)	0.443
Moderate OHSS rate [% (*n*)]	3.5 (7/202)	2.5(5/200)	0.570

OHSS, ovarian hyperstimulation syndrome.

Effects of estradiol supplementation during the luteal phase of in vitro fertilization cycles: a meta-analysis

Byung Chul Jee, M.D.,[a] *Chang Suk Suh, M.D.,*[a,b,c] *Seok Hyun Kim, M.D.,*[b,c] *Yong Beom Kim, M.D.,*[a] *and Shin Yong Moon, M.D.*[b,c]

Result(s): There were no statistically significant differences between E_2+P versus P-only group regarding overall IVF outcomes. From seven studies including GnRH agonist cycles, no statistical significant differences were found between the two groups in clinical PR per patient (relative risk [RR] 1.32, 95% confidence interval [CI] 0.79–2.19), clinical PR per ET (RR 1.83, 95% CI 0.96–3.49), implantation rate (RR 1.20, 95% CI 0.34–4.21), ongoing PR per patient (RR 1.34, 95% CI 0.37–4.82), clinical abortion rate (RR 1.05, 95% CI 0.48–2.28), and ectopic PR (RR 0.53, 95% CI 0.07–4.10). Clinical PR per patient (RR 0.94, 95% CI 0.62–1.42) and ongoing PR per patient (RR 1.09, 95% CI 0.79–1.50) from three studies including GnRH antagonist cycles only were all similar between the two groups.

Conclusion(s): The combined data presented in this meta-analysis suggest that the addition of E_2 to P for luteal phase support does not improve IVF outcomes in GnRH agonist and antagonist cycles. However, the authors feel that there is an obvious need for further large-scale studies regarding GnRH antagonist cycles. (Fertil Steril® 2010;93:428–36. ©2010 by American Society for Reproductive Medicine.)

A comparison of the effects of three different luteal phase support protocols on in vitro fertilization outcomes: a randomized clinical trial

Turgut Var, M.D., Esra Aysin Tonguc, M.D., Melike Doğanay, M.D., Cavidan Gulerman, M.D., Tayfun Gungor, M.D., and Leyla Mollamahmutoglu, M.D.

In vitro fertilization cycle characteristics of the three treatment groups.

Characteristic	Group 1 (E_2 + P), n = 96	Group 2 (hCG + P), n = 95	Group 3 (P only), n = 97	*P* value
No. of oocytes retrieved	9.1 ± 3.9	9.5 ± 3.9	9.5 ± 1.8	.65
No. of embryos transferred	2.7 ± 1.0	2.6 ± 0.6	2.7 ± 0.4	.28
Implantation rate (%)	16.7 ± 22.7	20.0 ± 21.6	7.9 ± 15.4	.001[a]
Clinical PR, % (no.)	40.6 (39/96)	38.9 (37/95)	21.6 (21/97)	.01[a]
Miscarriage rate, % (no.)	12.8 (5/39)	13.5 (5/37)	38 (8/21)	.02[a]
Multiple-pregnancy rate, % (no.)	2.3 (2/96)	14.7 (14/95)	0 (0/97)	.001[b]

Note: $P < .05$ was considered to be statistically significant. Data are expressed as mean ± SD or as percentage and number.

[a] Group 3 versus group 1 and group 2.

[b] Group 2 versus group 1 and group 3.

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journal homepage: www.elsevier.com/locate/ejogrb

Estradiol supplementation during the luteal phase of in vitro fertilization cycles: a prospective randomised study

Esra Tonguc *, Turgut Var, Sebnem Ozyer, Ayse Citil, Muammer Dogan

Zekai Tahir Burak Women's Health Education and Research Hospital, Ankara, Turkey

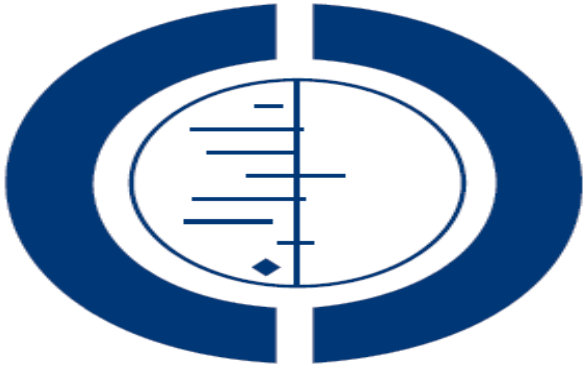
Implantation, pregnancy, miscarriage and multiple pregnancy rates in the three treatment groups.

	Group 1 (n=95)	Group 2 (n=95)	Group 3 (n=95)	p
Implantation rate (IR) (%)	11.9%	16.4%	12.8%	NS
Clinical pregnancy rate (PR) (n, %)	30 (31.6%)	38 (40%)	31 (32%)	NS
Miscarriage rate (n, %)	6/30 (20%)[a]	1/38 (2.6%)[a]	3/31 (9.6%)	0.04[a]
Multiple pregnancy rate (n, %)	2 (2.1%)	7 (7.3%)	8 (8.4%)	NS

NS: non significant.

[a] χ^2 test: $p < 0.05$ is considered significant.

Condensation: For luteal phase support, adding 2, 4 or 6 mg of oral estradiol to progesterone showed no statistical difference in terms of pregnancy and implantation rates, but a significantly higher miscarriage rate was found when 2 mg estradiol was used.



Luteal phase support for assisted reproduction cycles (Review)

van der Linden M, Buckingham K, Farquhar C, Kremer JAM, Metwally M

P vs P+E

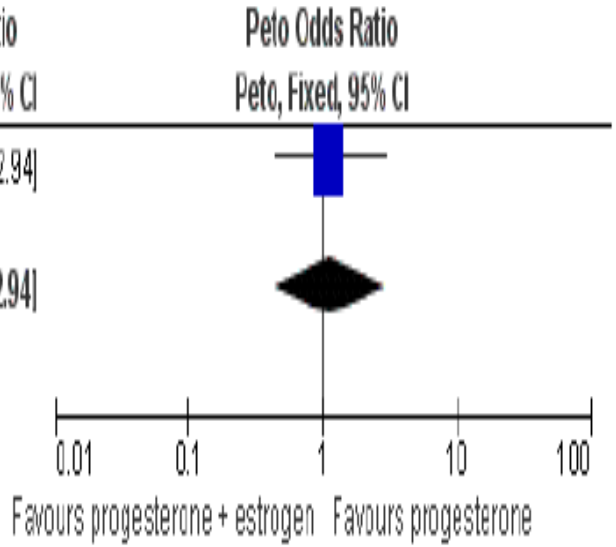
	No. of studies	No. of participants	OR (95% CI)
Live birth rate	1	100	1.13 (0.43-2.94)
Clinical pregnancy rate	7	1345	1.25 (0.99-1.59) **a,b**
Ongoing pregnancy rate	5	993	1.00 (0.77-1.31)
Miscarriage rate	6	1281	0.99 (0.69-1.43)
OHSS	1	59	0.14 (0.01-2.21)
Multiple pregnancy rate	NA	NA	NA

Figure 9. Forest plot of comparison: 4 Progesterone versus progesterone + estrogen, outcome: 4.1 Live Birth Rate.

