

# Prevention and Management of OHSS

**HUSEYIN GORKEMLI, MD**  
**KONYA N.E. UNIVERSITY**  
**MERAM MEDICAL SCHOOL**

**MSRM 2016**

# OHSS

## HOW COMMON IS IT?

Human Reproduction Vol.20, No.12 pp. 3293–3300, 2005  
Advance Access publication August 26, 2005.

doi:10.1093/humrep/dei253

### Complications of IVF and ovulation induction

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Reija Klemetti<sup>1,3</sup>, Tiina Sevón<sup>1</sup>, Mika Gissler<sup>2</sup> and Elina Hemminki<sup>1</sup>

<sup>1</sup>Research on Practices and <sup>2</sup>Information Unit, STAKES, National Research and Development Centre for Welfare and Health, Helsinki, Finland

<sup>3</sup>To whom correspondence should be addressed: STAKES, P.O.Box 220, 00531 Helsinki, Finland. E-mail: reija.klemetti@stakes.fi

- ❑ Finland registry: 9,175 IVF cycles
- ❑ Severe OHSS:
  - 1.4% per cycle
  - 2.3% per patient (mean 3.3 cycles/pt)

1.4%

# OHSS

## HOW COMMON IS IT?

~ 300,000 IVF (Europe 2003)

~ 130,000 IVF (USA 2005)

→ 430, 000 IVF cycles reported

→ **6,020 severe OHSS patients  
from IVF**



**Human Reproduction, Vol.29, No.10 pp. 2099–2113, 2014**

Advanced Access publication on July 27, 2014 doi:10.1093/humrep/deu175

human  
reproduction

ESHRE PAGES

## Assisted reproductive technology in Europe, 2010: results generated from European registers by ESHRE<sup>†</sup>

**M.S. Kupka<sup>\*</sup>, A.P. Ferraretti, J. de Mouzon, K. Erb, T. D'Hooghe, J.A. Castilla, C. Calhaz-Jorge, C. De Geyter, V. Goossens, and The European IVF-monitoring (EIM)<sup>‡</sup> Consortium, for the European Society of Human Reproduction and Embryology (ESHRE)**

ESHRE Central Office, Mellemaat 40, Glinnebeek B-1052, Belgium

Ovarian hyperstimulation syndrome(OHSS) was reported in 25 of the 31 countries In total, 1500 cases of OHSS were recorded, corresponding to a prevalence of 0.3% (0.8% in 2009) of all stimulated cycles in the countries reporting the data.

**Supplementary Table XVI Complications and fetal reductions in 2010.**

Country	Cycles	OHSS	Complications to oocyte retrieval				Fetal reduction
			All	Bleeding	Infection	Maternal death	
Austria	6402						
Belgium	28 521	75	186	20	18	1	0
Bulgaria	5030	2	7	7	0	0	41
Czech Republic	20 020	53	9	9	0	0	
Denmark	15 954						
Finland	9312	65	17	11	6	0	
France	79 422						30
Germany	62 571	111	164	309	0	0	
Greece	3693	27	7	13	0	0	26
Hungary	5562	10	2	0	0	0	6
Iceland	824	5	1	1	0	0	0
Ireland	4078	13	6	3	3	0	0
Italy	58 860	162	119	111	8	0	0
Kazakhstan	2276	16					4
Lithuania	131	0	0	0	0	0	0
Macedonia	1497	21		26			20
Moldova	624	3	1	1	0	0	7
Montenegro	452	4					2
Norway	9007	63	11	7	4	0	0
Poland	13 325	56	33	29	4	0	0
Portugal	7179	47	5	2	3	0	
Romania	1151	14		2			3
Russia	34 026	401	47	44	2	0	48
Serbia	1484	20	4	4	0	0	6
Slovenia	4419	34	1	1		0	0
Spain	58 725	180	55	27	5	1	62
Sweden	17 628						1
Switzerland	9540	22	22	3	0	0	11
The Netherlands	23 627						
Ukraine	7085	96	11	11	0	0	38
The UK	57 856						139
All	550 296	1500	708	641	53	2	441

# Outline

- ✓ Risk factors
- ✓ Prevention
- ✓ Management



# OHSS RISK FACTORS

1. Young age
2. Low BMI
3. PCOS
4. Allergic history
5. High TAFC
6. High doses of gonadotropins
7. High or rapidly rising E2 levels
8. Large number of large & medium-size follicles
9. Large numbers of eggs retrieved
10. High or repeated doses of hCG
11. Pregnancy
12. Previous OHSS

## ASSISTED REPRODUCTIVE TECHNOLOGY

FERTILITY AND STERILITY®  
VOL. 71, NO. 5, MAY 1999  
Copyright ©1999 American Society for Reproductive Medicine  
Published by Elsevier Science Inc.  
Printed on acid-free paper in U.S.A.