Study or Subgroup	Progesterone Events	Total	Progesterone + estrogen Events	Total	Weight	Peto Odds Ratio Peto, Fixed, 95% CI
Lewin 1994 (1)	11	50	10	50	100.0%	1.13 [0.43, 2.94]
Total (95% CI)		**50**		**50**	**100.0%**	**1.13 [0.43, 2.94]**
Total events	11		10			

Heterogeneity: Not applicable

Test for overall effect: Z = 0.24 (P = 0.81)



(1) IM progesterone 50 mg daily vs IM progesterone 50 mg daily E2 2 mg oral daily

GnRH Agonist

- FSH, LH ↑→ Ovary
- GnRH receptor in endometrium
- GnRH → Embryo

Human Reproduction Update, Vol.17, No.6 pp. 734–740, 2011
Advanced Access publication on July 6, 2011 doi:10.1093/humupd/dmr029

human reproduction update

Increased live birth rates with GnRH agonist addition for luteal support in ICSI/IVF cycles: a systematic review and meta-analysis

D. Kyrou[1,*], E.M. Kolibianakis[1], H.M. Fatemi[2], T.B. Tarlatzi[1], P. Devroey[2], and B.C. Tarlatzis[1]

BACKGROUND: The aim of this systematic review and meta-analysis was to evaluate whether the addition of GnRH agonist for luteal support in ICSI/IVF cycles enhances the probability of live birth.

METHODS: Systematic literature search (MEDLINE, EMBASE, CENTRAL and RCT registries) was conducted to identify relevant randomized controlled trials published as full manuscripts. Meta-analysis of data yielded pooled risk differences (RDs) and 95% confidence intervals (CIs). A random effects model was applied for pooling the studies.

RESULTS: Six relevant RCTs were identified including a total of 2012 patients. The probability of live birth rate (RD: +16%, 95% CI: +10 to +22%) was significantly higher in patients who received GnRH agonist support compared with those who did not. The subgroup analysis according to the type of GnRH analogue used for LH suppression did not change the effect observed (studies in which GnRH agonist was used during ovarian stimulation, RD: +15%, 95% CI: +5 to +23%); (studies in which GnRH antagonist was used during ovarian stimulation, RD: +19%, 95% CI: +11 to +27%).

CONCLUSIONS: The best available evidence suggests that GnRH agonist addition during the luteal phase significantly increases the probability of live birth rates.

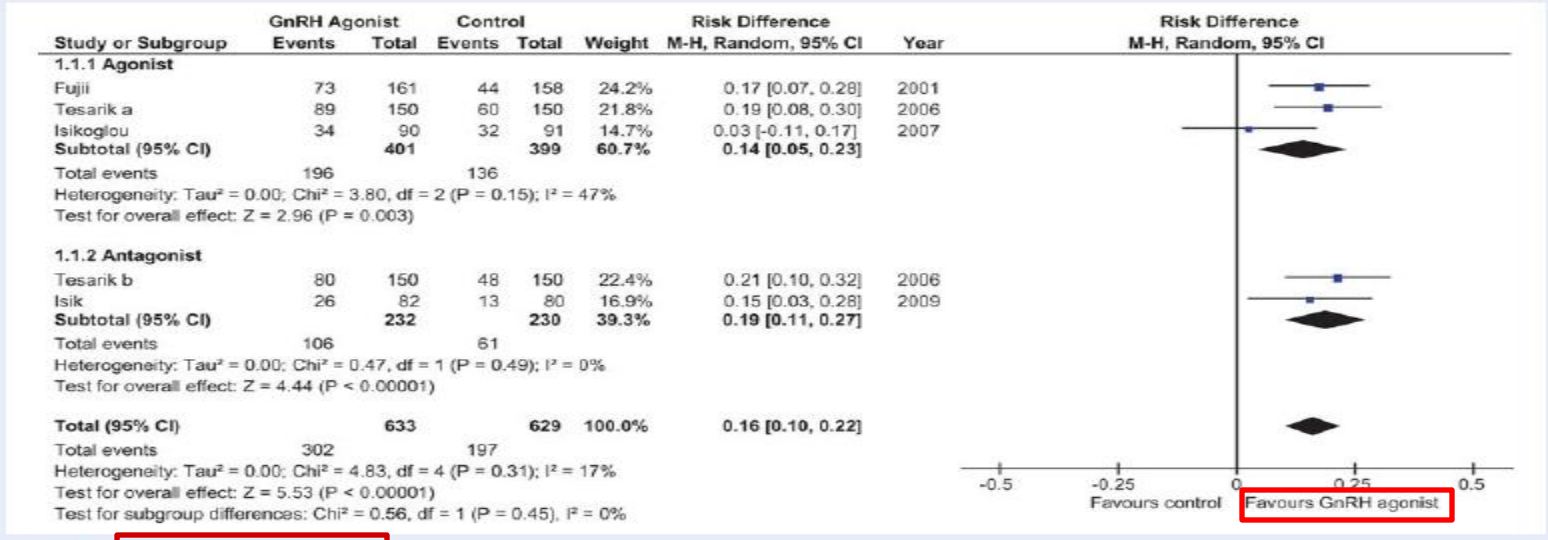


Figure 1 Forest plot live birth.

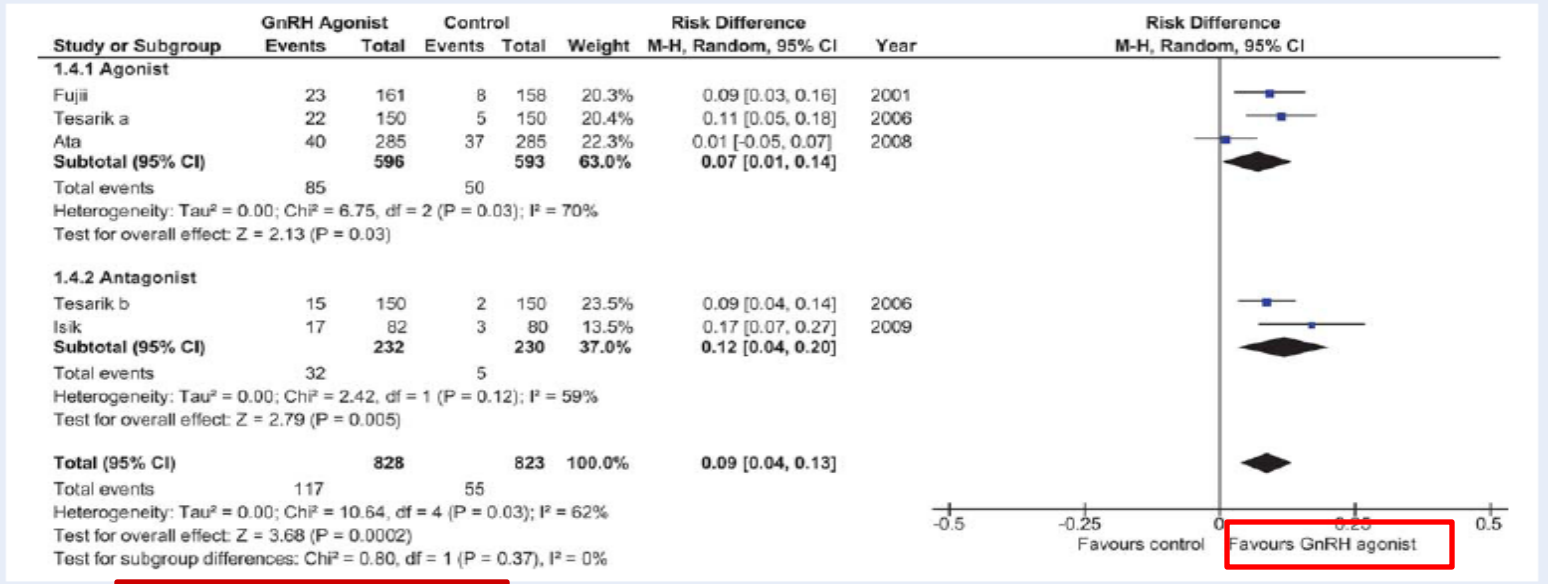


Figure 3 Forest plot multiple pregnancy.

Comparison the effect of GnRH agonist as luteal phase support in long and antagonist protocol in ART cycles: A case control study

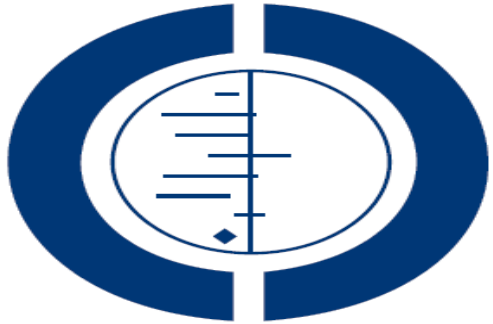
Nagihan Özcan, Ali İrfan Güzel, Gülnur Özaksit, Nafiye Yılmaz

(unpublished data)

51 long GnRH agonist protocol , 37 GnRH antagonist protocol.

All of the patients used vaginal progesterone and estradiol valerate (orally 4 mg/day) in the luteal phase. In long protocol group 23 patients were administered only vaginal progesterone +E (Group 1) and 28 patients received vaginal progesterone +E and 0.5 mg leuprolide asetate on post-embryo transfer day 5 and 10 (Group 2). In GnRH antagonist group; 15 patients recieved only vaginal progesterone+E (Group 3) and 23 patients received vaginal progesterone +E and 0.5 mg leuprolide asetate on post-embryo transfer day 5 and 10 (Group 4).

	LP group (n=23)	LP+GnRH agonist group (n=28)	GnRH antagonist group (n=15)	GnRH antagonist+ GnRH agonist group (n=23)	P
OHSS$^{\alpha}$	1 (4.34)	0	2	1 (4.34)	0.261
Clinical pregnancy rate$^{\alpha}$	6 (26 .08)	6 (21.42)	4 (26.66)	7 (30.43)	0.911
Live birth rate$^{\alpha}$	2 (8.68)	4 (14.28)	2 (13.33)	3 (13.04)	0.545
Miscarriage rate$^{\alpha}$	3 (13.04)	1 (3.57)	1 (6.66)	1 (4.34)	0.555



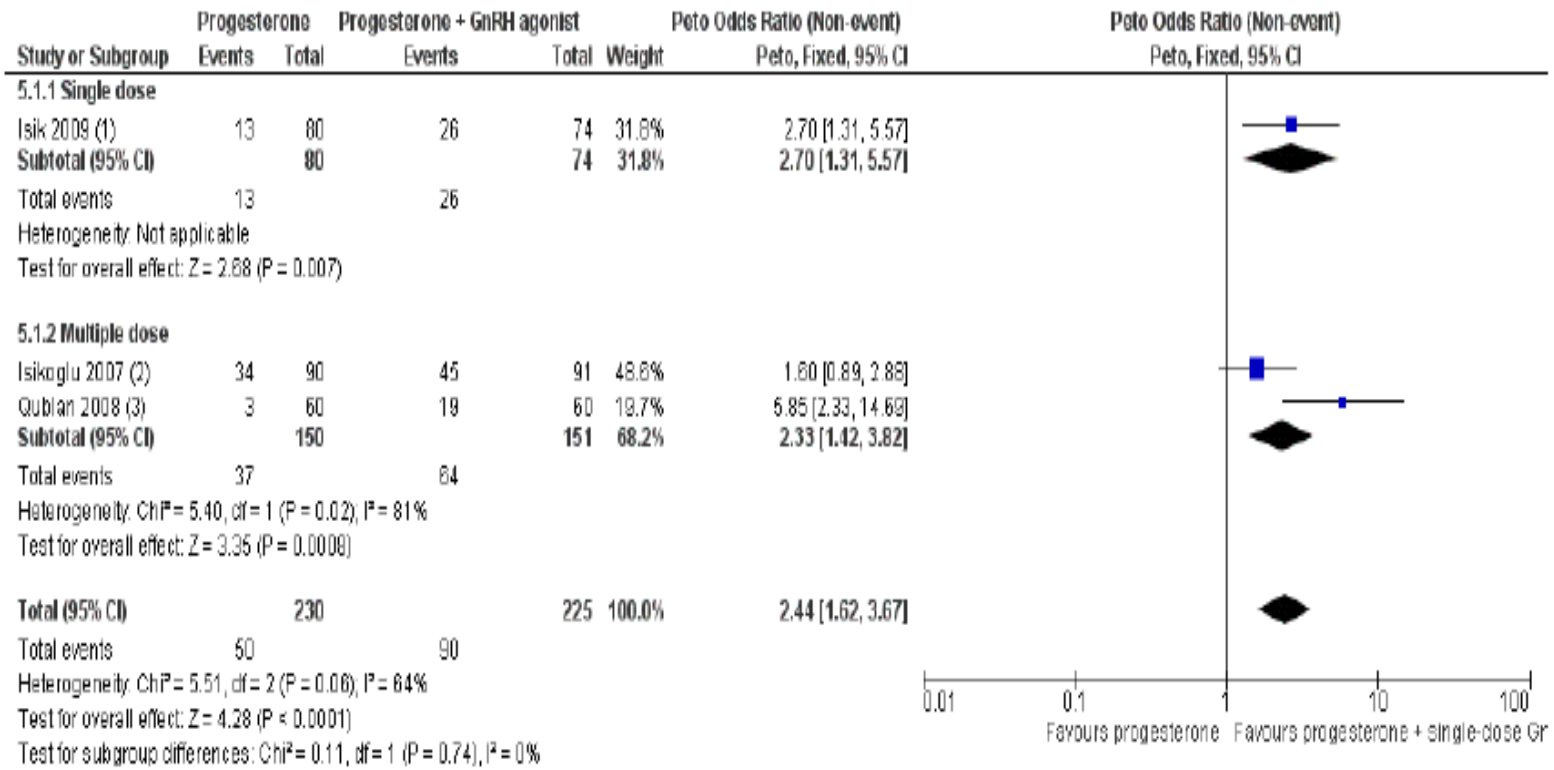
Luteal phase support for assisted reproduction cycles (Review)

van der Linden M, Buckingham K, Farquhar C, Kremer JAM, Metwally M

P vs P + GnRH agonist

	No. of studies	OR (95% CI)
Live birth rate	3	2.44 (1.62-3.67) **a**
Clinical pregnancy rate	6	1.36 (1.11-1.66) **b**
Ongoing pregnancy rate	2	1.31 (1.03—1.67)**c**
Miscarriage rate	1	0.59 (0.14-2.45)
OHSS	NA	NA
Multiple pregnancy rate	2	0.84 (0.55-1.26)

Figure 10. Forest plot of comparison: 5 Progesterone versus progesterone + GnRH agonist, outcome: 5.1 Live Birth Rate.