### Prospective study of the clinical and laboratory parameters of patients in whom ovarian hyperstimulation syndrome developed during controlled ovarian hyperstimulation for in vitro fertilization

Anders Enskog, M.D.,\*† Malin Henriksson, B.Sc.,† Margaretha Unander, M.D., Ph.D.,†  
Lars Nilsson, M.D., Ph.D.,† and Mats Brännström, M.D., Ph.D.†

Göteborg University, Göteborg, Sweden

# OHSS-Cytokines

- ☐ IL - 1
- ☐ IL - 2
- ☐ IL - 6
- ☐ VEGF
- ☐ TNF $\alpha$



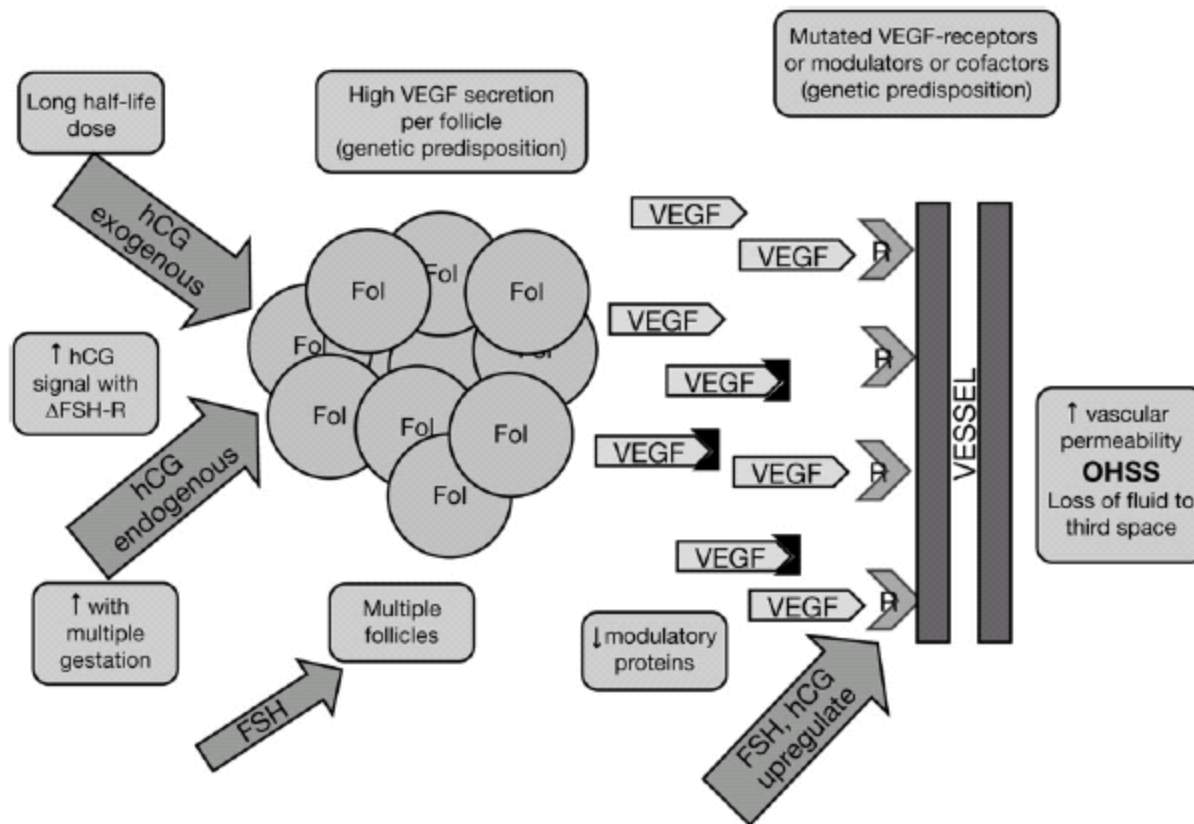
# Ovarian VEGF Production (Basic&Clinical Studies)



Capillary permeability  
Angiogenesis  
Endothelial cell proliferation

# OHSS-VEGF

The pathogenesis of OHSS.



Estradiol	<p>Estradiol level is a reliable predictor of OHSS during ART [5]</p> <p>OHSS can occur despite low estradiol levels [10]</p> <p>High estradiol concentrations are not sufficient to induce OHSS [6]</p> <p>Currently considered a mere marker of granulosa activity [11]</p>
hCG	<p>Fundamental for triggering OHSS</p> <p>hCG alone is not sufficient to induce OHSS [4]</p>
Interleukins	<p>Some interleukins are associated with OHSS, and elevated concentrations are associated with increased vascular permeability, hemoconcentration, elevated plasma estradiol concentration, and inhibition of hepatic albumin production [12]</p>
Renin-angiotensin system	<p>There is a direct correlation between plasma renin activity and the severity of OHSS [13]</p> <p>All hypovolemic conditions are associated with a secondary reactive hyperaldosteronism via renin-angiotensin cascade activation [17]</p> <p>Renin-angiotensin system activation is probably the effect and not the cause of OHSS</p>
VEGF	<p>VEGF expression is associated with OHSS increased vascular permeability [18]</p> <p>VEGF levels are elevated during ovarian stimulation with exogenous FSH, which is enhanced after hCG administration [19, 20]</p>

# OHSS RISK FACTORS

## E2 levels are over-rated predictors of OHSS

### **Incidence and prediction of ovarian hyperstimulation syndrome in women undergoing gonadotropin-releasing hormone antagonist in vitro fertilization cycles**

*Evangelos G. Papanikolaou, M.D., Ph.D., Cristina Pozzobon, M.D.,  
Efstratios M. Kolibianakis, M.D., Ph.D., Michel Camus, M.D., Herman Tournaye, M.D., Ph.D.,  
Human M. Fatemi, M.D., Andre Van Steirteghem, M.D., Ph.D., and Paul Devroey, M.D., Ph.D.*  
Centre for Reproductive Medicine, University Hospital, Dutch-Speaking Brussels Free University, Brussels, Belgium

- ❑ A cut-off of 3,000 pg/ml will miss 2/3 of severe OHSS
- ❑ Number of follicles  $\geq 12$  mm better pred. than E2
- ❑ E2  $\geq 5,000$  and  $\geq 18$  foll best predictor of OHSS
  - ❑ 83% SENSITIVITY
  - ❑ 84% SPECIFICITY

# Estradiol concentration on day of HCG and risk for OHSS

Asch et al (1991)

- ❑  $E2 < 3500 \text{ pg/ml}$  ----- 0%
- ❑  $3500 \text{ pg/ml} < E2 < 5999 \text{ pg/ml}$  --- 1.5%
- ❑  $E2 > 6000 \text{ pg/ml}$  ----- 38%

Sensitivity: 83%    Specificity 99%

Levy et al (1996); Shimon et al (2001);

- ❑ OHSS with  $E2 < 500 \text{ pg/ml}$  !!!  
which means 1...2...3...

# Estradiol concentration on the day of HCG and risk for OHSS

- ...1. There is a large overlap in E2 concentrations between women who develop and women who do not develop OHSS
- ...2. E2 concentration is inadequate as the only predictive factor
- ...3. Is found at highest concentrations  $>6000\text{pg/ml}$  when it becomes very predictive of OHSS

# Which patients become high risk for OHSS during HMG therapy?

## 2. Those who have large number of follicles on the day of HCG

>14 follicles of 11mm.(Papanikolaou et al 2006)

>11 follicles of 10mm.(Lee et al 2008)

## 3. Those who have large number of oocytes retrieved

>30 OOR	14% severe OHSS(Morris et al 1995)
<20	0% severe OHSS (Asch et al 1991)
<20 OOR< 30	1.4% severe OHSS
>30 OOR	23% severe OHSS

# The role of VEGF in OHSS

- ❑ OHSS is a dramatic complication of OI
- ❑ VEGF mRNA is expressed by granulosa & theca cells
- ❑ Ovarian VEGF levels correlate with the dose of gonadotrophins administered
- ❑ Excess of bioactive VEGF in FF increases OHSS risk
- ❑ VEGF expression is dependent on LH
- ❑ There is an association between hCG & OHSS
- ❑ VEGF is increased by hCG in a dose-& time-dependent fashion

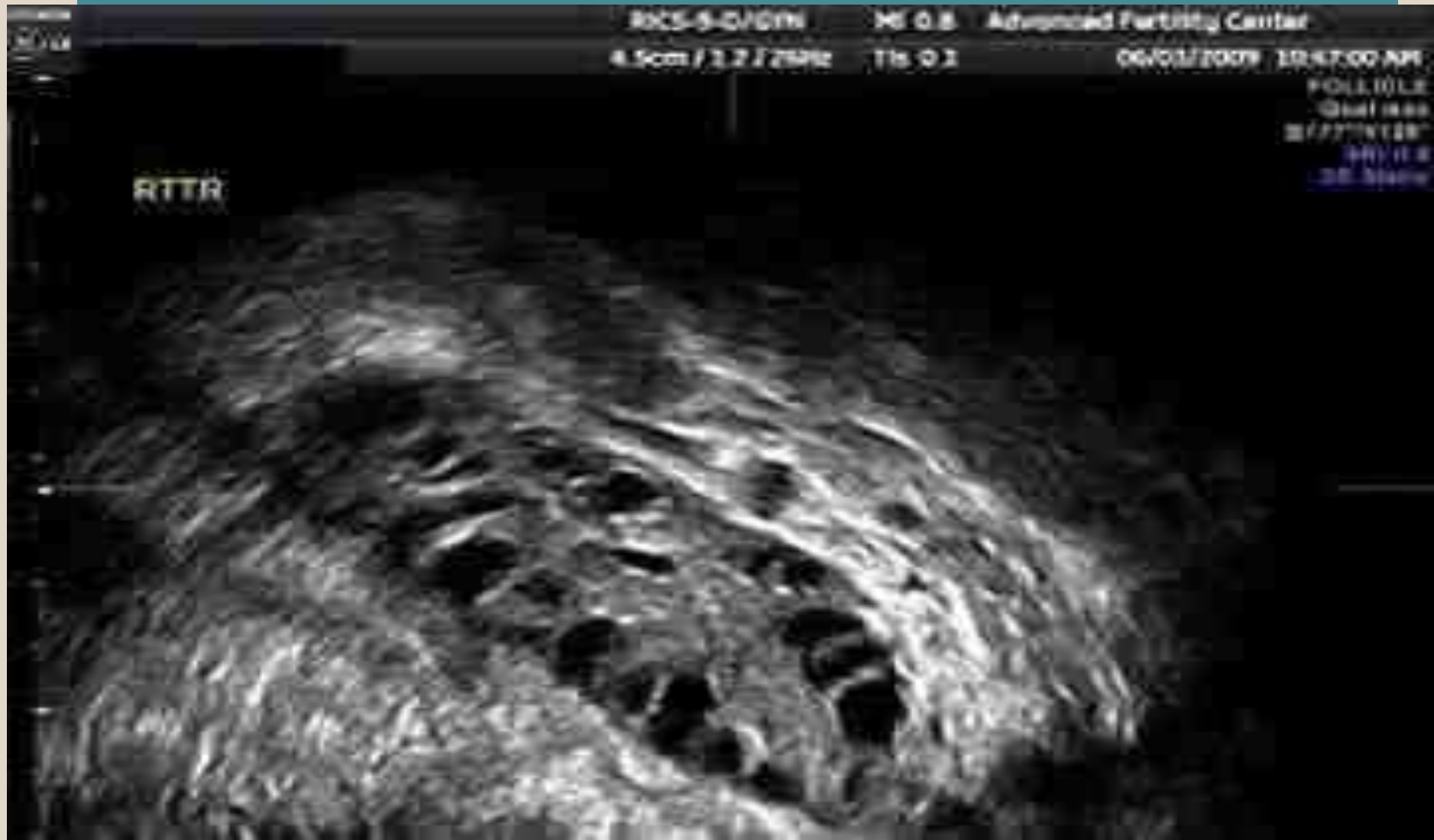
*Rizk B et al, HR Update. 1997; (3):255-66*