(1) Vaginal progesterone 200 mg 3 times daily + single dose hCG 1500 IU vs vaginal progesterone 200 mg 3 times daily + single dose hCG 1500 IU + sc leuprolide acetate 0.5 mg on day 6 after

(2) Progesterone 50 mg im daily vs progesterone 50 mg im daily + GnRH agonist 0.25 mg sc daily for 12 days

(3) Cyclogest (not defined) + placebo vs Cyclogest (not defined) + sc triptorelin 0.1 mg 3 times

LPS in GnRHa Trigger Cycles

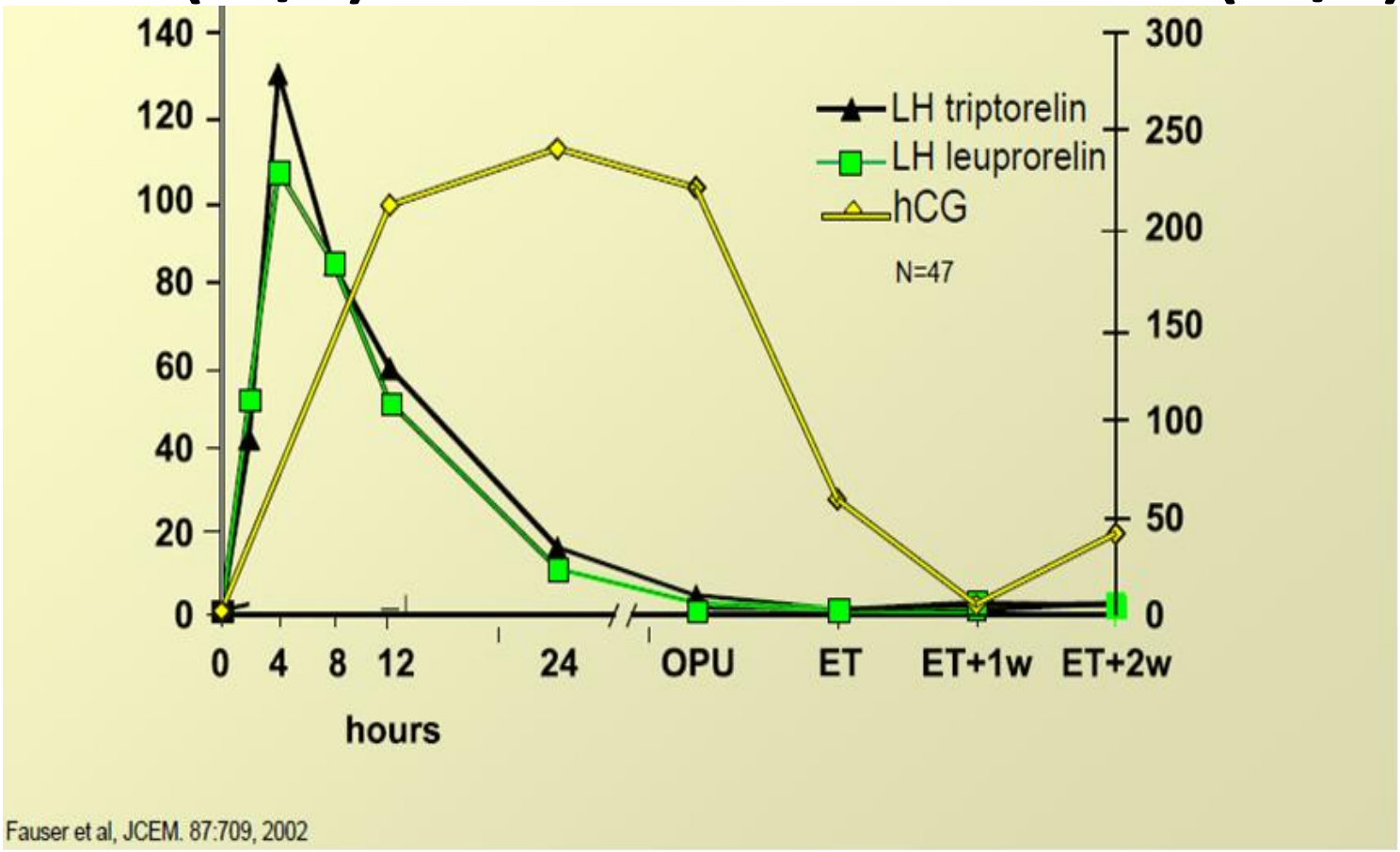
Hyper-response

Antagonist cycles & Analog trigger

Cryo-all oocyte/embryo

Fresh ET &
Attempt to rescue the luteal phase

- Intensive luteal phase support
- 1500 IU hCG rescue
- Dual trigger
- rLH rescue
- Other


LH(IU/L)
HCG(IU/L)
140
120
100
80
60
40
20
0
300
250
200
150
100
50
0
LH triptorelin
LH leuprorelin
hCG
N=47
0
4
8
12
24
OPU
ET
ET+1w
ET+2w
hours
Fauser et al, JCEM. 87:709, 2002

Human Reproduction Update, Vol.17, No.4 pp. 510–524, 2011
Advanced Access publication on March 30, 2011 doi:10.1093/humupd/dmr008

human reproduction update

GnRH agonist for triggering of final oocyte maturation: time for a change of practice?

P. Humaidan [1,*], S. Kol [2], and EG. Papanikolaou [3], on behalf of the 'The Copenhagen GnRH Agonist Triggering Workshop Group'†

[1]The Fertility Clinic, Skive Regional Hospital, Resenvej 25, 7800 Skive, Denmark [2]Department of Obstetrics and Gynecology, IVF Unit, Rambam Medical Center, Haifa, Israel [3]Assisted Reproduction Unit, Aristotle University of Thessaloniki, Thessaloniki, Greece

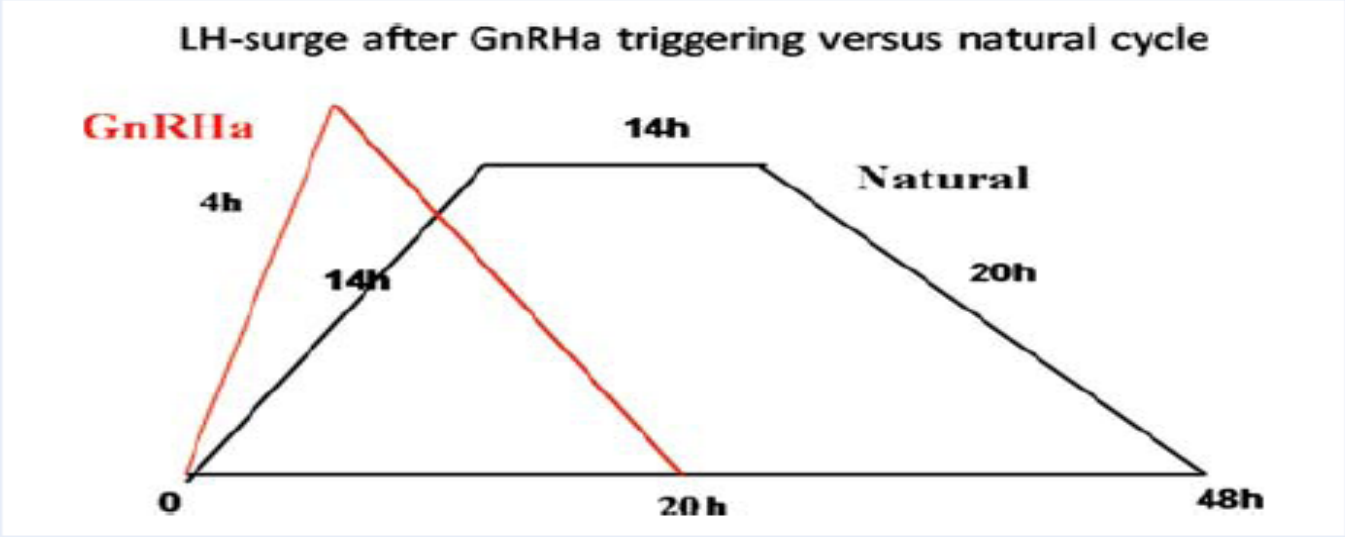


Figure 1 Differences in LH-surge after GnRH-agonist triggering when compared with a natural cycle.

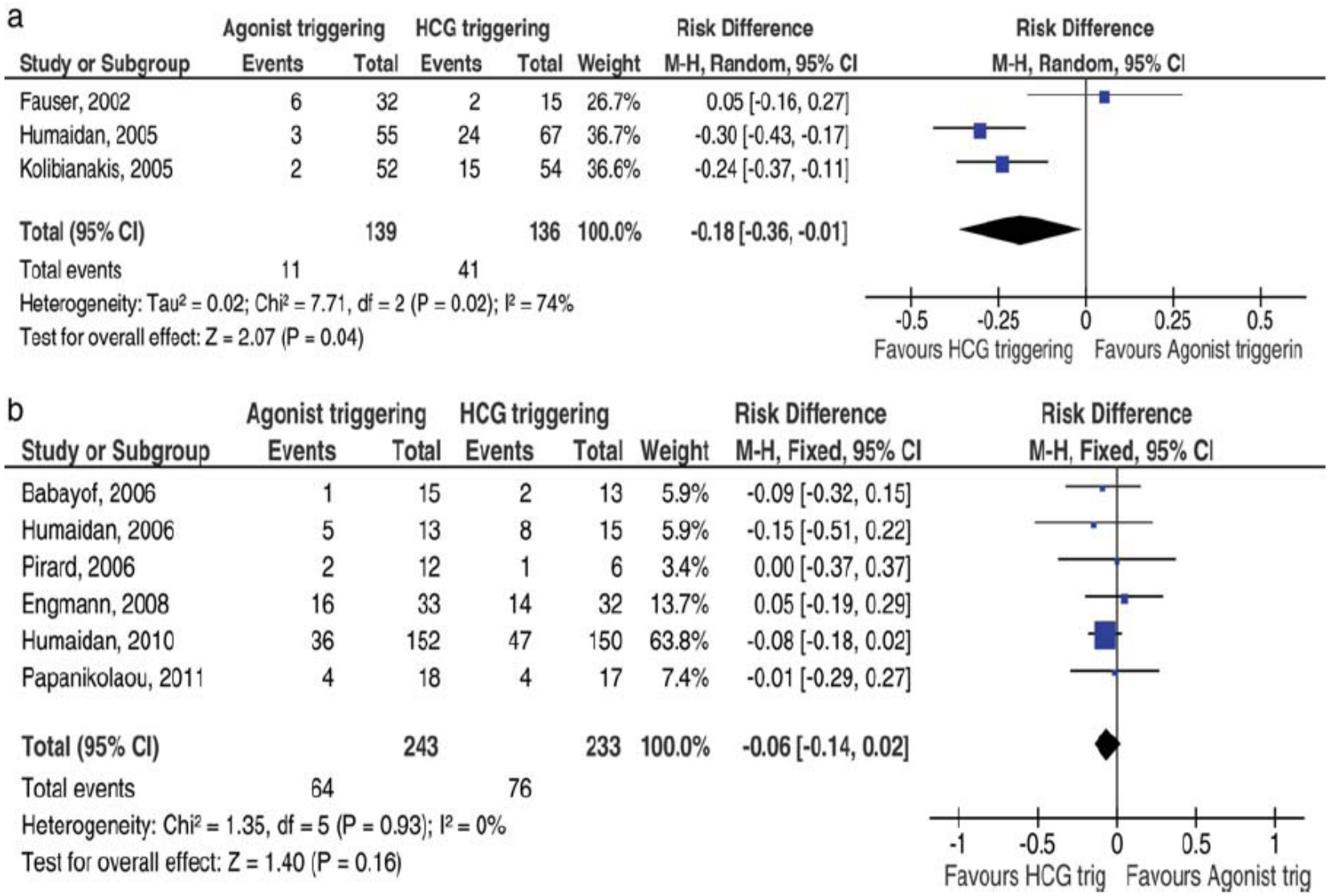


Figure 2 (**a**) Ongoing pregnancy rate after conventional luteal support. (**b**) Delivery rate after modified luteal support.

Table III GnRHa to trigger ovulation: target groups and current recommendations.