*Neulen J et al, Hum Reprod, 2001; 16(4):621-6*

*Gomez et al Bio Repro 2003*



# PCO - high risk for OHSS



# OHSS -AMH

- ❑ >1.26 ng/ml normoresponder
- ❑ >3,36 ng/ml OHSS risk
- ❑ >7 ng/ml OHSS risk high

# OHSS PREVENTION STRATEGIES

## CAREFUL CLINICAL APPROACH

### **BEFORE STIMULATION**

1. Use protocols with low dose HMG
2. Use protocols that reduce the duration of exposure to HMG
3. GnRH Antagonists
4. Insulin Sensitizers
5. IVM of Oocytes

### **DURING STIMULATION**

1. Low D HCG to trigger Ov/tion
2. GnRHa to trigger Ov/tion
3. Recombinant human LH
4. Coasting
5. Cycle cancellation
6. Cryopreservation of embryos
7. IV Albumin
8. Hydroxyethyl starch
9. Glucocorticoids
10. DOPAMINE AGONISTS

# PREVENTION OHSS

- A. Cancel Cycle -withhold hCG trigger
- B. Coasting
- C. Decrease dose of hCG trigger
- D. Agonist trigger
- E. Cryopreservation of embryos
- F. IV albumin at time of egg retrieval
- G. Paracentesis

# OHSS-PREVENTION STRATEGIES

## Non-IVF cycles

### ❑ Recommended Stimulation Protocols with Low Dose HMG

1. Low dose step-up protocol  
75IU FSH--37.5IU

*(Homburg and Howels 1999)*

1. Step-down protocol  
150IU FSH – 75IU

*(Macklon and Fauser 2000)*

# OHSS-PREVENTION STRATEGIES

## In IVF cycles

### ❑ Recommended Stimulation Protocols with Low Dose HMG

1. Limited Ovarian Stimulation (LOS) protocol-PCO
2. HMG stimulation until the leading follicle reached 12mm prior to HCG (*El-Sheikh et al 2001*)
3. Low starting dose of 150IU FSH for all patients at high risk for OHSS (*Homburg and Insler 2002*)
4. FSH from day5+GnRHant when follicles  $\geq 14$  (*Hobmann et al 2003*)

# PREVENTION OHSS

*Cancel Cycle – withhold hCG trigger*

- ❑ **IVF:** Most effective preventative technique, BUT emotionally & financially stressful
- ❑ Reserved for prior severe OHSS and total loss of control of the cycle



# PREVENTION OHSS

## *Coasting*

CONCEPT: Stopping gonadotropin and postponing hCG trigger until E2 level is lower.

## Mechanism

- ❑ Lower gonadotropin stimulation → decreased LH receptors → decreased luteinization → ↓ VEGF
- ❑ Lower gonadotropin stimulation may increase rate of granulosa cell apoptosis, especially of smaller follicles
- ❑ Coasting lowers concentration of follicular fluid VEGF<sup>1</sup>

<sup>1</sup> Tozer AJ et al: *Human Reprod* (2004)





# PREVENTION OHSS

## *Coasting*

### What does the literature tell us:

- ❑ Unable to determine true effectiveness of coasting since no RCT
- ❑ Indications for coasting variable amongst studies
- ❑ Target E2 level quite variable (typically about 3,000 pg/ml)
- ❑ Coasting does not totally prevent OHSS: 16% of patients still had ascites and 2.5% required hospitalizations<sup>1</sup>
- ❑ Coasting for > 4 days results in lower pregnancy/implantation rates<sup>2,3</sup>

<sup>1</sup> Delvigne A, Rozenberg S: *Human Reprod* (2002)

<sup>2</sup> Levinsohn-Tavor O, et al: *Human Reprod* (2003)

<sup>3</sup> Mansour R, et al O et al: *Human Reprod* (2005)



# PREVENTION OHSS

## *Decrease dose of hCG*

### Reducing the dose of human chorionic gonadotropin in high responders does not affect the outcomes of in vitro fertilization

David W. Schmidt, M.D., Donald B. Maier, M.D., John C. Nulsen, M.D., and Claudio A. Benadiva, M.D.

The Center for Advanced Reproductive Services, Department of Obstetrics and Gynecology, Division of Reproductive Endocrinology and Infertility, University of Connecticut Health Center, Farmington, Connecticut

#### Retrospective review of high responders

- 94 IVF cycles
- If  $E_2$  2,500-4,000 pg/ml → 5,000 IU hCG
- $E_2$  > 4,000 pg/ml → 3,300 IU hCG

#### RESULTS

- **No difference in OHSS** but note excellent maturation with as low as 3,300 IU hCG

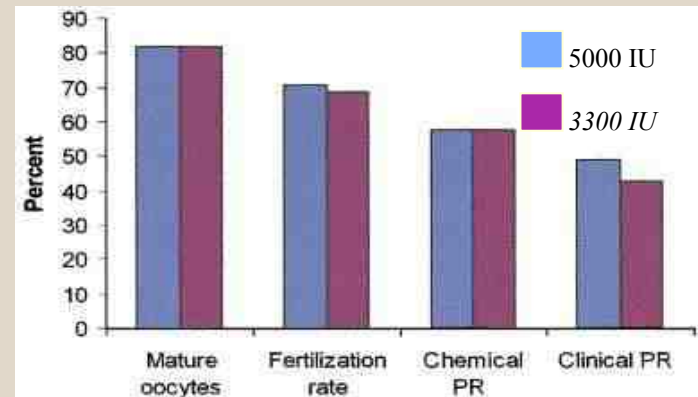
TABLE 2

Incidence of OHSS according to dose hCG.