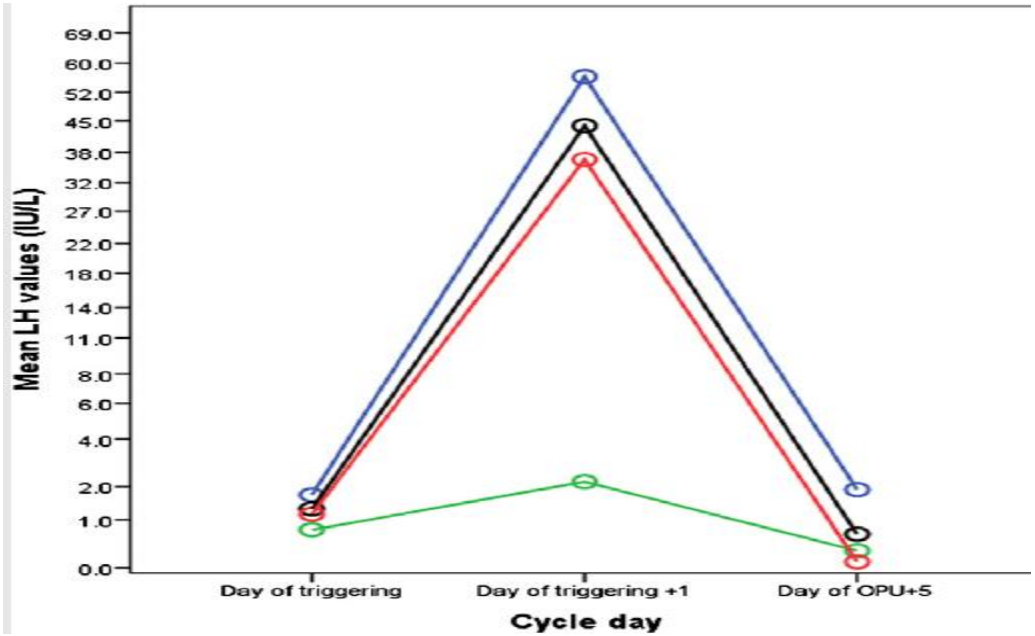
Type of patient	Advantages by using GnRHa	Luteal phase support	Disadvantages
Oocyte donor	OHSS is avoided	Not required	No disadvantages-considered to be the protocol of choice
	Good oocyte quality		
	Menses after 4–6 days		
	Reduction in luteal ovarian size		
	Reduction in luteal free fluid accumulation		
High-responder patient	OHSS is avoided	IM prog + E2patches adjusted according to serum levels	The most optimal LPS still to be determined
	Good oocyte quality	1500 IU hCG, 35 h after GnRHa trigger	
	Reduction in luteal ovarian size	Repeated bolus of 500 IU hCG	
	Reduction in luteal free fluid accumulation	Repeated bolus of rec-LH	
		Repeated bolus of GnRHa	
		Freeze all embryos	
Normo-responder patient	OHSS is avoided	1500 IU HCG, 35 h after GnRHa trigger	Minor adjustment in LPS still needed
	More MII oocytes	Repeated bolus of rec-LH	
	Good oocyte quality	IM prog + E2patches adjusted according to serum levels	
		Freeze all embryos	
Fertility preservation (oocyte freezing prior to chemotherapy)	OHSS is avoided	Not required	No disadvantages-considered to be the protocol of choice
	More MII oocytes		
	Good oocyte quality		
	Low luteal phase estradiol		

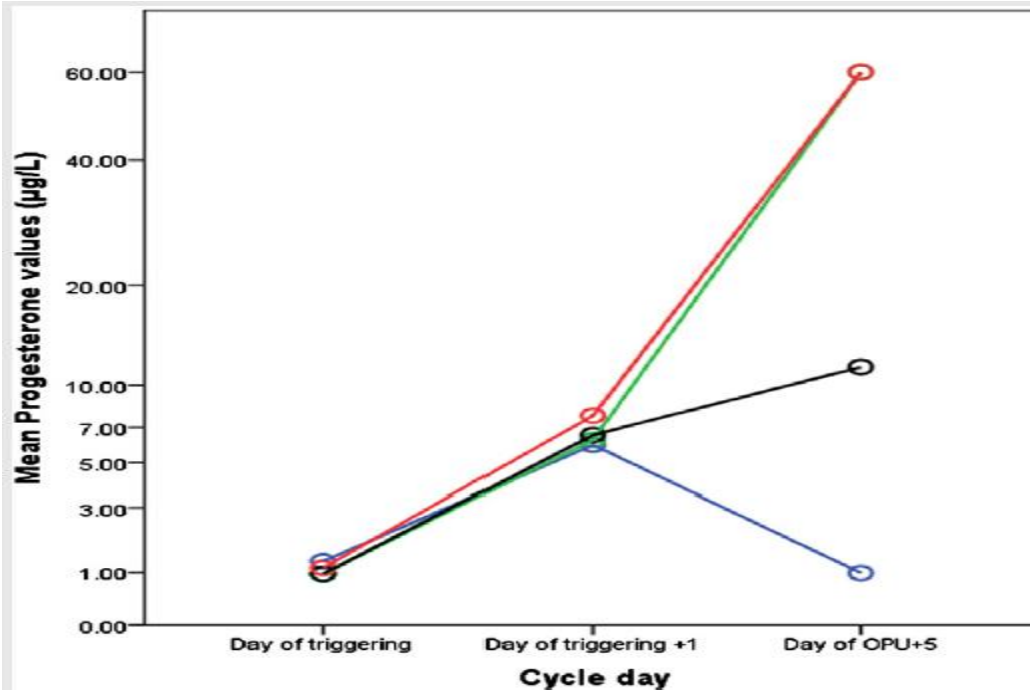
Early luteal phase endocrine profile is affected by the mode of triggering final oocyte maturation and the luteal phase support used in recombinant follicle-stimulating hormone–gonadotropin-releasing hormone antagonist in vitro fertilization cycles

Human M. Fatemi, M.D., Ph.D.,[a] Nikolaos P. Polyzos, M.D., Ph.D.,[a] Inge van Vaerenbergh, M.Sc.,[b] Claire Bourgain, M.D., Ph.D.,[b] Christophe Blockeel, M.D., Ph.D.,[a] Birgit Alsbjerg, M.D.,[c] Evangelos G. Papanikolaou, M.D., Ph.D.,[a] and Peter Humaidan, M.D., M.Sc.[c,d]

A= 10,000 IU hCG + Standard LPS
B= 0.2 mg Triptorelin + 1500 IU hCG (OPU +1hr) + Standard LPS
C= 0.2 mg Triptorelin + Standard LPS
D= 0.2 mg Triptorelin only (No LPS)

(Standard LPS: Natural micronized P 600 mg/d &
Estradiol Valerate 4 mg/d starting OPU + 1 day)





Type of protocol

- A:hCG trigger
- B: GnRHa trigger -1500 IU and LPS
- C: GnRHa trigger and LPS
- D: GnRHa trigger and no LPS

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REVIEW

Improving the luteal phase after ovarian stimulation: reviewing new options

C Yding Andersen [a,b,*], K Vilbour Andersen [b]

[a] Laboratory of Reproductive Biology, The Juliane Marie Centre for Women, Children and Reproduction, Copenhagen University Hospital and Faculty of Health Science, Copenhagen University, Copenhagen, Denmark; [b] ARTs Biologics, Copenhagen, Denmark
* Corresponding author. E-mail address: yding@rh.dk (C Yding Andersen).

Table 1 Studies in IVF patients cotreated with a GnRH antagonist receiving GnRH agonist trigger.