OHSS	5,000 IU	3,300 IU	P value <sup>a</sup>
Total	10.6% (5/47)	21.3% (10/47)	.357
Mild	8.5% (4/47)	6.3% (3/47)	.978
Moderate	2.1% (1/47)	10.6% (5/47)	.207
Severe	0% (0/47)	4.2% (2/47)	.495

<sup>a</sup> Not significant.

Schmidt. Reduced hCG dose in high responders. *Fertil Steril* 2004.



# PREVENTION OHSS

## *Decrease dose of hCG*

**Triggering final oocyte maturation using different doses of human chorionic gonadotropin: a randomized pilot study in patients with polycystic ovary syndrome treated with gonadotropin-releasing hormone antagonists and recombinant follicle-stimulating hormone**

*Efstratios M. Kolibianakis, M.D., Ph.D., Evangelos G. Papanikolaou, M.D., Ph.D., Herman Tournaye, M.D., Ph.D., Michel Camus, M.D., Andre C. Van Steirteghem, M.D., Ph.D., and Paul Devroey, M.D., Ph.D.*

Centre for Reproductive Medicine, Vrije Universiteit Brussel, Brussels, Belgium

SAME DEAL.....

Although it theoretically makes sense to reduce the dose of hCG, there is little data to support.

Studies are small/not powered to detect a difference.

Trigger	10,000 IU	5,000 IU	2,500 IU
N	28	26	26
Preg	26.9% 7/26	30.8% 8/26	34.8% 8/23
Severe OHSS	1/26	1/26	0/26

*Kolibianakis EM et al (2007) Fert Steril*

## Article

# Low-dose HCG is useful in preventing OHSS in high-risk women without adversely affecting the outcome of IVF cycles

## Abstract

Severe ovarian hyperstimulation syndrome (OHSS) is a rare but potentially fatal condition associated with conventional IVF treatment. It is found predominantly in women with polycystic ovaries who have an exaggerated response to exogenous FSH, leading to a large number of follicles and an overproduction of vascular endothelial growth factor with resultant excessive increases in vascular permeability. There is evidence to suggest that OHSS is also linked to the use of human chorionic gonadotrophin (HCG) to induce ovulation. Therefore while HCG is essential for corpus luteum function, high amounts of HCG can lead to OHSS in high responders. In a pilot study, infertile patients at high risk of developing OHSS were given half the current minimum dose of HCG (i.e. 2500 IU). No woman developed moderate or severe OHSS; 13 women (61.9%) conceived and there were three twin pregnancies. In women at high risk of OHSS, a low dose of HCG appears to prevent the development of OHSS without compromising success rates.

(Nargund G, 2007)

# PREVENTION OHSS

## *Agonist trigger*

- ❑ Reserved for antagonist protocol
- ❑ Agonist (Triptorelin 0.2 mg, Lupreulide 1 mg) trigger
- ❑ First described by Itskovitz-Eldor J et al (Hum Reprod 2000) to treat 8 patients at risk for OHSS
  
- ❑ So, what' s the data.....

# PREVENTION OHSS

## *Agonist trigger*

Human Reproduction Update, Vol.12, No.2 pp. 159–168, 2006  
Advance Access publication October 27, 2005

doi:10.1093/humupd/dmi045

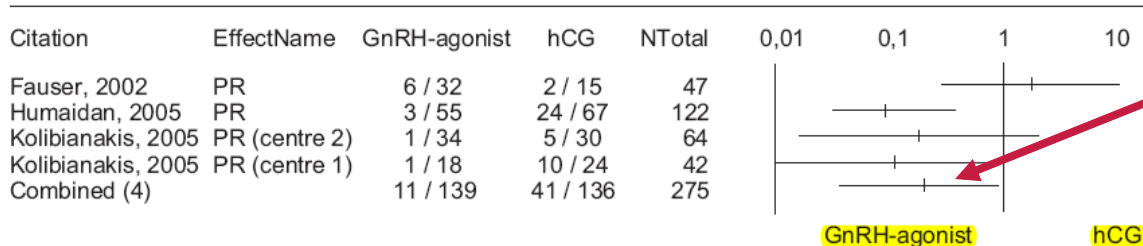
### GnRH agonist for triggering final oocyte maturation in the GnRH antagonist ovarian hyperstimulation protocol: a systematic review and meta-analysis

G.Griesinger<sup>1,3</sup>, K.Diedrich<sup>1</sup>, P.Devroey<sup>2</sup> and E.M.Kolibianakis<sup>2</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, University Clinic of Schleswig-Holstein, Campus Luebeck, Luebeck, Germany and <sup>2</sup>Centre of Reproductive Medicine, Dutch Speaking, Brussels Free University, Brussels, Belgium

<sup>3</sup>To whom correspondence should be addressed at: Ratzeburger Allee 160, 23538 Luebeck.  
E-mail: georg.griesinger@frauenklinik.uni-luebeck.de

#### Pregnancy rate per randomised patient



- ❑ 23 papers published
- ❑ Only 3/23 meet criteria for meta-analysis (RCT)

#### Agonist versus hCG Trigger

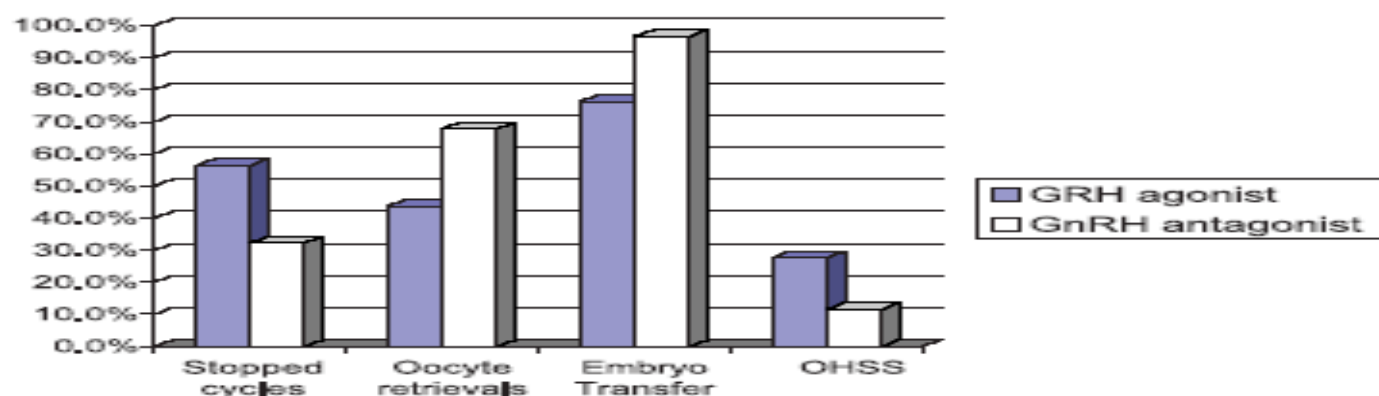
- ❑ No diff in no. oocytes, fert rate, or embryo score
- ❑ No OHSS either gp BUT

**? Lower preg rate** with agonist trigger  
(? Lut support issue)

# Comparison of GnRH agonists and antagonists in assisted reproduction cycles of patients at high risk of ovarian hyperstimulation syndrome

G.Ragni<sup>1,4</sup>, W.Vegetti<sup>1</sup>, A.Riccaboni<sup>1</sup>, B.Engl<sup>2</sup>, C.Brigante<sup>3</sup> and P.G.Crosignani<sup>1</sup>

fer) were obtained. **CONCLUSIONS:** Although this study presents some limitations owing to the use of historical controls, our data show a favourable effect of GnRH antagonists in reducing the incidence of OHSS and the number of assisted fertilization cycles cancelled because of the risk of OHSS in high responder patients. As a consequence, GnRH antagonist plus gonadotrophin administration could also increase the percentage of oocyte