Study	Luteal-phase support	Progesterone at 7 days after oocyte retrieval (nmol/l)	Positive pregnancy test at 14 days after trigger	Pregnancy loss	Clinical pregnancy
Humaidan et al. (2005)	Crinone (90 mg per day)	39 ± 4	14/48 (29)	11/14 (79)	3/48 (6)
Humaidan et al. (2010)	1500 IU HCG on the day of retrieval plus 90 mg/day Crinone	74 ± 4	63/130 (48)	13/63 (21)	50/130 (38)
Humaidan et al. (2013)	1500 IU HCG on day of retrieval and 5 days later plus 90 mg/day Crinone	440 ± 25	47/110 (43)	4/47 (9)	43/110 (39)

When to start and stop LPS

- hCG day
- OPU day
- OPU + 1 day
- ET day

- Pregnancy test
- 5- 7 th week
- 10-12 th week

REVIEW Open Access

The optimal duration of progesterone supplementation in pregnant women after IVF/ICSI: a meta-analysis

Xi-Ru Liu[1], Hua-Qiao Mu[2], Qi Shi[1], Xiao-Qiu Xiao[3] and Hong-Bo Qi[1*]

Study Author, year	Timing of randomisation	ART	COH protocols	Total	Initiation of P	Dose & route of administration	No.	Early P cessation group	No.	Continuation group
Kohls, 2012	Clinical pregnancy	IVF/ICSI	GnRH-anta	220	OR	vaginal P 200mg bid	110	week 5	110	week 8
Kyrou, 2011	Positive hCG test	IVF/ICSI	GnRH-anta	200	ET	vaginal P 200mg tid	100	the 16th day post-ET	100	week 7
Goudge, 2010	COH	IVF	GnRH-a/ GnRH-anta	101	ET/OR	IM P50mg qd	53	the 11th day post-ET	48	week 6
Aboulghar, 2008	Clinical pregnancy	ICSI	GnRH-a	257	Unstated	IM or vaginal P	125	week 6-7	132	week 9-10
Andersen, 2002	Positive hCG test	IVF/ICSI	GnRH-a	303	ET	vaginal P 200mg tid	150	the 14th day post-ET	153	week 7
Prietl, 1992	Positive hCG test	IVF	CC/hMG/ GnRH-a	120	Unstated	PC500mg/EV10mg tiw	65	the 12th day post-ET	55	week 12

Study or Subgroup	early P cessation Events	Total	P continuation Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Aboulghar 2008	5	125	6	132	8.6%	0.88 [0.28, 2.81]
Andersen 2002	22	150	18	153	26.4%	1.25 [0.70, 2.23]
Goudge 2010	10	35	7	31	11.0%	1.27 [0.55, 2.92]
Kohls 2012	6	110	9	110	13.3%	0.67 [0.25, 1.81]
Kyrou 2011	17	100	22	100	32.6%	0.77 [0.44, 1.37]
Prietl 1992	9	65	5	55	8.0%	1.52 [0.54, 4.28]
Total (95% CI)		**585**		**581**	**100.0%**	**1.01 [0.74, 1.38]**
Total events	69		67			

Heterogeneity: Chi² = 2.96, df = 5 (P = 0.71); I² = 0%

Test for overall effect: Z = 0.05 (P = 0.96)

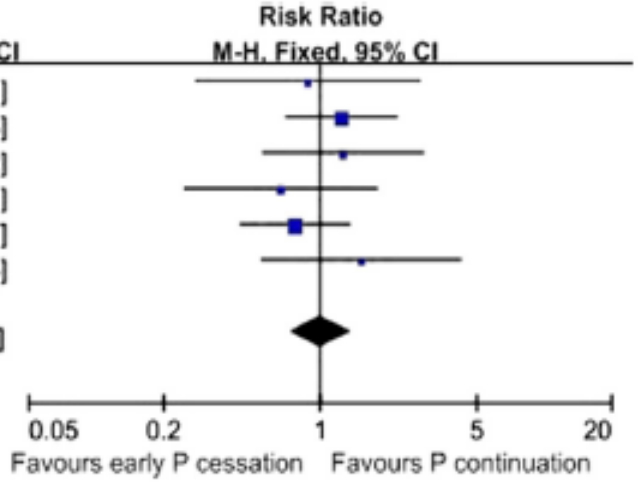

Figure 5 Miscarriage rate of women who underwent early P cessation versus P continuation after IVF/ICSI.

Study or Subgroup	early P cessation Events	Total	P continuation Events	Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Andersen 2002	118	150	126	153	83.1%	0.96 [0.85, 1.07]
Goudge 2010	25	35	24	31	16.9%	0.92 [0.70, 1.22]
Total (95% CI)		**185**		**184**	**100.0%**	**0.95 [0.86, 1.05]**
Total events	143		150			

Heterogeneity: Chi² = 0.05, df = 1 (P = 0.82); I² = 0%

Test for overall effect: Z = 0.97 (P = 0.33)

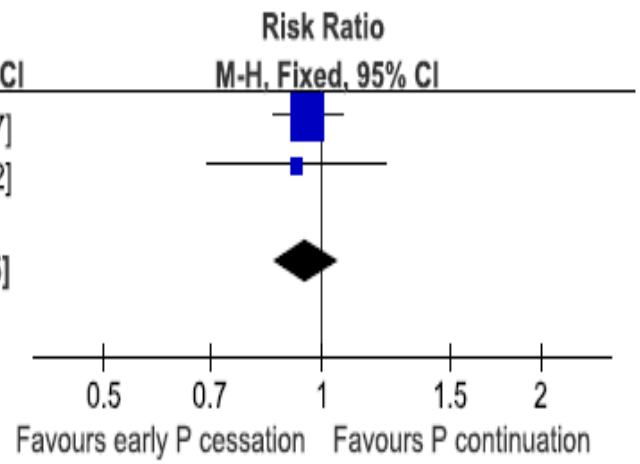

Figure 4 Live birth rate of women who underwent early P cessation versus P continuation after IVF/ICSI.

Luteal phase support for assisted reproduction cycles (Review)

van der Linden M, Buckingham K, Farquhar C, Kremer JAM, Metwally M

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2011, Issue 10

Authors' conclusions

This review showed a significant effect in favour of progesterone for luteal phase support, favouring synthetic progesterone over micronized progesterone. Overall, the addition of other substances such as estrogen or hCG did not seem to improve outcomes. We also found no evidence favouring a specific route or duration of administration of progesterone. We found that hCG, or hCG plus progesterone, was associated with a higher risk of OHSS. The use of hCG should therefore be avoided. There were significant results showing a benefit from addition of GnRH agonist to progesterone for the outcomes of live birth, clinical pregnancy and ongoing pregnancy. For now, progesterone seems to be the best option as luteal phase support, with better pregnancy results when synthetic progesterone is used.

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human reproduction update

IN A NUTSHELL

In this updated Cochrane review, the live birth rate was significantly higher with progesterone for luteal phase support in IVF/ICSI cycles. Co-treatments did not improve outcomes, except for GnRH agonists. We found no evidence favouring a specific route, dosage or duration of progesterone.

hCG alone or as a supplement to progesterone was associated with a higher risk of OHSS and should therefore be avoided.