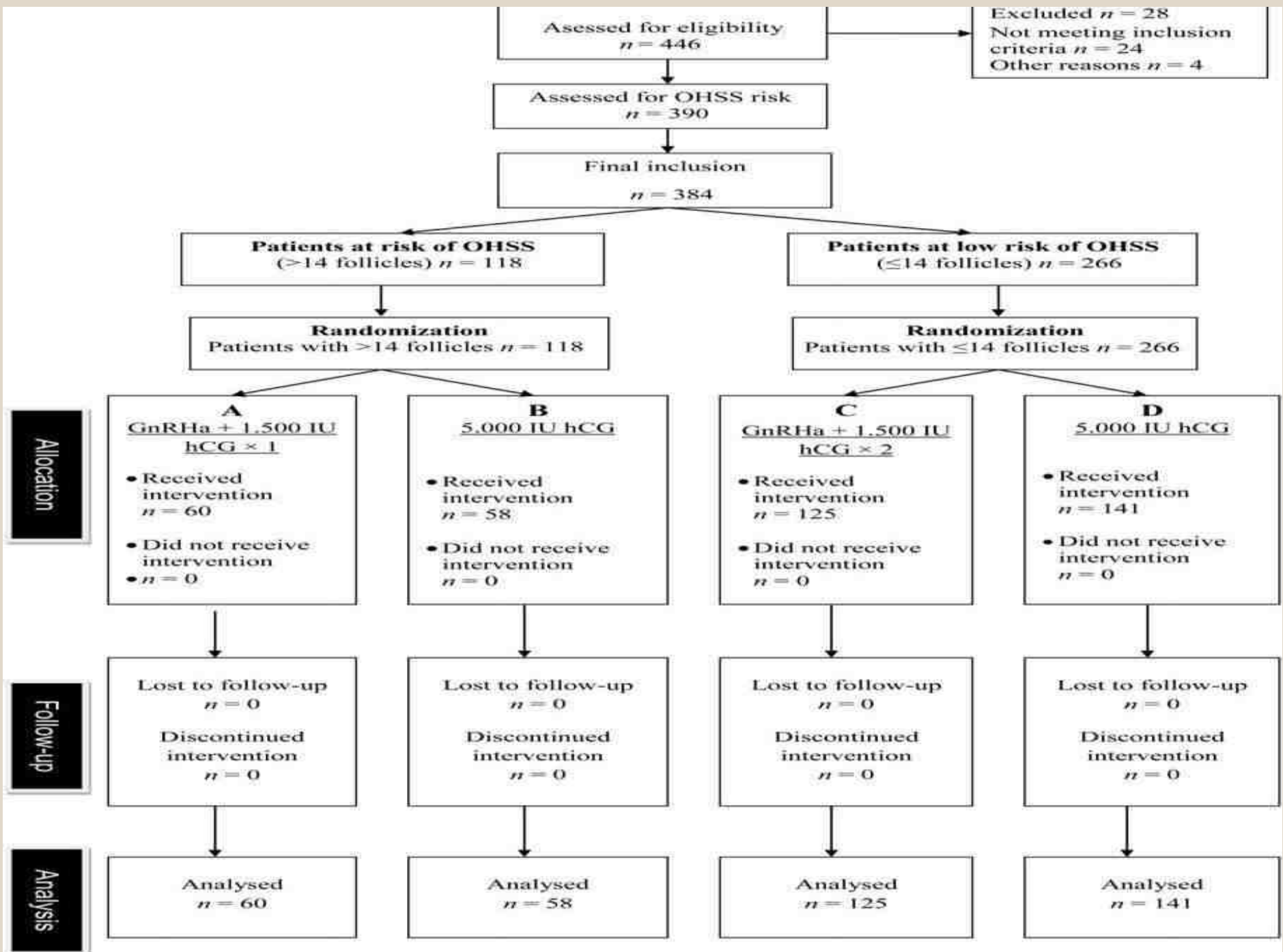


**Figure 1.** Comparison of stopped cycles, oocyte retrieval, embryo transfer and incidence of OHSS between the two treatment cycles (filled bars, GnRH agonist; empty bars, GnRH antagonist). Values are expressed in percentages; differences were statistically significant for stopped cycles and oocyte retrieval (both  $P < 0.001$ ), embryo transfer ( $P < 0.003$ ) and OHSS ( $P < 0.006$ ).

# **GnRHa trigger and individualized luteal phase hCG support according to ovarian response to stimulation: two prospective randomized controlled multi-centre studies in IVF patients**

**P. Humaidan<sup>1,2,\*</sup>, N.P. Polyzos<sup>3</sup>, B. Alsbjerg<sup>1</sup>, K. Erb<sup>4</sup>, A.L. Mikkelsen<sup>5</sup>, H.O. Elbaek<sup>6</sup>, E.G. Papanikolaou<sup>7</sup>, and C.Y. Andersen<sup>8</sup>**





# Luteal Antagonist

## Management of severe early ovarian hyperstimulation syndrome by re-initiation of GnRH antagonist



Dr. Tifon G. Lainas

Tifon G. Lainas studied medicine at the University of Athens, Greece. He obtained his MD degree in 1973 and his PhD in 1985 also from the University of Athens. He served as Senior Registrar at Elena Venizelou Maternity Hospital from July 1979 to May 1987. He is Clinical Director at Eugonia ART Unit in Athens, Greece. His research interests are various, including optimization of ovarian stimulation protocols, ovarian hyperstimulation syndrome, reproductive endocrinology and reproductive endoscopic surgery.

Lainas TG RBM online 2009)

Metformin reduces risk of ovarian hyperstimulation syndrome in patients with PCO in ART cycles : a randomized, controlled trial

- PCOS
- Long Protocol
- Metformin
- 150 U/dx5 Step Down protocol

Palomba S et al. 2011 December Fertil Steril

# Dual trigger of oocyte maturation with gonadotropin-releasing hormone agonist and low-dose human chorionic gonadotropin to optimize live birth rates in high responders

Daniel Griffin, M.D., Claudio Benadiva, M.D., Nicole Kummer, M.D., Tara Budinetz, D.O., John Nulsen, M.D., and Lawrence Engmann, M.D.

# PREVENTION OHSS

## *Cryopreservation of all embryos*

**OHSS is more common and severe with pregnancy due to hCG-induced ovarian stim.**

## THE DATA

- ✓ Cochrane review found insufficient evidence  
*Amso NN, D'Angelo (2002) Hum Reprod*
- ✓ As with all methods, it may reduce but not eliminate OHSS  
*Queenan Jr JT (1997) Hum Reprod*
- ✓ Cryo = Coasting *Benavida C et al. (1997) F&S*
- ✓ Cryo = IVF albumin *Shaker A (1996) F&S*

# PREVENTION OHSS

## *IV Albumin prophylaxis*

### Intravenous albumin does not prevent moderate-severe ovarian hyperstimulation syndrome in high-risk IVF patients: a randomized controlled study

José Bellver<sup>1</sup>, Elkin A. Muñoz, Agustín Ballesteros, Sérgio Reis Soares, Ernesto Bosch, Carlos Simón, Antonio Pellicer and José Remohí

Department of Infertility, Instituto Valenciano de Infertilidad (IVI), Plaza de la Policía Local 3, 46015, Valencia, Spain

<sup>1</sup>To whom correspondence should be addressed at: Instituto Valenciano de Infertilidad, Plaza de la Policía Local 3, 46015, Valencia, Spain. E-mail: jbellverp@sego.es

**Human Reprod (2003) 18: 2283-2288**

#### Largest/best RCT (976 patients)

- ☐ Patients at high risk OHSS (20 eggs)
- ☐ 40 g albumin at VOR versus nothing x 30 minutes

#### CONCLUSIONS

- ☐ No benefit of albumin
- ☐ Risks (prions, virus/CJD)