LPS in the World

Reproductive BioMedicine Online (2012) 25, 139–145

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ARTICLE

Progesterone support in IVF: is evidence-based medicine translated to clinical practice? A worldwide web-based survey

Edi Vaisbuch [a,*], Milton Leong [b], Zeev Shoham [a]

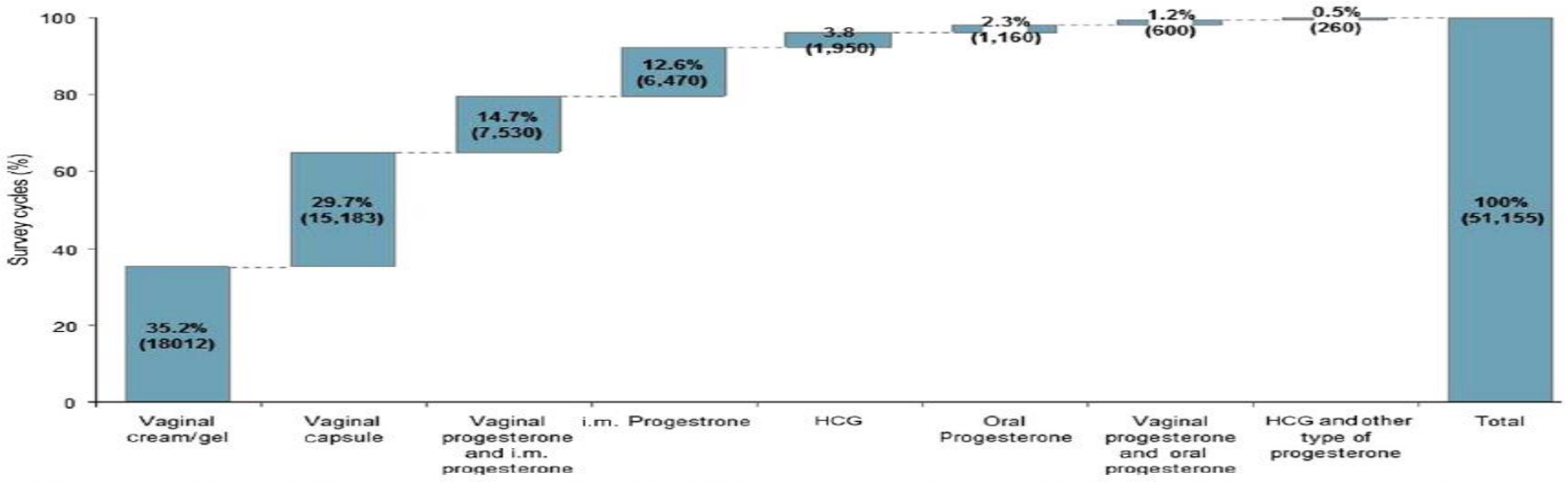

Figure 1 Distribution of luteal-phase supplementation treatments used among the 51,155 IVF annual cycles included in the survey. Data in columns are % (No. of annual cycles). HCG = human chorionic gonadotrophin.

Table 2 Routes of progesterone administration for luteal-phase supplementation by geographic region.

Region	No. of cycles/ year	Vaginal	Intramuscular	Vaginal and intramuscular
Asia	8095	4285 (52.9)	810 (10.0)	2250 (27.8)
Europe	19,620	14,770 (75.3)	1250 (6.4)	1200 (6.1)
North America	14,600	6020 (41.2)	4410 (30.2)	3960 (27.1)
Africa	1420	700 (49.3)	0	120 (8.5)
South America	2620	2620 (100)	0	0
Australia	4800	4800 (100)	0	0

Values are number of cycles (% of total cycles per region).

Table 3 Period of luteal-phase supplementation by geographic region.

	No. of cycles/ year	Until positive pregnancy test	Until FHB identified	Until 10–12 weeks' gestation
Total	51,155	5920 (11.6)	11,215 (21.9)	34,020 (66.5)
Region				
Asia	8095	500 (6.2)	1015 (12.5)	6580 (81.3)
Europe	19,620	4820 (24.6)	4300 (21.9)	10,500 (53.5)
North America	14,600	300 (2.1)	5600 (38.4)	8700 (59.6)
Africa	1420	0	0	1420 (100)
South America	2620	0	300 (11.5)	2320 (88.5)
Australia	4800	300 (6.3)	0	4500 (93.8)

Values are number of cycles (% of total cycles per region). FHB — fetal heart beat.

Reproductive BioMedicine Online (2014) 28, 330–335

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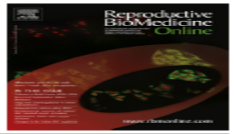

ARTICLE

Luteal-phase support in assisted reproduction treatment: real-life practices reported worldwide by an updated website-based survey

Edi Vaisbuch [a,*], Dominique de Ziegler [b], Milton Leong [c], Ariel Weissman [d], Zeev Shoham [a]

Abstract An updated worldwide web-based survey assessed the real-life clinical practices regarding luteal-phase supplementation (LPS) in assisted reproduction. This survey looked for changes since a former survey conducted nearly 3 years earlier. The survey questions were: If you support the luteal phase, when do you start the regimen you are using?; Which agent/route is your treatment of choice to support the luteal phase?; If you use vaginal progesterone, which formulation do you use?; and How long you continue progesterone supplementation if the patient conceived? Data were obtained from 408 centres (82 countries) representing 284,600 IVF cycles/year. The findings were: (i) most practitioners (80% of cycles) start LPS on the day of egg collection; (ii) in >90%, a vaginal progesterone product is used (77% as a single agent and 17% in combination with i.m. progesterone), while human chorionic gonadotrophin as a single agent for LPS is not being used at all; and (iii) in 72% of cycles, LPS is administered until 8–10 weeks' gestation or beyond. When compared with the initial survey, the results of this survey are encouraging as there is a clear shift towards a more unified and evidence-based approach to LPS in IVF cycles.

Table 2 Comparison of the initial survey in 2009 with the current survey.

	Current survey (June 2012)	*Previous survey (September 2009)*
Cycles per year	284,600	51,155
Vaginal progesterone only	77	64
i.m. progesterone only	5	13
Oral progesterone only	0.5	2
Combined drugs	17	16
HCG only	0	5
Duration of LPS beyond 8 weeks of gestation	72[a]	67[b]

Values are *n* or%.
HCG = human chorionic gonadotrophin; LPS = luteal-phase supplementation.
[a]Until 8–10 weeks of gestation (44%) or up to 12 weeks or more (28%).
[b]Until 10–12 weeks of gestation.

LPS in Turkey

- The majority of participants prefer to support the luteal phase regardless of the type of gonadotropin releasing hormone analogue used for pituitary suppression.
- LPS is started between day of oocyte collection and embryo transfer.
- Progesterone vaginal gel seems to be the most commonly used agent for LPS.
- Almost half of participants think estrogen should be used as an adjuvant to progesterone.
- Most participants reported continuing LPS until completion of the first trimester of pregnancy.

Ata B, et all
J Turk Soc Obstet Gynecol, 2010; 7(3): 224-7