**Table IV.** Comparison of clinical evolution of albumin and control groups in severe ovarian hyperstimulation syndrome (OHSS) cases ( $n = 46$ )

Parameter	Albumin group ( $n = 23$ )	Control group ( $n = 23$ )	<i>P</i>
Paracentesis ( $n$ )	21	20	NS
No. of paracenteses per patient	1.3 (0.8)	1.9 (1.8)	NS
Hospital admission ( $n$ )	7	5	NS
Complications ( $n$ )	3 <sup>a</sup>	2 <sup>b</sup>	NS
Days from oocyte retrieval to beginning of OHSS	4.4 (4.0)	4.5 (3.3)	NS
Duration of OHSS (days)	8.4 (5.8)	10 (6.9)	NS

Values are mean (SD) unless otherwise indicated.

<sup>a</sup>Two adult respiratory distress syndromes and one pleural effusion.

<sup>b</sup>One thromboembolic event and one cerebrovascular accident.

# **Dopamine Agonist Cabergoline Reduces Hemoconcentration and Ascites in Hyperstimulated Women Undergoing Assisted Reproduction**

**The Journal of Clinical Endocrinology & Metabolism 92(8):2931–2937  
Copyright © 2007 by The Endocrine Society  
doi: 10.1210/jc.2007-0409**

# Outpatient paracentesis

Smith LP, Hacker MR, Alper MM. Fertil Steril (In Press)

## **STUDY RESULTS**

- ❑ 146 outpatient paracentesis (96 patients)
  - ❑ 50 pts (52%) → Only one paracentesis
  - ❑ 35 pts (36%) → paracentesis #2
  - ❑ 8 pts (8%) → paracentesis #3
  - ❑ 3 pts (3%) → paracentesis #4
  - ❑ 1 pt (1%) → paracentesis #5
- ❑ Volume of fluid removed
  - ❑ Mean: 2,155 ml
  - ❑ Range: 500-4,500 ml



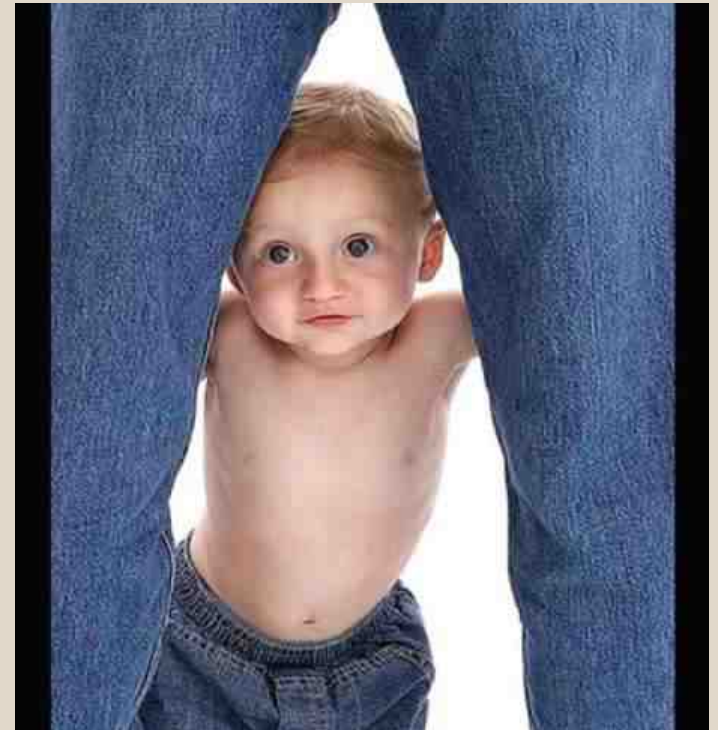
# Prevention of OHSS

1. Coast when E2 levels very high or too many medium range follicles
2. Always give standard dose of hCG (Ovidrel®) - Never cancel cycle irrespective of E2
3. No IV albumin prophylaxis
4. Cryo-all if patient is symptomatic on day of ET
5. Aggressive **outpatient vaginal paracentesis** for moderate-severe symptoms.

# SUMMARY

## Prevention of OHSS

- ❑ **No** universally agreed upon best method to prevent OHSS
  - ❑ **Coasting** the most common method used, followed by **cryopreservation** of embryos
  - ❑ Consider outpatient paracentesis early!
- ❑ Data limited in RCT for all preventative measures
  - ❑ Difficult to prove on method superior due to **low incidence** of severe OHSS



# Summary points

- ✓ Risk factors
- ✓ Prevention
- ✓ Clinical features
- ✓ Outpatient Management

1. OHSS is a potentially life threatening complication
2. Estradiol levels alone not highly predictive
3. Beware of risk factors
4. The only method to completely prevent OHSS is cycle cancellation.
5. No good data on best method to prevent OHSS (due to ↓ incidence)
6. Not totally preventable although coasting and freezing embryos are most commonly used.
7. Outpatient paracentesis prevents hospitalizations.

# OHSS PREVENTION STRATEGIES

## SUMMARY

### Effective

- ☐ Low dose HMG
- ☐ GnRH ant
- ☐ Metformin (PCO)
- ☐ IVM
- ☐ Low dose HCG
- ☐ GnRHag to trigger ovulation
- ☐ Coasting
- ☐ HES
- ☐ Dopamine agonists

### Not Effective/Doubtful

- ☐ Recombinant LH
- ☐ IV Albumin
- ☐ Cryopreservation

Thank you for your patience...

